Part 1—Administrative

CHAPTER 1
SCOPE AND ADMINISTRATION

User note:

About this chapter: Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—General Provisions (Sections 101–102) and Part 2—Administrative Provisions (Sections 103–113). Section 101 identifies which buildings and structures come under its purview and references other ICC codes as applicable. This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

PART 1—GENERAL PROVISIONS

SECTION 101
SCOPE AND GENERAL REQUIREMENTS

101.1 Title. These regulations shall be known as the 2018 International Fire Code with Phoenix Amendments, hereinafter referred to as “this code”, or the Phoenix Fire Code.

101.2 Scope. The provisions of this code shall supplement all laws relating to fire safety and shall apply to all persons without restriction, unless specifically exempted. This code establishes regulations affecting or relating to structures, facilities, processes, premises and safeguards regarding all of the following:

1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices.
2. Conditions hazardous to life, property or public welfare in the occupancy of structures or premises.
3. Fire hazards in the structure or on the premises from occupancy or operation.
4. Matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems.
5. Conditions affecting the safety of fire fighters and emergency responders during emergency operations.

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted. Appendices A, B, D and N are adopted and are considered to be part of this code.

101.2.2 Policies. A diamond () in the margin indicates that a City of Phoenix policy has been created to clarify the application of this code, in accordance with Section 104.7.

101.3 Intent. The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, and premises, and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

101.4 Severability. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

101.5 Validity. In the event any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions hereof, which are determined to be legal; and it shall be presumed that this code would have been adopted without such illegal or invalid parts or provisions.

SECTION 102
APPLICABILITY

102.1 Construction and design provisions. The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions that, in the opinion of the fire code official, constitute a distinct hazard to life or property.
4. Existing structures, facilities and conditions where required in Chapter 11.

102.2 Administrative, operational and maintenance provisions. The administrative, operational and maintenance provisions of this code shall apply to:

1. Conditions and operations arising after the adoption of this code.
2. Existing conditions and operations.

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

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Exception: Where approved by the fire code official, a change of occupancy shall be permitted without complying with the requirements of this code, the Phoenix Building Code and the International Existing Building Code, provided that the new or proposed use or occupancy is less hazardous, based on life and fire risk, in accordance with the Tarver Ordinance and Table 903.1.5.

102.4 Application of building code. The design and construction of new structures shall comply with the International Building Code, and any alterations, additions, changes in use or changes in structures required by this code, which are within the scope of the International Building Code, shall be made in accordance therewith.

[A] 102.5 Application of residential code. Where structures are designed, constructed in accordance with the International Building Code the provisions of this code shall apply as follows:

1. Construction and design provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies. Where interior or exterior systems or devices are installed, construction permits required by Section 105.7 of this code shall apply.

2. Administrative, operational and maintenance provisions of this code shall apply.

[A] 102.6 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local jurisdiction as historic buildings where such buildings or structures do not constitute a distinct hazard to life or property. Fire protection in designated historic buildings shall be provided with an approved fire protection plan as required in Section 1103.1.1.

[A] 102.7 Referenced codes and standards. The codes and standards referenced in this code shall be those that are listed in Chapter 80, and such codes and standards shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 102.7.1 and 102.7.2.

102.7.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

102.7.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

102.7.3 Fire protection system conflicts. Where a conflict between a general requirement and a specific requirement for all fire protection systems, the most restrictive requirement shall be applicable.

102.8 Subjects not regulated by this code. Where applicable standards or requirements are not set forth in this code, or are contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards, as approved, shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the fire code official to determine compliance with codes or standards for those activities or installations within the fire code official’s jurisdiction or responsibility.

102.9 Matters not provided for. Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, that are not specifically provided for by this code, shall be determined by the fire code official.

102.10 Conflicting provisions. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

102.11 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

102.12 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

PART 2—ADMINISTRATIVE PROVISIONS

SECTION 103
DIVISION OF FIRE PREVENTION

103.1 General. The department of fire prevention is established within the jurisdiction under the direction of the fire code official. The function of the department shall be the implementation, administration and enforcement of the provisions of this code.

103.2 Appointment. The fire code official shall be appointed by the chief appointing authority the jurisdiction; and the fire code official shall not be removed from office except for cause and after full opportunity to be heard on specific and relevant changes by and before the appointing authority.

103.3 Deputies. In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the fire code official shall have the authority to appoint a deputy fire code official, other related technical officers, inspectors and other employees.

103.4 Liability. The fire code official and other individuals charged by the fire chief with the control or extinguishment of any fire, the enforcement of this code or any other official duties, acting in good faith and without malice in the discharge of their duties, shall not thereby be rendered civilly or criminally liable personally for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of their duties.
103.4.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representatives of the jurisdiction until the final termination of the proceedings. The fire code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.

SECTION 104
GENERAL AUTHORITY AND RESPONSIBILITIES
104.1 General. The fire code official is hereby authorized to enforce the provisions of this code. The fire code official shall have the authority to render interpretations of this code. The fire code official shall have the authority to adopt policies, procedures, rules and regulations in order to clarify the application of its provisions. Such interpretations, policies, procedures, rules and regulations shall be in compliance with the intent and purpose of this code. Such policies, procedures, rules and regulations shall not have the effect of waiving requirements specifically provided for in this code.

Notice of intention to adopt proposed additions or revisions to the regulations shall be published in one issue of a newspaper published in the City of Phoenix, 30 calendar days before becoming effective. The notice shall state the substance of the proposed additions or revisions. If the fire code official receives, within 30 calendar days of the publication date, a written request for a public hearing, the fire code official shall arrange within 15 calendar days of such request a hearing before the Fire Safety Advisory Board.

Any person who wishes to be heard concerning any adopted rule or regulation may make formal application for a hearing before the Fire Safety Advisory Board. See Section 108.

A minimum of one certified Phoenix copy of such rules and regulations shall be filed with the city clerk and shall be in effect immediately thereafter.

104.2 Applications and permits. The fire code official is authorized to receive applications, review construction documents and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

104.2.1 Exempt buildings. A federal, state, county agency or municipal corporation may declare itself exempt from the requirements of this code.

104.2.2 Annexation. A building or facility under construction on the effective date of annexation shall be required to secure City building permits and pay fees. From the effective date of annexation, all construction shall conform to the pertinent City construction codes and ordinances.

A building may be allowed to complete the project under the previous authority having jurisdiction and obtain green tags/approvals from that jurisdiction.

Circumstances that would prohibit obtaining City building or fire permits require an appeal.

104.2.3 State fire code. Pursuant to the provisions of Arizona Revised Statute Section 41-2163(A)(2), the City of Phoenix assumes jurisdiction for prescribing and enforcing minimum fire prevention standards within the City of Phoenix, except for state- or county-owned building.

104.3 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the fire code official has reasonable cause to believe that there exists in a building or upon any premises any conditions or violations of this code that make the building or on premises unsafe, dangerous or hazardous, the fire code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon on the fire code official by this code. If such building or premises is occupied, the fire code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the fire code official shall first make a reasonable effort to locate the owner, the owner’s authorized agent or other person having charge or control of the building or premises and request entry. If entry is refused, the fire code official has recourse to every remedy provided by law to secure entry.

104.3.1 Warrant. Where the fire code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to permit entry therein by the fire code official for the purpose of inspection and examination pursuant to this code.

104.4 Identification. The fire code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.5 Notices and tags. The fire code official is authorized to issue such notices or orders as are required to affect compliance with this code in accordance with Sections 110.1 and 110.2. Notices or orders that are given verbally shall be confirmed by service in writing. Signs, tags or seals posted or affixed by the fire code official shall not be mutilated, destroyed or tampered with or removed without authorization from the fire code official.

104.6 Official records. The fire code official shall keep official records as required by Sections 104.6.1 through 104.6.4. Such official records shall be retained for not less than 5 years or for as long as the structure or activity to which such records relate remains in existence, unless otherwise provided by other regulations.

104.6.1 Approvals. A record of approvals shall be maintained by fire code official and shall be available for public inspection during business hours in accordance with applicable laws.

104.6.2 Inspections. The fire code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

104.6.3 Fire records. The fire department shall keep a record of fires occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent of such fires and
the damage caused thereby, together with other information as required by the fire code official.

104.6.4 Administrative. Application for modification, alternative methods or materials and the final decision of the fire code official shall be in writing and shall be officially recorded in the records of fire code official.

104.7 Approved materials and equipment. Materials, equipment and devices approved by the fire code official shall be constructed and installed in accordance with such approval.

104.7.1 Material and equipment reuse. Materials, equipment and devices shall not be reused or reinstalled unless such elements have been reconditioned, tested and placed in good and proper working condition and approved.

104.7.2 Technical assistance. To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to inspection by the fire code official. The fire code official is authorized to require the owner or owner’s authorized agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official and shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

104.7.3 Special inspection. The fire code official is authorized to require special inspections. The owner, engineer or architect of record acting as the owner’s agent shall employ one or more special inspectors who shall provide inspections. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the fire code official, for inspection of the system installation or modification requiring special inspections.

104.7.3.1 Duties and responsibilities of the special inspector. The special inspector shall observe the work assigned for conformity to the approved design drawings and specifications.

The special inspector shall furnish inspection reports to the fire code official, the engineer or architect of record, and other designated persons. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority and to the fire code official.

The special inspector shall submit a final signed report stating whether the work requiring special inspection is, to the best of the inspector’s knowledge, in conformance to the approved plans and specifications.

104.8 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided that the fire code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.

104.9 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the fire code official finds that the proposed design, is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the fire code official shall respond in writing, stating the reasons why the alternative was not approved.

104.9.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources.

104.9.2 Tests. Where there is insufficient evidence of compliance with the provisions of this code, or evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the fire code official shall have the authority to require tests as evidence of compliance to be made without expense to the jurisdiction. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the fire code official shall approve the testing procedures. Tests shall be performed by an approved agency. Reports of such tests shall be retained by the fire code official for the period required for retention of public records.

104.10 Fire investigations. The fire code official, the fire department or other responsible authority shall have the authority to investigate the cause, origin and circumstances of any fire, explosion or other hazardous condition. Information that could be related to trade secrets or processes shall not be made part of the public record, except as directed by a court of law.

104.10.1 Assistance from other agencies. Police and other enforcement agencies shall have authority to render necessary assistance in the investigation of fires when requested to do so.

104.10.2 Forensic analysis. The fire code official may also require a forensic analysis of the cause of failure by an independent laboratory approved by the fire code official. A written report generated through the forensic analysis will be forwarded to the fire code official for approval and record keeping.

104.11 Authority at fires and other emergencies. The fire chief or officer of the fire department in charge at the scene of a fire or
other emergency involving the protection of life or property, or any part thereof, shall have the authority to direct such operation as necessary to extinguish or control any fire, perform any rescue operation, investigate the existence of suspected or reported fires, gas leaks or other hazardous conditions or situations, or take any other action necessary in the reasonable performance of duty. In the exercise of such power, the fire chief is authorized to prohibit any person, vehicle, vessel or thing from approaching the scene, and is authorized to remove, or cause to be removed or kept away from the scene, any vehicle, vessel or thing that could impede or interfere with the operations of the fire department and, in the judgment of the fire chief, any person not actually and usefully employed in the extinguishing of such fire or in the preservation of property in the vicinity thereof.

104.11.1 Barricades. The fire chief or officer of the fire department in charge at the scene of an emergency is authorized to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation so as to prevent accidents or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

104.11.2 Obstructing operations. Persons shall not obstruct the operations of the fire department in connection with extinguishment or control of any fire, or actions relative to other emergencies, or disobey any lawful command of the fire chief or officer of the fire department in charge of the emergency, or any part thereof, or any lawful order of a police officer assisting the fire department.

104.11.3 Systems and devices. Persons shall not render a system or device inoperative during an emergency unless by direction of the fire chief or fire department official in charge of the incident.

104.12 False and misleading reports. No person shall willfully submit to the Fire Department and any of its members, any false, fraudulent, misleading, or unfounded reports or statements to misrepresent any fact for the purpose of interfering with the fire department or with the intention of misleading any fire department personnel.

104.13 Unauthorized tampering. Signs, tags or seals posted or affixed by the fire code official shall not be mutilated, destroyed, tampered with or removed without authorization from the fire code official.

SECTION 105
PERMITS

105.1 General. Permits shall be in accordance with Sections 105.1.1 through 105.9.

105.1.1 Permits required. A property owner or owner’s authorized agent who intends to conduct an operation or business, or install, move, or modify or remove fire protection systems and equipment that are regulated by this code, or to cause any such work to be performed, shall first make application to the fire code official and obtain the required permit.

105.1.2 Types of permits. There shall be two types of permits as follows:

1. Operational permit. An operational permit allows the applicant to conduct an operation or a business for which a permit is required by Section 105.6 for either:
   1.1. A prescribed period.
   1.2. Until renewed or revoked.

2. Construction permit. A construction permit allows the applicant to install or modify systems and equipment for which a permit is required by Section 105.7 through 105.8.8.

   2.1 Fire protection system permits shall only be issued to current business certificate holders.

105.1.3 Multiple permits for the same location. Where more than one permit is required for the same location, the fire code official is authorized to consolidate such permits into a single permit provided that each provision is listed in the permit.

105.1.4 Emergency Repairs. Where equipment replacements and repairs requiring a permit must be performed in an emergency situation, the permit application shall be submitted, within 72 hours of identifying the emergency, to the fire code official.

105.1.5 Repairs. Application or notice to the fire code official is not required for ordinary repairs to structures, equipment or systems. Such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall any repairs include addition to, alteration of, replacement or relocation of any standpipe, fire protection water supply, automatic sprinkler system, fire alarm system or other work affecting fire protection or life safety.

105.1.5.1 Restoration procedures following a fire, explosion or hazardous materials release. A permit is required to repair damage to a building, premise, storage facility or outdoor area following a fire, explosion or hazardous materials release. All work is subject to inspector’s approval. Additional permits and approved plans may be required.

105.1.6 Annual permit. Instead of an individual construction permit for each alteration to an already approved system or equipment installation, the fire code official is authorized to issue an annual permit on application therefor to any person, firm or corporation regularly employing one or more qualified tradespersons in the building, structure or on the premises owned or operated by the applicant for the permit.

[A] 105.1.6.1 Annual permit records. The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The fire code official shall have access to such records at all times or such records shall be filed with the fire code official as designated.

105.2 Application. Application for a permit required by this code shall be made to the fire code official in such form and detail as prescribed by the fire code official. Applications for permits shall be accompanied by such plans as prescribed by the fire code official.

105.2.1 Refusal to issue permit. If the application for a permit
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describes a use that does not conform to the requirements of this code and other pertinent laws and ordinances, the fire code official shall not issue a permit, but shall return the application to the applicant with the refusal to issue such permit. Such refusal shall, where requested, be in writing and shall contain the reasons for refusal.

105.2.2 Inspection authorized. Before a new operational permit is approved, the fire code official is authorized to inspect the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used to determine compliance with this code or any operational constraints required.

105.2.3 Time limitation of application. An application for a permit for any proposed work or operation shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been diligently prosecuted, or a permit shall have been issued; except that the fire code official is authorized to grant one or more extensions of time for additional periods not exceeding 180 days each.

105.2.4 Action on application. The fire code official shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the construction documents do not conform to the requirements of pertinent laws, the fire code official shall reject such application in writing, stating the reasons therefor. If the fire code official is satisfied that the proposed work or operation conforms to the requirements of this code and laws and ordinances applicable thereto, the fire code official shall issue a permit therefor as soon as practicable.

105.3 Conditions of a permit. A permit shall constitute permission to maintain, store or handle materials; or to conduct processes that produce conditions hazardous to life or property; or to install equipment utilized in connection with such activities; or to install or modify any fire protection system or equipment or any other construction, equipment installation or modification in accordance with the provisions of this code where a permit is required by Section 105.6, 105.7, or 105.8. All work done on new and existing systems shall meet the requirements of the current adopted codes and standards. Such permission shall not be construed as authority to violate or cancel the provisions or any other ordinance of the jurisdiction.

[A] 105.3.1 Expiration. An operational permit shall remain in effect until reissued, renewed or revoked, or for such a period of time as specified in the permit.

Construction permits shall automatically become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized by such permit is suspended or abandoned for a period of 180 days after the time the work is commenced. Before such work recommences, a new permit shall be first obtained and the fee to recommence work, if any, shall be one-half the amount required for a new permit for such work, provided that changes have not been made and will not be made in the original construction documents for such work, and provided further that such suspension or abandonment has not exceeded one year. Permits are not transferable and any change in occupancy, operation, use, hazard, tenancy or ownership shall require that a new permit be issued.

[A] 105.3.2 Extensions. A permittee holding an unexpired permit shall have the right to apply for an extension of the time within which the permittee will commence work under that permit where work is unable to be commenced within the time required by this section for good and satisfactory reasons. The fire code official is authorized to grant, in writing, one or more extensions of the time period of a permit for periods of not more than 180 days each. Such extensions shall be requested by the permit holder in writing and justifiable cause demonstrated.

[A] 105.3.3 Occupancy prohibited before approval. The facility, building or structure shall not be occupied prior to the building official issuing a certificate of occupancy permit and conducting associated inspections indicating the applicable provisions of this code have been met.

Exception: It shall be lawful to occupy portions of buildings or structures under a Temporary Certificate of Occupancy issued by the City of Phoenix, subject to the conditions stated therein.

105.3.3.1 Temporary Certificate of Occupancy. In accordance with Section 110 of the International Building Code the fire code official, in conjunction with the building official, is authorized to approve the conditions necessary to occupy the premises or portion thereof before the entire work or operations on the premises is completed. When issued such portion or portions shall be occupied safely prior to full completion or installation of equipment and operations without endangering life or public welfare.

[A] 105.3.4 Conditional permits. Where permits are required and on the request of a permit applicant, the fire code official is authorized to issue a conditional permit to occupy the premises or portion thereof before the entire work or operations on the premises is completed, provided that such portion or portions will be occupied safely prior to full completion or installation of equipment and operations without endangering life or public welfare. The fire code official shall notify the permit applicant in writing of any limitations or restrictions necessary to keep the permit area safe. The holder of a conditional permit shall proceed only to the point for which approval has been given, at the permit holder’s own risk and without assurance that approval for the occupancy or the utilization of the entire premises, equipment or operations will be granted.

[A] 105.3.5 Posting the permit. Issued permits shall be kept on the premises designated therein at all times and shall be readily available for inspection by the fire code official.

[A] 105.3.6 Compliance with code. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be
valid. The issuance of a permit based on construction documents and other data shall not prevent the fire code official from requiring the correction of errors in the construction documents and other data. Any addition to or alteration of approved construction documents shall be approved in advance by the fire code official, as evidenced by the issuance of a new or amended permit.

105.3.7 Information on the permit. The fire code official shall issue all permits required by this code on an approved form furnished for that purpose. The permit shall contain a general description of the operation or occupancy and its location and any other information required by the fire code official. Issued permits shall bear the signature of the fire code official or other approved legal authorization.

105.3.8 Validity of permit. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinances of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents, operational documents and other data shall not prevent the fire code official from requiring correction of errors in the documents or other data.

105.4 Construction documents. Construction documents shall be in accordance with this Sections 105.4.1 through 105.4.6.

105.4.1 Submittals. Construction documents and supporting data shall be submitted in two or more sets with each application for a permit and in such form and detail as required by the fire code official. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

Exception: The fire code official is authorized to waive the submission of construction documents and supporting data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that review of construction documents is not necessary to obtain compliance with this code.

105.4.1.1 Examination of documents. The fire code official shall examine or cause to be examined the accompanying construction documents and shall ascertain by such examinations whether the work indicated and described is in accordance with the requirements of this code.

[A] 105.4.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are allowed to be submitted where approved by the fire code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations as determined by the fire code official. Two sets of accurate and legible fire protection system component plans shall be submitted to the fire code official for approval, in the following scale:

Site Plans 1" = 50'
Fire Protection Systems ¼" = 1' Other scales may be used with prior approval from the fire code official. Electronic submittals require a bar graph scale on each page.

105.4.2.1 Fire protection system shop drawings. Shop drawings for the fire protection system(s) shall be submitted to indicate compliance with this code and the construction documents and shall be approved prior to the start of installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

[A] 105.4.2.2 Life Safety Report. A Life Safety Report, providing a description of the fire protection in the building, shall be prepared by an Arizona professional prior to submitting construction drawings for: high-rise buildings; covered mall buildings; buildings containing atriums, storage height over 40 feet (12 192 mm) or Group F and S occupancies over 500,000 square feet (464 512 m2); and other structures as determined by the fire code or building official.

This description shall include the basic concepts used for suppression, alarm, notification, egress, fire resistive assemblies, smoke control, and other related systems, as well as the coordination of those systems. Additional fire protection and/or life safety systems including hose connections may be required by the fire code official. Upon completion of the project, a copy of the approved documentation shall be maintained, including any changes and updates, both at the site and with the Fire Department.

105.4.3 Applicant responsibility. It shall be the responsibility of the applicant to ensure that the construction documents include all of the fire protection requirements and the shop drawings are complete and in compliance with the applicable codes and standards.

[A] 105.4.4 Approved documents. Construction documents approved by the fire code official are approved with the intent that such construction documents comply in all respects with this code. Review and approval by the fire code official shall not relieve the applicant of the responsibility of compliance with this code.

[A] 105.4.4.1 Phased approval. The fire code official is authorized to issue a permit for the construction of part of a structure, system or operation before the construction documents for the whole structure, system or operation have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for parts of a structure, system or operation shall proceed at the holder’s own risk with the building operation and without assurance that a permit for the entire structure, system or operation will be granted.

[A] 105.4.5 Amended construction documents. Work shall be in accordance with the approved construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.
SCAPE AND ADMINISTRATION

[A] 105.4.6 Retention of construction documents. One set of construction documents shall be retained by the fire code official for a period of not less than 180 days from the completion of the permitted work, or as required by state or local laws. One set of approved construction documents shall be returned to the applicant and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress.

[A] 105.5 Revocation of a permit. The fire code official is authorized to revoke a permit issued under the provisions of this code when it is found by inspection or otherwise that there has been a false statement or misrepresentation as to the material facts in the application or construction documents on which the permit or approval was based, including, but not limited to, any one of the following:

1. The permit is used for a location or establishment other than that for which it was issued.
2. The permit is used for a condition or activity other than that listed in the permit.
3. Conditions and limitations set forth in the permit have been violated.
4. There have been any false statements or misrepresentations as to the material fact in the application for permit or plans submitted or a condition of the permit.
5. The permit is used by a different person or firm than the name for which it was issued.
6. The permittee failed, refused or neglected to comply with orders or notices duly served in accordance with the provisions of this code within the time provided therein.
7. The permit was issued in error or in violation of an ordinance, regulation or this code.
8. The permit holder’s business certificate has expired.

105.5.1 Work without a permit. Operating or starting work without the applicable Fire Prevention permit is strictly prohibited. A penalty equal to 300 percent of the cost of the required construction permit and inspection fees shall be assessed for the work.

105.6 Required operational permits. The fire code official is authorized to issue operational permits for the operations set forth in Sections 105.6.1 through 105.6.51.15.

Permit applications for bonfires, fire performers, outdoor assembly events, vehicle displays, tents and other membrane structures, fireworks and trade shows and exhibitions shall be submitted not fewer than 10 business days in advance of the event. This does not include City of Phoenix holidays. Permit applications submitted fewer than 10 business days in advance of the event shall be assessed a penalty fee of $25 per day. If a permit is denied, the applicant has the right to file for an appeal to the Fire Marshal in accordance with Section 104.6.4.

105.6.1 Aerosol products. An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products in excess of 500 pounds (227 kg) net weight.

105.6.2 Amusement buildings. An operational permit is required to operate a special amusement building.

105.6.3 Aviation facilities. An operational permit is required to use a Group H or Group S occupancy for aircraft servicing or repair and aircraft fuel-servicing vehicles. Additional permits required by other sections of this code include, but are not limited to, hot work, hazardous materials and flammable or combustible finishes.

105.6.4 Carnivals and fairs. An operational permit is required to operate a carnival or fair. See 105.6.36, Outdoor assembly event.

105.6.5 Cellulose nitrate film. An operational permit is required to store, handle or use cellulose nitrate film in a Group A occupancy.

105.6.6 Combustible dust-producing operations. An operational permit is required to operate a grain elevator, flour starch mill, feed mill, or a plant pulverizing aluminum, coal, cocoa, spices or sugar, or other operations producing combustible dusts as defined in Chapter 2.

105.6.7 Combustible fibers. An operational permit is required for the storage and handling of combustible fibers in quantities greater than 100 cubic feet (2.8 m³).

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

Exception: Vehicles equipped for and using compressed gas as a fuel for propelling the vehicle.

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

For SI: 1 cubic foot = 0.02832 m³.

105.6.9 Covered and open mall buildings. An operational permit is required for:

1. The placement of retail fixtures and displays, concession
equipment, displays of highly combustible goods and similar items in the mall.
2. The display of liquid or gas-fired equipment in the mall.
3. The use of open-flame or flame-producing equipment in the mall.

105.6.10 Cryogenic fluids. An operational permit is required to produce, store, transport on site, use, handle or dispense cryogenic fluids in excess of the amounts listed in Table 105.6.10.

**Exception:** Permits are not required for vehicles equipped for and using cryogenic fluids as a fuel for propelling the vehicle or for refrigerating the lading.

<table>
<thead>
<tr>
<th>TYPE OF CRYOGENIC FLUID</th>
<th>INSIDE BUILDING (gallons)</th>
<th>OUTSIDE BUILDING (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable</td>
<td>More than 1</td>
<td>60</td>
</tr>
<tr>
<td>Inert</td>
<td>60</td>
<td>500</td>
</tr>
<tr>
<td>Oxidizing (includes oxygen)</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Physical or health hazard not indicated above</td>
<td>Any Amount</td>
<td>Any Amount</td>
</tr>
</tbody>
</table>

For SI: 1 gallon = 3.785 L.

105.6.11 Cutting and welding. An operational permit is required to conduct cutting or welding operations within the jurisdiction.

105.6.12 Dry cleaning. An operational permit is required to engage in the business of dry cleaning or to change to a more hazardous cleaning solvent used in existing dry cleaning equipment.

105.6.13 Exhibits and trade shows. An operational permit is required to operate exhibits and trade shows.

**Exception:** Exhibits less than 100 aggregate square feet (9290 mm²).

105.6.14 Explosives. An operational permit is required for the manufacture, storage, handling, sale or use of any quantity of explosives, explosive materials, fireworks or pyrotechnic special effects within the scope of Chapter 56.

**Exception:** Storage in Group R-3 occupancies of smokeless propellant, black powder and small arms primers for personal use, not for resale and in accordance with Section 5606.

105.6.15 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 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.

105.6.16 Flammable and combustible liquids. An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of flammable or combustible liquids. This requirement shall not apply to the offsite transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
   2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the fire code official, would cause an unsafe condition.
   2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.
5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground flammable or combustible liquid tank.
8. To change the type of contents stored in a flammable or combustible liquid tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine flammable or combustible liquids.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor
vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or, where required by the fire code official, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707.

12. To conduct pump-out of flammable and/or combustible liquid tanks.

13. To slurry fill and underground tank.

14. To abandon an underground or aboveground tank.

105.6.17 Floor finishing. An operational permit is required for floor finishing or surfacing operations exceeding 350 square feet (33 m²) using Class I or Class II liquids. Buildings under construction or renovation with a valid construction permit do not require a permit to conduct this activity. The activity shall be performed in accordance with this section.

105.6.18 Fruit and crop ripening. An operational permit is required to operate a fruit or crop-ripening facility or conduct a fruit-ripening process using ethylene gas.

105.6.19 Fumigation and insecticidal fogging. An operational permit is required to operate a business of fumigation or insecticidal fogging, and to maintain a room, vault or chamber in which a toxic or flammable fumigant is used.

105.6.20 Hazardous materials. An operational permit is required to store, transport on site, dispense, use or handle hazardous materials in excess of the amounts listed in Table 105.6.20.

<table>
<thead>
<tr>
<th>TABLE 105.6.20</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERMIT AMOUNTS FOR HAZARDOUS MATERIALS</td>
</tr>
<tr>
<td>TYPE OF MATERIAL</td>
</tr>
<tr>
<td>Combustible liquids</td>
</tr>
<tr>
<td>Corrosive materials</td>
</tr>
<tr>
<td>Gases</td>
</tr>
<tr>
<td>Liquids</td>
</tr>
<tr>
<td>Solids</td>
</tr>
<tr>
<td>Explosive materials</td>
</tr>
<tr>
<td>Flammable materials</td>
</tr>
<tr>
<td>Gases</td>
</tr>
<tr>
<td>Liquids</td>
</tr>
<tr>
<td>Solids</td>
</tr>
<tr>
<td>Highly toxic materials</td>
</tr>
<tr>
<td>Gases</td>
</tr>
<tr>
<td>Liquids</td>
</tr>
<tr>
<td>Solids</td>
</tr>
</tbody>
</table>

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 20 gallons where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 20 gallons or less, when such materials are necessary for maintenance purposes, operation, or sanitation of equipment.

b. 200 pounds where Table 5003.1.1(1) Note k applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 200 pounds or less when such materials are necessary for maintenance purposes, operation, or sanitation of equipment.
105.6.21 HMP facilities. An operational permit is required to store, handle or use hazardous production materials.

105.6.22 High-piled storage. An operational permit is required to use a building or portion thereof with more than 500 square feet (46 m²), including aisles, of high piled storage.

105.6.23 Hot work operations. An operational permit is required for hot work including, but not limited to:

1. Public exhibitions and demonstrations where hot work is conducted.
2. Use of portable hot work equipment inside a structure.
   Exception: Work that is conducted under a construction permit, or work conducted at one-and two-family dwellings.
3. Fixed-site hot work equipment, such as welding booths.
4. Hot work conducted within a wildfire risk area.
5. Application of roof coverings with the use of an open-flame device.
6. Where approved, the fire code official shall issue a permit to carry out a hot work program. This program allows approved personnel to regulate their facility’s hot work operations. The approved personnel shall be trained in the fire safety aspects denoted in this chapter and shall be responsible for issuing permits requiring compliance with the requirements found in Chapter 35. These permits shall be issued only to their employees or hot work operations under their supervision.

105.6.24 Industrial ovens. An operational permit is required for operation of industrial ovens regulated by Chapter 30.

105.6.25 Lumber yards and woodworking plants. An operational permit is required for the storage or processing of lumber exceeding 100,000 board feet (8333³ mm).

105.6.26 Liquid-fueled or gaseous-fueled or electric vehicles or equipment in buildings. An operational permit is required to display, or demonstrate liquid, or gaseous - or fueled vehicles or electric vehicles or equipment in buildings.

   Exception: Automobile dealerships.

105.6.27 LP-gas. An operational permit is required for:

1. Storage and use of LP-gas.
   Exceptions:
   1. A permit is not required for individual containers with a 500-gallon (1893 L) water capacity or less or, multiple container systems having an aggregate quantity not exceeding 500 gallons (1893 L),
   2. Containers serving occupancies in Group R-3.
   3. Vapor service less than 2,000 gallons (7570 L) water capacity.
2. Operation of cargo tankers that transport LP-gas.
3. Flare off.

105.6.28 Magnesium. An operational permit is required to melt, cast, heat treat or grind more than 10 pounds (4.54 kg) of magnesium.

105.6.29 Miscellaneous combustible storage. An operational permit is required to store in any building or on any premises in excess of 2,500 cubic feet (71 m³) gross volume of combustible empty packing cases, boxes, barrels or similar containers, combustible pallets, rubber tires, rubber, cork or similar combustible material.

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

105.6.31 Motor fuel-dispensing facilities. An operational permit is required for the operation of automotive, marine and fleet motor fuel-dispensing facilities.

105.6.32 Open burning or bonfire. An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be adhered to.

   Exception: Recreational fires.

105.6.33 Open flames and torches. An operational permit is required to remove paint with a torch; or to use a torch or open-flame device in a wildfire risk area.

105.6.34 Open flames, candles or flame performers. An operational permit is required to use open flames or candles in connection with fire performers, or assembly areas, dining areas of restaurants or drinking establishments.

105.6.35 Organic coatings. An operational permit is required for any organic-coating manufacturing operation producing more than 1 gallon (4 L) of an organic coating in one day.

[a] 105.6.36 Outdoor assembly event. An operational permit is required to conduct an outdoor assembly event where planned attendance exceeds 1,000 persons, or when 50 or more persons are in a confined area.

105.6.37 Places of assembly. An operational permit is required to operate a place of assembly.

105.6.38 Plant extraction systems. An operational permit is required to use plant extraction systems.

105.6.39 Private fire hydrants. An operational permit is required for the removal from service, use or operation of private fire hydrants.

   Exception: A permit is not required for private industry with trained maintenance personnel, private fire brigade or fire departments to maintain, test and use private hydrants.

105.6.40 Pyrotechnic special effects material. An operational permit is required for use and handling of pyrotechnic special effects material.

105.6.41 Pyroxylin plastics. An operational permit is required for storage or handling of more than 25 pounds (11 kg) of cellulose nitrate (pyroxylin) plastics, and for the assembly or manufacture of articles involving pyroxylin plastics.

105.6.42 Refrigeration equipment. An operational permit is required to operate a mechanical refrigeration unit or system regulated by Chapter 6.

105.6.43 Repair garages. An operational permit is required for operation of repair garages.
105.6.44 Rooftop heliports. An operational permit is required for the operation of a rooftop heliport.

105.6.45 Spraying or dipping. An operational permit is required to conduct a spraying or dipping operation utilizing flammable or combustible liquids, or the application of combustible powders regulated by Chapter 24.

105.6.46 Storage of used, scrap tires and tire byproducts. An operational permit is required to establish, conduct or maintain storage of used or scrap tires and tire byproducts that exceed 2,500 cubic feet (71 m³) of total volume of scrap tires, and for indoor storage of tires and tire byproducts.

105.6.47 Temporary membrane structures and tents. An operational permit is required to operate an air-supported temporary membrane structure, a temporary special event structure or a tent having an area in excess of 800 square feet (74 m²).

Exceptions:
1. Tents used exclusively for recreational camping purposes.
2. Tents open on all sides, which comply with all of the following:
   2.1. Individual tents having a maximum size of 1200 square feet (111 m²).
   2.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 1200 square feet (111 m²) total.
   2.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

105.6.48 Tire-rebuilding plants. An operational permit is required for the operation and maintenance of a tire-rebuilding plant.

105.6.49 Waste handling and recycling operations. An operational permit is required for the operation of wrecking yards, junk yards, waste material-handling facilities, and recycling facilities.

105.6.50 Wood products. An operational permit is required to store chips, hogged material, lumber or plywood in excess of 200 cubic feet (6 m³).

105.6.51 City of Phoenix permits. The fire code official is authorized to issue operational permits for work as set forth in Sections 105.6.51.1 through 105.6.51.14.

105.6.51.1 Agro-industrial and solid biomass facilities. An operational permit is required to store agro-industrial products, chips hogged material, lumber or plywood in excess of 2,500 cubic feet (71 m³).

105.6.51.2 Assisted living facilities. An operational permit to operate an assisted living facility. This includes assisted living homes R-3 (1–5 beds), R-4 (6–10 beds), assisted living centers (11 or more beds), supervisory care and adult foster care.

105.6.51.3 Behavioral healthcare facility, Group I-1. An operational permit is required to operate a behavioral healthcare facility.

105.6.51.4 Commercial daycare facilities. An operational permit is required to operate a commercial daycare facility for children or adults.

105.6.51.5 Correctional facilities. An operational permit is required to operate a correctional facility.

105.6.51.6 Developmentally disabled group care homes. An operational permit is required to operate a developmentally disabled group home.

105.6.51.7 Fireworks, retail sales, indoors. An operational permit is required to conduct retail sales of fireworks indoors.

105.6.51.8 Fireworks, outdoor retail sales. An operational permit is required to conduct retail sales of fireworks outdoors.

105.6.51.9 Fireworks, wholesale sales. An operational permit is required for wholesale sale of consumer fireworks.

105.6.51.10 Fireworks, special effects / theatrical performances.

105.6.51.11 Hospital and nursing homes. An operational permit is required to operate a hospital or nursing home.

105.6.51.12 Indoor temporary place of assembly. An operational permit is required to conduct a public assembly when the means of egress are altered.

105.6.51.13 Juvenile Group Homes. An operational permit is required to operate a juvenile group home.

105.6.51.14 Junk yard, salvage and wrecking operations. An operating permit is required for the operation of wrecking yards, salvage, and junk yards.

105.6.51.15 Temporary indoor building use (TIBU). An operational permit is required to conduct a public assembly event in a building not designed for assembly.

105.7 Required construction permits. The fire code official is authorized to issue construction permits for work as set forth in Sections 105.7.1 through 105.8.8.

105.7.1 Automatic fire-extinguishing systems. A construction permit is required for installation of or modification to an automatic fire-extinguishing system.

105.7.2 Battery systems. A construction permit is required to install stationary storage battery systems regulated by Section 1206.

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

105.7.4 Compressed gases. When the compressed gases in use or storage exceed the amounts listed in Table 105.6.8 a construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a compressed gas system.

Exceptions:
1. Routine maintenance.

2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

105.7.5 Cryogenic fluids. A construction permit is required for installation of or alteration to outdoor stationary cryogenic fluid storage systems where the system capacity exceeds the amounts listed in Table 105.6.10. Maintenance performed in accordance with this code is not considered to be an alteration and does not require a construction permit.

[A] 105.7.6 Emergency responder radio coverage system. A construction permit is required for installation of or modification to emergency responder radio coverage systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.7.7 Fire alarm and detection systems and related equipment. A construction permit is required for installation of or modification to fire alarm and detection systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.7.8 Fire pumps and related equipment. A construction permit is required for installation of or modification to fire pumps and related fuel tanks, jockey pumps, controllers and generators. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.7.9 Flammable and combustible liquids. A construction permit is required:

1. To install, repair or modify a pipeline for the transportation of flammable or combustible liquids.
2. To install, construct or alter tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
3. To install, alter, remove, abandon or otherwise dispose of a flammable or combustible liquid tank.

Exceptions:

1. To temporarily or permanently install a storage tank or above-ground storage tank or pressure vessel for Class I, II or III-A liquids with less than 125 gallons (473 L) outside a building, or 60 gallons (227 L) inside a building.
2. To temporarily or permanently install a storage tank or above-ground storage tank or pressure vessel less than 1,000 gallons (3785 L) for Class III-B liquids.
3. To slurry fill an underground tank.
4. To neutralize the hazard and abandon an underground or above-ground tank.

[A] 105.7.10 Fuel cell power systems. A construction permit is required to install stationary fuel cell power systems.

[A] 105.7.11 Gas detection systems. A construction permit is required for the installation of or modification to gas detection systems. Maintenance performed in accordance with this code is not considered a modification and shall not require a permit.

[A] 105.7.12 Gates and barricades across fire apparatus access roads. A construction permit is required for the installation of or modification to a gate or barricade across a fire apparatus access road.

[A] 105.7.13 Hazardous materials. A construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a storage facility, hazardous materials storage tank, gas cabinet, exhausted enclosure, gas room or chemical drainage and containment area or other area regulated by Chapter 50 where the hazardous materials in use or storage exceed the amounts listed in Table 105.6.20.

Exceptions:

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

Prior to the installation or modification of piping, systems, or tanks containing hazardous materials or the installation or modification of hazardous materials storage rooms, gas cabinets, exhausted enclosures, gas rooms or chemical drainage and containment areas, plans shall be submitted to the fire code official for approval. A registered professional engineer shall seal and sign the construction drawings.

[A] 105.7.14 High-piled combustible storage. A construction permit is required for the installation of or modification to a structure exceeding 500 square feet (46 m²), including aisles, for high-piled combustible storage. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.


Exceptions:

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

[A] 105.7.16 LP-gas. A construction permit is required for installation of or modification to an LP-gas system including:

1. Install, alter or modify LP-gas containers with an aggregate water capacity of 125 gallons (473 L) or more used exclusively for vapor service.
2. Install, alter or modify racks storing 20-pound cylinders for the purpose of conducting an LP-gas exchange program at a specific site.
3. Install, alter or modify LP-gas containers used for liquid transfer service.
4. A permit is required for individual containers less than 125-gallon (473 L) water capacity serving...
occupancies in Group R-3, exclusively for vapor service.

[A] 105.7.17 Motor vehicle repair rooms and booths. A construction permit is required to install or modify a motor vehicle repair room or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.18 Plant extraction systems. A construction permit is required for installation of or modification to plant extraction systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.19 Private fire hydrants. A construction permit is required for the installation or modification of private fire hydrants. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.20 Smoke management systems. Construction permits are required for installation of or alteration to smoke control, smoke removal, smoke and heat vents or smoke exhaust systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.21 Solar photovoltaic power systems. A construction permit is required to install or modify solar photovoltaic power systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.22 Special event structure. A single construction permit is required to erect and take down a temporary special event structure.

[A] 105.7.23 Spraying or dipping. A construction permit is required to install or modify a spray room, dip tank or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.24 Standpipe systems. A construction permit is required for the installation, modification or removal from service of a standpipe system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.7.25 Temporary membrane structures and tents. A construction permit is required to erect an air-supported temporary membrane structure, a temporary stage canopy or a tent having an area in excess of 800 square feet (74).

Exceptions:
1. Tents used exclusively for recreational camping purposes.
2. Funeral tents and curtains, or extensions attached thereto, when used for funeral services.
3. Tents and awnings open on all sides, which comply with all of the following:

3.1. Individual tents shall have a maximum size of 1200 square feet (111 m²).
3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 2000 square feet (111 m²) total.
3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be maintained.

105.8 City of Phoenix required permits. The fire code official is authorized to issue construction permits for work as set forth in Sections 105.8.1 through 105.8.12.

105.8.1 Access, site. A construction permit is required to install or modify premise identification review, fire lanes, identification of fire protection equipment, key boxes, stairwell identification and pedestrian gates.

105.8.1.1 Address directories. A construction permit is required to install or modify address directories.

105.8.1.2 Alternate surface access roads. A construction permit is required to install or modify alternative surface fire apparatus access roads.

105.8.2 Access and special egress control devices. A construction plan review and permit are required for strike card access and magnetic lock devices.

105.8.3 Blasting operations. A construction permit is required to conduct blasting operations using explosives.

105.8.4 Carbon dioxide compressed gas systems, liquefied. To install or modify a liquefied carbon dioxide compressed gas system (beverage dispensing, etc.).

105.8.5 Carbon dioxide compressed gas systems, high pressure. To install or modify a high-pressure carbon dioxide compressed gas system (beverage dispensing, etc.).

105.8.6 Combustible dust collection system. A construction permit is required to install, modify or alter a dust collection system for combustible dust producing operations.

105.8.7 Fire apparatus access roads. A construction permit is required to install or modify fire apparatus access roads.

105.8.8 Firefighter breathing air system. A construction permit is required for installation or modification of a firefighter breathing air system.

105.8.9 Fire protection system removal permits. A removal permit allows the applicant to remove systems or equipment. The fire department shall be notified when any system is to be removed. Replacement of a required system shall be within the same business day. Removal permits shall only be issued to current qualified contractors.

105.8.10 Fire lines & hydrants. A construction permit is required for the installation or modification of fire lines that serve fire protection systems, fire hydrants, or any combination thereof.

105.8.10.1 Stub-outs and water supply. Stub-outs, which are installed and tested as part of the underground
105.8.11 Smoke and heat vents. A construction permit is required to install, alter or modify smoke and heat vents.

105.8.12 Water tank. A construction permit is required to install, alter or modify a static water tank.

105.9 Business certificate to conduct business. The fire code official shall issue a business certificate to conduct business to qualified contractors that install, modify, alter, add to, test, repair provide required inspections or service any fire protection system, sprinkler system, standpipe system, fire main, fire pump or any other fire-extinguishing or detection system, device or appliance. Fire protection system construction permits shall only be issued to current business certificate holders.

105.9.1 Qualified contractors. The following conditions shall be met to become a qualified contractor:

1. A current Arizona Registrar of Contractors license,
2. State of Arizona privilege tax license,
3. The qualified contractor shall be employed by the company to which the permit is issued. Employment verification may be required.
4. The qualified contractor applicant knows and understands the requirements of applicable standards and the code requirements appropriate for the business certificate being issued. This knowledge and understanding shall be determined by one of the following methods:
   4.1. The fire code official may accept a National Institute of Certifying Engineering Technicians (NICET) Level 3 or 4 certification in lieu of an examination by a recognized testing agency in the following fire protection equipment categories: automatic sprinkler systems; underground fire mains and hydrants; fire alarm systems; and special extinguishing systems (ie. Kitchen hoods).
   4.2. The business certificate qualified contractor applicant shall submit and maintain proof to the fire code official that his or her NICET certification is current in the proper fire protection equipment field for which they are applying. The maintenance of the NICET certification shall be a condition of the business certificate qualified contractor. Failure to maintain the required certification shall void business certificate qualified contractor status.
4.3. The fire code official may accept a valid Arizona Board-certified professional engineer. Required certificates must be maintained for the permit to be valid for qualified contractor status.
4.4. The fire code official may accept a successful completion of an exam by a recognized testing agency.

105.9.2 Responsibilities. The business certificate holder qualified contractor shall be responsible for:

1. Ensuring that all installations, modifications, maintenance and testing performed by the company comply with the applicable codes and standards, and
2. Ensuring that the plans submitted for a permit meet minimum requirements of the codes and standards that apply, and
3. Ensuring that the installation is done correctly and completely, and
4. Ensuring that permits are inspected and green tagged by the Phoenix Fire Department, and
5. Notifying Fire Prevention when an employee designated as a competent party is no longer employed by the company, and
6. Is responsible to ensure that all work is done or supervised by the appropriate competent party.
7. Notifying Fire Prevention in writing of any address change within 10 calendar days after such change. Failure of the individual to give such notification of a change of address is grounds for revocation of business certificate.
8. The qualified contractor shall, upon request, produce and show proper identification and the business certificate to anyone for whom that individual seeks to render services or to the fire code official.

Facility self-inspection. Testing, repairing, or servicing of fire protection equipment, devices or appliances may be conducted by facility employees or employees of qualified contractor both of whom are required to have valid qualifications see Section 105.9.1(4).

105.9.3 Business certificate renewal. Business certificates shall be renewed every three years from the date of issuance. When a certificate has expired, all work shall stop until updated qualifications have been submitted to Fire Prevention and a new certificate issued. Renewal shall take place prior to expiration.

Renewal after expiration. Applications for renewal shall be filed in the same manner as a new application for a qualified contractor.

105.9.4 Suspending a qualified contractor business certificate. The following conditions may result in the suspension of a qualified contractor, permit or certificate:

1. A single instance of performing work or an activity without a permit within a two-year period.
2. Three or more documented instances in a two-year period of two or more significant code violations at one construction project, or the completion or covering
105.10 Competent party. A competent party shall possess a valid certificate issued by an approve governmental agency, or other approved organization for the type of system and work performed and remain on-site during installation, modifications, maintenance and testing performed on fire protection systems.

105.10.1 Qualifications. The following conditions shall be met to become a competent party.

1. The competent party shall be employed by, or under contract with a company that is a qualified contractor. Verification may be required.

2. The competent party shall be knowledgeable with and comply with the requirements of applicable standards and the code requirements appropriate for the permit(s) issued.

This knowledge and understanding shall be determined by one of the following methods:

2.1. Successfully passing an examination provided by a recognized testing agency in the category for which they are performing the work.

2.2. The fire code official shall accept a current Arizona Registrar of Contractors license.

2.3. Fire alarm installation may be performed by a factory-trained and certified installer in accordance with NFPA 72.

2.4 Sprinkler installers may have current trade certification for installation and design.

2.5 Other qualifications for design and installation acceptable to the fire code official.

105.10.2 Maintenance. Failure to maintain the required certification shall void the competent party certificate. Competent party certificate holders may not use their certifications when expired. It is the responsibility of the individual to maintain their certifications.

105.11 Certificates of fitness. A certificate of fitness is required by persons who use or handle pyrotechnics materials or blasting materials, systems, devices or appliances.

105.11.1 Qualifications. The applicant shall submit evidence attesting to his or her qualifications and experience required for the type of certificate of fitness for which application has been submitted as follows:

Pyrotechnic Operator, Outdoor Fireworks. Pyrotechnic operators shall be a minimum of 21 years of age. The
applicant shall require two years of active training with a licensed outdoor fireworks pyrotechnic operator, and the applicant shall have participated in the setting up, loading, and firing of outdoor fireworks in not less than eight electric or manual outdoor fireworks displays.

Pyrotechnic Operator, Theatrical and Special Effects. Pyrotechnic operators shall be a minimum of 21 years of age and shall require two years of active work with a licensed theatrical pyrotechnic operator. The applicant shall have participated in the setting up and loading of pyrotechnics in not less than eight electric theatrical displays.

Blasters. Blasters shall be a minimum of 21 years of age and shall require a minimum of two years of experience in the conduct of blasting operations. Experience shall include the understanding of blasting designs, drilling of holes, loading of holes, decking, stemming, and wiring methods. Military experience in blasting does not qualify as blasting experience under the fire code.

105.11.2 Examinations. Every individual or company applying for a certificate of fitness to conduct pyrotechnic displays or to use explosive materials shall successfully pass a prescheduled written and oral examination approved by the fire code official. The minimum passing score is 80 percent. An applicant who does not pass the examination may reschedule to take the entire examination not less than 30 days from the date of the previous examination. An applicant who does not pass the examination on the second attempt shall not be allowed to retake the examination for a minimum of 30 days.

105.11.3 Letters of recommendation. Applications shall be accompanied by a minimum of three letters of recommendation. The letters shall be written and signed by past and present pyrotechnic or blasting company owners or their authorized representatives. Each letter of recommendation shall document the following information:

1. The name and title of the person recommending the applicant.
2. The recommending person’s employer name, address and telephone number.
3. The applicant’s employment dates.
4. The applicant’s job responsibilities associated with the use of explosive materials.
5. Attest to the applicant’s qualifications, experience, integrity, knowledge and training in the use and handling of explosive materials. The fire code official shall contact all references submitted with the application to confirm qualifications and experience, as well as compliance with state laws and regulations, and competency of the applicant to perform in a safe manner.
6. Proof of United States citizenship, United States birth certificate or United States passport.

105.11.4 Background verification. Each applicant who applies to conduct pyrotechnic displays or use explosive materials shall have a background verification conducted by the fire department or other enforcement agency and shall provide a valid ATF license.

105.11.5 Denial criteria. A certificate of fitness for blasting or pyrotechnics shall not be issued when it is determined that the applicant:

1. Is under indictment for, or who has been convicted in any court for a crime punishable by imprisonment for a term exceeding 1 year.
2. Is a fugitive from justice.
3. Is a convicted user of a controlled substance as defined in the Controlled Substances Act (21 USC 802).
4. Does not possess the required or applicable valid federal, state or county permits.

105.11.6 Expiration. Certificates of fitness shall expire three years after from the date of issuance. When a certificate has expired, all work authorized by that certificate shall stop until the certificate is reinstated or a new certificate is obtained.

SECTION 106
FEES

[A] 106.1 Fees. A permit shall not be issued until the fees have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

[A] 106.2 Schedule of fees. A fee for Fire Prevention activities shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

[A] 106.3 Work commencing before permit issuance. A person who commences any work, activity or operation regulated by this code before obtaining the necessary permits shall be subject to an additional fee established by the applicable governing authority, which shall be in addition to the required permit fees.

[A] 106.4 Related fees. The payment of the fee for the construction, alteration, removal or demolition of work done in connection to or concurrently with the work or activity authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

[A] 106.5 Refunds. The applicable governing authority is authorized to establish a refund policy.

106.6 Permit related fees. The fire code official is authorized to assess fees for expedited plan review, expedited operational and new construction inspections, operational and new construction reinspections and standby personnel.

106.7 Fire-fighting operations. If it is discovered that a fire is the result of a code violation, fees may be assessed to cover fire-fighting operations.

106.8 Fire-fighting on county islands. Fees may be assessed to cover fire-fighting operations that occur on county islands.

106.9 Assessment fees. The fire code official is authorized to assess fees annually for: agro-industrial or solid biomass facilities and pallet yards; hazardous materials or substances
when quantities reach reportable quantities in accordance with Table 8107.1; or facilities with areas larger than 250,000 square feet (23 225 m²) that represent a special hazard as determined by the fire code official.

**Hazardous materials exception:** Tanks used as part of a hazardous waste treatment system are exempt from this requirement.

**Exemptions** The following hazardous materials, occupancies, or uses are exempt from the annual assessment fee described in Section 106.6. Exemption from the assessment fee does not waive any of the applicable requirements contained or adopted in this code.

**Hazardous materials exception:**

**Exceptions.**

1. Tanks used as part of a hazardous waste treatment system are exempt from this requirement.
2. Radioactive materials regulated in accordance with A.R.S. Title 30, Chapter 4.
3. Fire-extinguishing systems.
4. Any material used or stored for noncommercial purposes at single-family residences.
5. Any material contained in a transportation vehicle when the vehicle is not being used for permanent storage.
7. Underground storage tanks containing flammable or combustible liquids.
8. Underground storage containers containing flammable or combustible liquids.
10. LP-Gas cylinder exchange cabinets.

**106.10 Area assessment fees.** Facilities that represent special hazards as determined by the fire code official shall be assessed an area assessment fee. Facilities more than 250,000 square feet (23 225 m²), shall be assessed an additional fee calculated on the total area of the site. The assessment fee shall be calculated in intervals of 250,000 square feet (23 225 m²) in accordance with the fee schedule. For those facilities being assessed hazardous material fees area fees will be based on the fee group on accordance with Table 8107.1.

**SECTION 107 INSPECTIONS**

**107.1 Inspection authority.** The fire code official is authorized to enter and examine any building, structure, marine vessel, vehicle or premises in accordance with Section 104.3 for the purpose of enforcing this code.

**107.2 Inspections.** The fire code official is authorized to conduct such inspections as are deemed necessary to determine the extent of compliance with the provisions of this code and to approve reports of inspection by approved agencies or individuals. Reports of such inspections shall be prepared and submitted in writing for review and approval. Inspection reports shall be certified by a responsible officer of such approved agency or by the responsible individual. The fire code official is authorized to engage such expert opinion as deemed necessary to report upon unusual, detailed or complex technical issues subject to the approval of the governing body.

The fire code official is authorized to conduct a general inspection fee-for-service program for inspection that are voluntary or not required by the fire code. A fire inspection report will be issued noting compliance with the fire code or noting any issues to be addressed. Reinspections will continue until all compliance issues are resolved. Reinspection fees shall apply.

**107.2.1 Inspection requests.** It shall be the duty of the holder of the permit or their duly authorized agent to notify the fire code official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

**107.2.2 Approval required.** Work shall not be done beyond the point indicated in each successive inspection without obtaining the approval of the fire code official. The fire code official, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected, and such portion shall not be covered or concealed until authorized by the fire code official.

[A] **107.3 Concealed work.** It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be made visible and able to be accessed for inspection. 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.

**107.4 Approvals.** Approval as the 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 provisions of this code or of other ordinances of the jurisdiction shall not be valid.

**107.5 Annual facilities program.** The fire code official may authorize fire department participation in the Annual Facilities Program.
SECTION 108
MAINTENANCE

108.1 Maintenance of safeguards. Where any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, or otherwise installed, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be continuously maintained in accordance with this code and applicable referenced standards.

108.2 Testing and operation. Equipment requiring periodic testing or operation to ensure maintenance shall be tested or operated as specified in this code.

108.2.1 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the fire code official for inspection and testing.

108.3 Recordkeeping. A record of periodic inspections, tests, servicing and other operations and maintenance shall be maintained on the premises or other approved location for not less than 3 years or a different period of time specified in this code or referenced standards. Records shall be made available for inspection by the fire code official, and a copy of the records shall be provided to the fire code official upon request.

The fire code official is authorized to prescribe the form and format of such recordkeeping. The fire code official is authorized to require that certain required records be filed with the fire code official.

108.4 Supervision. Maintenance and testing shall be under the supervision of a responsible person who shall ensure that such maintenance and testing are conducted at specified intervals in accordance with this code.

108.5 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, except as necessary during emergencies, maintenance, repairs, alterations, drills or prescribed testing.

108.6 Overcrowding. Overcrowding or admittance of any person beyond the approved capacity of a building site or facility or a portion thereof shall not be allowed. The fire code official, on finding any overcrowding conditions or obstructions in aisles, passageways or other means of egress, or on finding any condition that constitutes a life safety hazard, shall be authorized to cause the event to be stopped until such condition or obstruction is corrected.

SECTION 109
FIRE SAFETY ADVISORY BOARD

109.1 Fire Safety Advisory Board. In order to hear and decide appeals of orders, decisions or determinations made by the fire code official relative to the application and interpretation of this code, there shall be and is hereby created the Fire Safety Advisory Board. Hereinafter called “the Board,” it shall consist of up to 13 members, a majority of whom are residents of the City of Phoenix. All shall be citizens of the United States and composed and consisting of persons representing the following industries, trades and professions: fire-protection systems contractor; architect; realtor; developer; petroleum industry; liquefied petroleum gas industry; property insurance; fire-protection engineering; owner or manager of a business that would not qualify for membership in another industry; health care industry; special events coordinator; construction contractor; and resident of the City of Phoenix. The Board shall be appointed by the governing body and shall hold office at its pleasure. The fire code official shall be an ex officio member of said board but shall not have a vote on any matter before the Board. The Board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the fire code official.

109.2 Limitations on authority. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equivalent method of protection or safety is proposed. The board shall not have authority to waive requirements of this code.

109.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to hazards of fire, explosions, hazardous conditions or fire protection systems, and are not employees of the jurisdiction.

109.4 Terms of office. The members and alternates of the Board shall be appointed by the city council for a term of four years. Continued absence of any member from three consecutive regular meetings of the Board shall render any such member liable for immediate removal from office. Removal shall be at the discretion of the city council. Vacancies for an unexpired term shall be filled by the city council.

109.5 Meeting procedures. The Board shall adopt rules of procedure for conducting its business and shall annually elect one of its members to serve as chairperson. The Board shall hold one regular meeting a month unless otherwise directed by the chairperson. Special Board meetings may be called by the fire code official or at the request of a chairperson or any three members of the Board. One half of the voting members plus one voting member of the Board shall constitute a quorum.

No member of the Board shall vote on any questions concerning a property or business in which that member has any direct or indirect personal financial interest. In these instances, the member shall also make full disclosure of his interest to the Board.

The fire code official shall designate an employee to serve as a recording secretary to the Board, who shall keep and maintain a detailed record of all proceedings and perform other secretarial duties as required by the Board.

109.6 Duties and responsibilities. It shall be the duty of the Board to hear appeals to decisions of the fire code official. The Board may submit to the fire code official recommendations on matters pertaining to this code or ordinance provisions and amendments. The duties and powers of the Board shall be in an advisory capacity only.

109.7 Appeal to the Fire Marshal. An appeal shall be submitted to the Fire Marshal in writing. Appeals shall be made within 30
days of receipt of a notice of noncompliance indicating required corrections.

109.7.1 Property Liens. A property lien may be placed on properties when Appeal Stipulations are granted for extended periods of time.

109.8 Appeal to the Fire Safety Advisory Board. Any person may appeal a decision of the Fire Marshal to the Fire Safety Advisory Board following the decision of the Fire Marshal. The appellant shall appear to present the appeal to the Board. The appeal shall be made within 30 days of receiving a decision from the Fire Marshal.

109.9 Appeal to the Superior Court. Any persons aggrieved by a decision of the Board may at any time 30 days after the Board’s decision, file an appeal with the Superior Court of the county by following the various methods of appeal or review procedures as set forth by the applicable statutes of the State of Arizona.

SECTION 110 VIOLATIONS

110.1 Unlawful acts. It shall be unlawful for a person, firm or corporation to erect, construct, alter, repair, remove, demolish or utilize a building, occupancy, premises or system regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

110.2 Owner/occupant responsibility. Correction and abatement of violations of this code shall be the responsibility of the owner or the owner’s authorized agent. Where an occupant creates, or allows to be created, hazardous conditions in violation of this code, the occupant shall be held responsible for the abatement of such hazardous conditions.

110.3 Notice of violation. Where the fire code official finds a building, premises, vehicle, storage facility or outdoor area that is in violation of this code, the fire code official is authorized to prepare a written notice of violation describing the conditions deemed unsafe and, when compliance is not immediate, specifying a time for reinspection.

110.3.1 Service. A notice of violation issued pursuant to this code shall be served on the owner, the owner’s authorized agent, operator, occupant or other person responsible for the condition or violation, either by personal service, mail or by delivering the same to, and leaving it with, some person of responsibility upon the premises. For unattended or abandoned locations, a copy of such notice of violation shall be posted on the premises in a conspicuous place at or near the entrance to such premises and the notice of violation shall be mailed by certified mail with return receipt requested or a certificate of mailing, to the last known address of the owner, the owner’s authorized agent, operator, occupant or other person responsible for the condition or violation to which the notice of violation pertains. In case of extreme danger to persons or property, immediate compliance is required.

110.3.2 Compliance with orders and notices. A building, premises or thing shall not be used when in violation of this code as noted on a tag order or notice in accordance with Section 104.5. A notice of violation issued or served as provided by this code shall be complied with by the owner, the owner’s authorized agent, operator, occupant or other person responsible for the condition or violation to which the notice of violation pertains. In case of extreme danger to persons or property, immediate compliance is required.

110.3.3 Prosecution of violations. If the notice of violation is not complied with promptly, the fire code official is authorized to request the legal counsel of the jurisdiction to institute the appropriate legal proceedings at law or in equity to restrain, correct or abate such violation or to require the removal or termination of the unlawful occupancy of the structure in violation of the provisions of this code or of the order or direction made pursuant hereto.

110.3.4 Civil actions or criminal citations. Any person, firm, or corporation who causes, permits, facilitates, aids or abets any violation of this code, or who fails to perform any act or duty required by this code, is subject to a civil sanction of not less than $500 nor more than $2,500 or a Class 1 criminal misdemeanor.

110.3.4.1 Commencement of civil action. Any civil action to enforce the provisions of this code shall be commenced, and summonses shall be issued, in accordance with the procedures set forth in Arizona Revised Statutes, city ordinance or as provided in the Local Rules of Practice and Procedure City Court City of Phoenix.

110.3.4.2 Admission or denial of allegations; hearing; findings of Court; civil sanctions

1. A person served with a civil citation or complaint shall appear at the time and place stated in the citation or summons, or may appear prior to the time, and admit or deny the allegations of the complaint. Allegations not denied at the time of appearance are deemed admitted.

2. If the allegations are admitted, the Court shall enter judgment for the City and impose a civil sanction.

3. If the person denies the allegations, the Court shall set the matter for hearing. Civil hearings are informal and held without a jury, and the City of Phoenix is required to prove the violation charged by a preponderance of the evidence. Technical rules of evidence do not apply, except for statutory provisions relating to privileged communications. If the person elects to be represented by counsel, the person shall so notify the Court at least 10 days prior to the hearing date. Hearings may be recorded. If the Court finds in favor of the person, the Court shall enter an order dismissing the citation or complaint. If the Court finds in favor of the City, the Court shall enter judgment for the City and impose a civil sanction.

4. If the person served with a civil citation or complaint fails to appear on or before the time directed to appear or at the time set for hearing by the Court, the allegations shall be deemed admitted and the Court shall enter judgment for the City and impose a civil sanction.
sanction.

110.3.4.3 Criminal penalties. Whenever in any section of this code the doing of any act is required, prohibited or declared to be unlawful, any person, firm or corporation who shall be convicted of a violation of any such section shall be guilty of a Class I misdemeanor.

110.3.4.4 Injunctive Relief. The imposition of any civil action or criminal penalty provided in this Code shall not preclude the fire code official from instituting any appropriate action or proceeding to require compliance with the provisions of this Code and with administrative orders and determinations made hereunder. In the event that any building, structure or building occupancy, equipment is erected, constructed, reconstructed, altered, repaired, converted, demolished, moved or maintained, or any building, structure, premises or system service is used or occupied in violation of this Code, the fire code official may institute any appropriate action or proceedings to prevent unlawful erection, construction, reconstruction, alteration, repair, removal, demolition or utilization a building, occupancy, premises or system regulated by this code.

110.4 Violation penalties. Persons who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the approved construction documents or directive of the fire code official, or of a permit or certificate used under provisions of this code, shall be guilty of a Class I criminal misdemeanor punishable by a civil sanction of not more less than $500 per day nor more than $2,500 per day. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

[A] 110.4.1 Abatement of violation. In addition to the imposition of the penalties herein described, the fire code official is authorized to institute appropriate action to prevent unlawful construction or to restrain, correct or abate a violation; or to prevent illegal occupancy of a structure or premises; or to stop an illegal act, conduct of business or occupancy of a structure on or about any premises.

110.4.2 Abatement orders. The Municipal Court of the City of Phoenix shall have jurisdiction to issue orders to the property owner of record, as recorded in the Maricopa County Recorder’s Office, to abate unsafe conditions or any other violation of this Code, or to issue orders permitting the City of Phoenix to abate unsafe conditions as defined in this Code. Abatement orders may be issued by the Municipal Court pursuant to a request from the fire code official or may be initiated by the Court in addition to any civil sanction or criminal penalty assessed for violations of this Code.

SECTION 111
UNSAFE BUILDINGS

111.1 General. If during the inspection of a premises, a building, or structure, or any building system, in whole or in part, constitutes a clear and imminent threat to human life, safety or health, the fire code official shall issue such notice or orders to remove or remedy the conditions as shall be deemed necessary in accordance with this section, and shall refer the building to the building department for any repairs, alterations, remodeling, removing or demolition required.

111.1.1 Unsafe conditions. Structures, yards, or any building system, in whole or in part or existing equipment that are or hereafter become unsafe or deficient because of inadequate means of egress or that constitute a fire hazard or are otherwise dangerous to human life or the public welfare, or which involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. A vacant structure that is not secured against unauthorized entry as required by Section 311 shall be deemed unsafe.

111.1.2 Structural hazards. Where an apparent structural hazard is caused by the faulty installation, operation or malfunction of any of the items or devices governed by this code, the fire code official shall immediately notify the building code official in accordance with Section 111.1.

111.2 Evacuation. The fire code official or the fire department official in charge of an incident or inspection shall be authorized to order the immediate evacuation of any occupied building, site or facility or deemed unsafe when such building has hazardous conditions that present imminent danger to building occupants. Persons so notified shall immediately leave the structure or premises and shall not enter or re-enter until authorized to do so by the fire code official or the fire department official in charge of the incident.

111.3 Summary abatement. Where conditions exist that are deemed hazardous to life and property, the fire code official or fire department official in charge of the incident is authorized to abate summarily such hazardous conditions that are in violation of this code.

111.4 Abatement. The owner, the owner’s authorized agent, operator or occupant of a building or premises deemed unsafe by the fire code official shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other approved corrective action. If the person, firm or corporation responsible for an unauthorized discharge is undetermined or unable to be contacted, then the property owner shall institute and complete all actions necessary to remedy the effects of such unauthorized discharge, whether sudden or gradual, at no cost to the jurisdiction.

When deemed necessary by the fire code official and in the absence of the owner or responsible party, emergency measures may be taken to provide for security of property or and its contents. The cost of such actions shall be borne by the property owner or other responsible party. Upon notification, the owner or responsible party may be required to provide for ongoing security of the property if deemed necessary by the fire code official.

111.4.1 Emergency abatement. When deemed necessary by the fire code official emergency abatement measures shall be taken to provide for the public safety, security and rapid mitigation of hazards to property and contents. When any resources, including services, special equipment and/or materials are required to abate the hazard(s), and the services, special equipment and/or materials is/are not available onsite, the owner or responsible party shall have, under written agreement, when required by the fire code official, with a
SCOPE AND ADMINISTRATION

resource provider, the accessibility and use of the services, special equipment and/or material(s) sufficient to ensure rapid response and timely abatement. Special equipment may include, but not limited to, material-handling equipment as well as water trucks, earth movers, qualified operators, and any other equipment or personnel necessary to complete the abatement. The agreement(s) described herein are required and all current agreement(s) must be kept onsite and provided to the fire code official immediately upon request. A copy of the service agreement(s) shall be submitted and kept on file with the operational fire permit application. The cost of procuring resources shall be borne by the property owner or responsible party.

111.4.2 Material-handling Equipment. Material-handling equipment shall be available for moving mulch, dirt (soil or earth), wood chips, hogged material, wood fines, pallets or raw product during firefighting operations. All material-handling equipment located on site and required for either emergency abatement or abatement deemed necessary by a fire code official shall be kept in operable condition or replaced through the relevant agreement(s) described herein until repaired.

111.4.3 Security of Property or Premises. Upon notification, the owner or responsible party may be required to provide ongoing security of the property if deemed necessary by the fire code official.

SECTION 112
STOP WORK ORDER

112.1 Stop work order. Where the fire code official finds any work regulated by this code being performed in a manner contrary to the provisions of this code, or in a dangerous or unsafe manner, the fire code official is authorized to issue a stop work order.

112.2 Issuance. A stop work order shall be in writing and shall be given to the owner of the property, or to the owner’s authorized agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work is authorized to resume.

112.3 Emergencies. Where an emergency exists, the fire code official shall not be required to give a written notice prior to stopping the work.

112.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be liable to a civil sanction of not less than $500 nor more than $2,500 or a Class 1 criminal misdemeanor.

SECTION 113
SERVICE UTILITIES

113.1 Authority to disconnect service utilities. The fire code official shall have the authority to authorize disconnection of utility service to the building, structure or system in order to safely execute emergency operations or to eliminate an immediate hazard. The fire code official shall notify the serving utility and, whenever possible, the owner, or the owner’s authorized agent and occupant of the building, structure or service system of the decision to disconnect prior to taking such action if not notified prior to disconnection. The owner, or the owner’s authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

SECTION 114
FIRE WATCH

114.1 When required. Fire watch shall be provided as follows:

1. When required by other sections of this code.

2. When the fire code official deems a condition essential for public safety.

3. When the fire officer determines that conditions may result in a rekindle.

114.1.1 Financial responsibility. The property owner, the tenant or the occupant in control of the premises shall be responsible for the cost of providing a fire watch.

114.2 Qualifications. Personnel assigned to fire watch duties shall possess the following minimum qualifications:

1. Shall be at least 18 years of age.

2. Shall be able to speak, read and understand English.

3. Shall be capable of executing the duties and responsibilities as specified in Section 114.4.

4. Shall be capable of operating a mobile telephone or portable radio, or both.

5. Shall be capable of walking the assigned watch area.

114.3 Number and hours. The fire code official shall specify the number of fire watch personnel required and the hours during which they must be present based on the conditions and size of the facility.

114.4 Duties and responsibilities. Fire watch duties and responsibilities include, but are not limited to the following:

1. Know the address of the facility being watched.

2. Be equipped with a mobile telephone that can be used to contact 9-1-1 or a portable radio that can be used to communicate with a constantly attended security/communications center.

3. Continuously make rounds and monitor all assigned areas.

4. Immediately report any sign of smoke, fire or other emergency to 9-1-1 or to the security/communications center.

5. Shall activate the fire alarm system when the building is equipped with such a system or notify those present to evacuate the building or area.

6. Shall assist with the evacuation of people present in the area.
7. Keep a fire watch log that includes the following information:
    7.1. Identifies the building or area by name and address that is under watch.
    7.2. The date and time each round or tour is completed, plus comments on what was observed. Each entry shall contain the name and signature of the person conducting the watch.

    Fire watch logs shall be immediately accessible for review by the fire code official. A copy of the fire watch log shall be submitted to the Phoenix Fire Department, Fire Prevention Division.

8. Continue the fire watch until permission has been received from the Phoenix Fire Department to terminate the fire watch activities.

    Fire watch personnel shall not be assigned additional duties during their fire watch tour.

9. Fire watch personnel shall be trained in the use of portable fire extinguishers.
CHAPTER 2
DEFINITIONS

SECTION 201
GENERAL

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

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the International Building Code, International Fuel Gas Code, International Mechanical Code or International Plumbing Code, such terms shall have the meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies. Merriam Webster’s Collegiate Dictionary, 11th Edition, shall be considered as providing ordinarily accepted meanings.

SECTION 202
GENERAL DEFINITIONS

[BG] 24-HOUR BASIS. The actual time that a person is an occupant within a facility for the purpose of receiving care. It shall not include a facility that is open for 24 hours and is capable of providing care to someone visiting the facility during any segment of the 24 hours.

[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)”].

[B] ACCESSIBLE MEANS OF EGRESS. A continuous and unobstructed way of egress travel from any accessible point in a building or facility to a public way.

[B] ACCESSIBLE ROUTE. A continuous, unobstructed path that complies with Chapter 11 of the International Building Code.

ADDRESS DIRECTORIES. Graphic displays of dwelling unit or business suite locations that are weather resistant, internally illuminated, and permanently mounted adjacent to the fire apparatus access road.

AEROSOL CONTAINER. A metal can or plastic container up to a maximum size of 33.8 fluid ounces (1000 ml) or a glass bottle up to a maximum size of 4 fluid ounces (118 ml) designed and intended to dispense an aerosol.

AEROSOL COOKING SPRAY PRODUCTS. Aerosol cooking spray products are those aerosol products designed to deliver a vegetable oil or a solid or nonflammable liquid to reduce sticking on cooking and baking surfaces, or to be applied to food, or both. These products have a chemical heat of combustion that is greater than 8600 Btu/lb. (20 kJ/g) and contain no more than 18 percent by weight of flammable propellant.

AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 aerosol products. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb.) (20 kJ/g).

Level 2 aerosol products. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb. (20 kJ/g), but less than or equal to 13,000 Btu/lb. (30 kJ/g).

Level 3 aerosol products. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb. (30 kJ/g).

AEROSOL PRODUCT WAREHOUSE. A building used for warehousing aerosol products.

AGENCY. Any emergency responder department within the jurisdiction that utilizes radio frequencies for communication. This could include, but not be limited to, various public safety agencies such as fire departments, emergency medical services and law enforcement.

AGENT. A person who shall have charge, care or control of any structure as owner, or agent of the owner, or as executor, executrix, administrator, administratrix, trustee or guardian of the estate of the owner. Any such person representing the actual owner shall be bound to comply with the provisions of this code to the same extent as if that person was the owner.

[BG] AGRICULTURAL BUILDING. A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure shall not be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor shall it be a place used by the public.
AGRO-INDUSTRIAL. A facility, or portion thereof, housing operations involving the transforming of raw agricultural products into intermediate or consumable products.

[BG] AIR-INFLATED STRUCTURE. A structure that uses air-pressurized membrane beams, arches or other elements to enclose space. Occupants of such a structure do not occupy the pressurized areas used to support the structure.

[BG] AIR-SUPPORTED STRUCTURE. A structure wherein the shape of the structure is attained by air pressure, and occupants of the structure are within the elevated pressure area. Air supported structures are of two basic types:

- **Double skin.** Similar to a single skin, but with an attached liner that is separated from the outer skin and provides an airspace which serves for insulation, acoustic, aesthetic or similar purposes.

- **Single skin.** Where there is only the single outer skin and the air pressure is directly against that skin.

AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed automotive-type equipment into the fuel tanks of aircraft.

AIRCRAFT OPERATION AREA (AOA). Any area used or intended for use for the parking, taxiing, takeoff, landing or other ground-based aircraft activity.

AIRPORT. An area of land or structural surface that is used, or intended for use, for the landing and taking off of aircraft with an overall length greater than 39 feet (11 877 mm) and an overall exterior fuselage width greater than 6.6 feet (2012 mm), and any appurtenant areas that are used or intended for use for airport buildings and other airport facilities.

[BE] AISLE. An unenclosed exit access component that defines and provides a path of egress travel.

[BE] AISLE ACCESSWAY. That portion of an exit access that leads to an aisle.

ALARM, NUISANCE. See “Nuisance alarm.”

ALARM DEVICE, MULTIPLE STATION. See “Multiple-station alarm device.”

ALARM NOTIFICATION APPLIANCE. A fire alarm system component such as a bell, horn, speaker, light or text display that provides audible, tactile or visible outputs, or any combination thereof. See also “Audible alarm notification appliance” or “Visible alarm notification appliance.”

ALARM SIGNAL. A signal indicating an emergency requiring immediate action, such as a signal indicative of fire.

ALARM VERIFICATION FEATURE. A feature of automatic fire detection and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being automatically reset, in order to be accepted as a valid alarm-initiation signal.

ALCOHOL-BASED HAND RUB. An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands and containing ethanol or isopropanol in an amount not exceeding 95-percent by volume.

ALCOHOL-BLENDED FUELS. Flammable liquids consisting of 10-percent or greater, by volume, ethanol or other alcohols blended with gasoline.

[A] ALTERATION. Any construction or renovation to an existing structure other than a repair or addition.

[BE] ALTERNATING TREAD DEVICE. A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.

ALTERNATIVE SURFACE ACCESS ROADS. Roads for fire department use, that are required for fire department access, and that are constructed with approved materials, other than pavement.

[BG] AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less-than-24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.

[BG] AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less-than-24-hour basis to persons who are rendered incapable of self-preservation by the services provided.

AMMONIUM NITRATE. A chemical compound represented by the formula NH₄NO₃.

ANNUNCIATOR. A unit containing one or more indicator lamps, alphanumeric displays or other equivalent means in which each indication provides status information about a circuit, condition or location.

[A] APPROVED. Acceptable to the fire code official.

[BG] AREA, BUILDING. The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.

[BE] AREA OF REFUGE. An area where persons unable to use stairways can remain temporarily to await instructions or assistance during emergency evacuation.

ARRAY. The configuration of storage. Characteristics considered in defining an array include the type of packaging, flue spaces, height of storage and compactness of storage.

ARRAY, CLOSED. A storage configuration having a 6-inch (152 mm) or smaller width vertical flue space that restricts air movement through the stored commodity.
[BG] ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505 of the International Building Code.

[BG] ATTIC. The space between the ceiling framing of the top story and the underside of the roof.

AUDIBLE ALARM NOTIFICATION APPLIANCE. A notification appliance that alerts by the sense of hearing.

AUTOMATED RACK STORAGE. Automated rack storage is a stocking method whereby the movement of pallets, products, apparatus or systems are automatically controlled by mechanical or electronic devices.

AUTOMATIC. As applied to fire protection devices, a device or system providing an emergency function without the necessity for human intervention and activated as a result of a predetermined temperature rise, rate of temperature rise or combustion products.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM. An approved system of devices and equipment which automatically detects a fire and discharges an approved fire-extinguishing agent onto or in the area of a fire.

AUTOMATIC SMOKE DETECTION SYSTEM. A fire alarm system that has initiation devices that utilize smoke detectors for protection of an area such as a room or space with detectors to provide early warning of fire.

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

AUTOMATIC WATER MIST SYSTEM. A system consisting of a water supply, a pressure source and a distribution piping system with attached nozzles which, at or above a minimum operating pressure, defined by its listing, discharges water in fine droplets meeting the requirements of NFPA 750 for the purpose of the control, suppression or extinguishment of a fire. Such systems include wet-pipe, dry-pipe and pre-action types. The systems are designed as engineered, preengineered, local-application or total flooding systems.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles.

AVERAGE AMBIENT SOUND LEVEL. The root mean square, A-weighted sound pressure level measured over a 24-hour period, or the time any person is present, whichever time period is less.

[BG] AWNING. An architectural projection that provides weather protection, identity or decoration and is partially or wholly supported by the building to which it is attached. An awning is comprised of a lightweight frame structure over which a covering is attached.

[BE] BALANCED DOOR. A door equipped with double-pivoted hardware so designed as to cause a semicounter balanced swing action when opening.

BALED COTTON. See “Cotton.”

BALED COTTON, DENSELY PACKED. See “Cotton.”

BARRICADE. A structure that consists of a combination of walls, floor and roof, which is designed to withstand the rapid release of energy in an explosion and which is fully confined, partially vented or fully vented; or other effective method of shielding from explosive materials by a natural or artificial barrier.

Artificial barricade. An artificial mound or revetment with a minimum thickness of 3 feet (914 mm).

Natural barricade. Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures that require protection cannot be seen from the magazine or building containing explosive materials when the trees are bare of leaves.

BARRICADED. The effective screening of a building containing explosive materials from the magazine or other building, railway or highway by a natural or an artificial barrier. A straight line from the top of any sidewall of the building containing explosive materials to the eave line of any magazine or other building or to a point 12 feet (3658 mm) above the center of a railway or highway shall pass through such barrier.

[BG] BASEMENT. A story that is not a story above grade plane.

BATTERY SYSTEM, STATIONARY STORAGE. A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptible power supply, load shedding, load sharing or similar capabilities.

BATTERY TYPES.

Flow battery. A type of storage battery that includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of electrical current, occurs through the membrane while both liquids circulate in their respective spaces. The electrolyte is a carbonate mixture or a gelled polymer. The lithium ions are the charge carriers of the battery.
Lead-acid battery. A storage battery that is comprised of lead electrodes immersed in sulphuric acid electrolyte.

Lithium-ion battery. A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with an inorganic salt and can be in a liquid or a gelled polymer form. Lithiated metal oxide is typically a cathode and forms of carbon or graphite typically form the anode.

Lithium metal polymer battery. A storage battery that is similar to the lithium ion battery except that it has a lithium metal anode in the place of the traditional carbon or graphite anode.

Nickel-cadmium (Ni-Cd) battery. An alkaline storage battery in which the positive active material is nickel oxide, the negative contains cadmium and the electrolyte is potassium hydroxide.

Prepackaged stationary storage battery system. An energy storage system consisting of batteries, a battery management system, components and modules that are produced in a factory, designed to comprise the system when assembled on the job site.

Preengineered stationary storage battery system. An energy storage system consisting of batteries, a battery management system, components and modules that is factory assembled and shipped as a complete unit for installation at the job site.

Sodium-beta storage battery. A storage battery, also referred to as a Na-beta battery or NBB, which uses a solid beta-alumina electrolyte membrane that selectively allows sodium ion transport between a positive electrode such as metal halide and a negative sodium electrode.

Stationary storage battery. A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location. The number of cells connected in a series determines the nominal voltage rating of the battery. The size of the cells determines the discharge capacity of the entire battery. After discharge, it may be restored to a fully charged condition by an electric current flowing in a direction opposite to the flow of current when the battery is discharged.

Valve-regulated lead-acid (VRLA) battery. A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount. In VRLA batteries, the liquid electrolyte in the cells is immobilized in an absorptive glass mat (AGM cells or batteries) or by the addition of a gelling agent (gel cells or gelled batteries).

Vented (flooded) lead-acid battery. A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte. Flooded lead-acid batteries have a provision for the user to add water to the cell and are equipped with a flame-arresting vent which permits the escape of hydrogen and oxygen gas from the cell in a diffused manner such that a spark, or other ignition source, outside the cell will not ignite the gases inside the cell.

BIN BOX. A five-sided container with the open side facing an aisle. Bin boxes are self-supporting or supported by a structure designed so that little or no horizontal or vertical space exists around the boxes.

Biomass. Plant or animal-based material of biological origin excluding material embedded in geologic formations or transformed into fossils.

Blast area. The area including the blast site and the immediate adjacent area within the influence of flying rock, missiles and concussion.

Blast site. The area in which explosive materials are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and a distance of 50 feet (15 240 mm) in all directions.

Blast area. The area in which explosive materials are loaded or to be loaded for the same blast and a distance of 50 feet (15 240 mm) in all directions.

Blast site. The area in which explosive materials are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and a distance of 50 feet (15 240 mm) in all directions.

Blasting agent. A material or mixture consisting of fuel and oxidizer, intended for blasting provided that the finished product, as mixed for use or shipment, cannot be detonated by means of a No. 8 test detonator when unconfined. Blasting agents are labeled and placarded as Class 1.5 material by US DOTn.

Bleachers. Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see “Grandstand”).

Boarding house. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

Boiling point. The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch absolute (psia) (101 kPa) or 760 mm of mercury. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for the purposes of this classification, the 20-percent evaporated point of a distillation performed in accordance with ASTM D 86 shall be used as the boiling point of the liquid.

Bonfire. An outdoor fire utilized for ceremonial purposes.

Breakout. For revolving doors, a process whereby wings or door panels can be pushed open manually for means of egress travel.

British thermal unit (BTU). The heat necessary to raise the temperature of 1 pound (0.454 kg) of water by 1°F (0.5565°C).

Building. Any structure used or intended for supporting or sheltering any use or occupancy.

Building area. See “Area, building.”

Building height. See “Height, building.”
enforcement of the International Building Code, or a duly authorized representative.

**Bulk Oxygen System.** An assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds and interconnecting piping, that has a storage capacity of more than 20,000 cubic feet (566 m³) of oxygen at normal temperature and pressure (NTP) including unconnected reserves on hand at the site. The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen containers can be stationary or movable, and the oxygen can be stored as a gas or liquid.

**Bulk Plant or Terminal.** That portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

**Bulk Transfer.** The loading or unloading of flammable or combustible liquids from or between tank vehicles, tank cars or storage tanks.

**Bullet Resistant.** Constructed so as to resist penetration of a bullet of 150-grain M2 ball ammunition having a nominal muzzle velocity of 2,700 feet per second (fps) (824 mps) when fired from a 30-caliber rifle at a distance of 100 feet (30 480 mm), measured perpendicular to the target.

**Canopy.** A structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration, and may be structurally independent or supported by attachment to a building on one end and by not less than one stanchion on the outer end.

**Capacitor Array.** An arrangement of individual capacitor modules in close proximity to each other, mounted on storage racks or in cabinets or other enclosures.

**Capacitor Energy Storage System.** A stationary, rechargeable energy storage system consisting of capacitors, chargers, controls and associated electrical equipment designed to provide electrical power to a building or facility.

The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

**Preengineered capacitor energy storage system.** A capacitor energy storage system consisting of capacitors, an energy management system, components and modules that are produced in a factory, designed to comprise the system when assembled on the job site.

**Prepackaged capacitor energy storage system.** A capacitor energy storage system consisting of capacitors, an energy management system, components and modules that is factory assembled and then shipped as a complete unit for installation at the job site.

**Carbon Dioxide Enrichment System.** A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.

**Carbon Dioxide Extinguishing System.** A system supplying carbon dioxide (CO₂) from a pressurized vessel through fixed pipes and nozzles. The system includes a manual or automatic-actuating mechanism.

**Carbon Monoxide Alarm.** A single or multiplestation alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

**Carbon Monoxide Detector.** A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

**BG Care Suite.** In Group I-2 occupancies, a group of treatment rooms, care recipient sleeping rooms and the support rooms or spaces and circulation space within the suite where staff are in attendance for supervision of all care recipients within the suite, and the suite is in compliance with the requirements of Section 407.4.4 of the International Building Code.

**Carton.** A cardboard or fiberboard box enclosing a product.

**Ceiling Limit.** The maximum concentration of an airborne contaminant to which one may be exposed. The ceiling limits utilized are those published in DOL 29 CFR Part 1910.1000. The ceiling Recommended Exposure Limit (REL-C) concentrations published by the U.S. National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Ceiling (TLV-C) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Ceiling Workplace Environmental Exposure Level (WEEL-Ceiling) Guidelines published by the American Industrial Hygiene Association (AIHA), and other approved, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

**[A] Change of Occupancy.** A change in the use of a building or a portion of a building that results in any of the following:

1. A change of occupancy classification.
2. A change from one group to another group within an occupancy classification.
3. Any change in use within a group for which there is a change in the application of the requirements of this code.

**Chemical.** An element, chemical compound or mixture of elements or compounds or both.
CHEMICAL FUME HOOD. A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists and particulate matter generated within the hood.

CHEMICAL NAME. The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry, the Chemical Abstracts Service rules of nomenclature, or a name which will clearly identify a chemical for the purpose of conducting an evaluation.

[M] CHIMNEY. A primarily vertical structure containing one or more flues for the purpose of carrying gaseous products of combustion and air from a fuel-burning appliance to the outdoor atmosphere.

FACTORY- BUILT CHIMNEY. A listed and labeled chimney composed of factory-made components, assembled in the field in accordance with manufacturer’s instructions and the conditions of the listing.

MASONRY CHIMNEY. A field-constructed chimney composed of solid masonry units, bricks, stones, or concrete.

METAL CHIMNEY. A field-constructed chimney of metal.

CLEAN AGENT. Electrically nonconducting, volatile or gaseous fire extinguishant that does not leave a residue upon evaporation.

[BG] CLINIC, OUTPATIENT. Buildings or portions thereof used to provide medical care on a less-than-24-hour basis to persons who are not rendered incapable of self-preservation by the services provided.

CLOSED CONTAINER. A container sealed by means of a lid or other device such that liquid, vapor or dusts will not escape from it under ordinary conditions of use or handling.

CLOSED SYSTEM. The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gases. Examples of closed systems for solids and liquids include product conveyed through a piping system into a closed vessel, system or piece of equipment.

COLD DECK. A pile of unfinished cut logs.

COMBUSTIBLE DUST. Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a U.S. No. 40 standard sieve.

COMBUSTIBLE FIBERS. Readily ignitable and free-burning materials in a fibrous or shredded form, such as cocoa fiber, cloth, cotton, excelsior, hay, hemp, henequen, jute, kapok, oakum, rags, sisal, Spanish moss, straw, tow, wastepaper, certain synthetic fibers or other like materials. This definition does not include densely packed baled cotton.

COMBUSTIBLE GAS DETECTOR. An instrument that samples the local atmosphere and indicates the presence of ignitable vapors or gases within the flammable or explosive range expressed as a volume percent in air.

COMBUSTIBLE LIQUID. A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

Class II. Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).

Class IIIA. Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB. Liquids having closed cup flash points at or above 200°F (93°C).

The category of combustible liquids does not include compressed gases or cryogenic fluids.

[M] COMMERCIAL COOKING APPLIANCES. Appliances used in a commercial food service establishment for heating or cooking food and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system. Such appliances include deep fat fryers, upright broilers, griddles, broilers, steam-jacketed kettles, hot-top ranges, under-fired broilers (charbroilers), ovens, barbecues, rotisseries, and similar appliances. For the purpose of this definition, a food service establishment shall include any building or a portion thereof used for the preparation and serving of food.

COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or
2. Is designed to transport 16 or more passengers, including the driver.

COMMODITY. A combination of products, packing materials and containers.

COMMON AREA. For the purposes of the Americans with Disabilities Act (ADA) compliance for visual notification, a common area shall be a room, space, or element made available for the use of a restricted group of people (for example, occupants of a homeless shelter; the occupants of an office building, or the guests of such occupants). Common areas shall include restrooms, hallways, lobbies, meeting and conference rooms, classrooms, cafeterias, filing and photocopy rooms, employee break rooms, open office areas exceeding 300 square feet, examination and treatment rooms, and similar areas that are not used solely as employee work areas in accordance with the U.S. Access Board Technical Bulletin on Visual Alarms. Mechanical, electrical and telephone closets, janitor’s closets, and similar non-occupiable spaces that are not common areas or assigned work areas are not required to have visual alarms.

[BE] COMMON PATH OF EGRESS TRAVEL. That portion of the exit access travel distance measured from the most remote point of each room, area or space to that point...
where the occupants have separate and distinct access to two exits or exit access doorways.

[BE] COMMON USE. Interior or exterior circulation paths, rooms, spaces or elements that are not for public use and are made available for the shared use of two or more people.

COMPRESSED GAS. A material, or mixture of materials that:
1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure; and
2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

The states of a compressed gas are categorized as follows:
1. Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).
2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).
3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.
4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.

COMPRESSED GAS CONTAINER. A pressure vessel designed to hold compressed gases at pressures greater than one atmosphere at 68°F (20°C) and includes cylinders, containers and tanks.

COMPRESSED GAS SYSTEM. An assembly of equipment designed to contain, distribute or transport compressed gases. It can consist of a compressed gas container or containers, reactors and appurtenances, including pumps, compressors and connecting piping and tubing.

[BG] CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom and/or kitchen facilities.

CONSTANTLY ATTENDED LOCATION. A designated location at a facility staffed by trained personnel on a continuous basis where alarm or supervisory signals are monitored and facilities are provided for notification of the fire department or other emergency services.

[A] CONSTRUCTION DOCUMENTS. The written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a permit.

CONTAINER. A vessel of 60 gallons (227 L) or less in capacity used for transporting or storing hazardous materials. Pipes, piping systems, engines and engine fuel tanks are not considered to be containers.

CONTAINMENT SYSTEM. A gas-tight recovery system comprised of equipment or devices which can be placed over a leak in a compressed gas container, thereby stopping or controlling the escape of gas from the leaking container.

CONTAINMENT VESSEL. A gas-tight recovery vessel designed so that a leaking compressed gas container can be placed within its confines thereby encapsulating the leaking container.

CONTINUOUS GAS DETECTION SYSTEM. A gas detection system where the analytical instrument is maintained in continuous operation and sampling is performed without interruption. Analysis is allowed to be performed on a cyclical basis at intervals not to exceed 30 minutes.

CONTROL AREA. Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled. See also the definition of “Outdoor control area.”

CONTROLLED ACCESS GATES. Automatic or manually operated gates or devices that are placed across a fire apparatus access road or access path.

[BE] CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel.

CORRIDOR, OPEN-ENDED. See “Open-ended corridor.”

CORROSIVE. A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

COTTON.

Baled cotton. A natural seed fiber wrapped in and secured with industry-accepted materials, usually consisting of burlap, woven polypropylene, polyethylene or cotton or sheet polyethylene, and secured with steel, synthetic or wire bands, or wire; also includes linters (lint removed from the cottonseed) and motes (residual materials from the ginning process).

Baled cotton, densely packed. Cotton, made into banded bales, with a packing density of not less than 22 pounds per cubic foot (360 kg/m³), and dimensions complying with the following: a length of 55 inches...
Seed cotton. Perishable raw agricultural commodity consisting of cotton fiber (lint) attached to the seed of the cotton plant, which requires ginning to become a commercial product.

[BG] COURT. An open, uncovered space, unobstructed to the sky, bounded on three or more sides by exterior building walls or other enclosing devices.

[BG] COVERED MALL BUILDING. A single building enclosing a number of tenants and occupants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices, and other similar uses wherein two or more tenants have a main entrance into one or more malls. Anchor buildings shall not be considered as a part of the covered mall building. The term “covered mall building” shall include open mall buildings as defined below.

Mall. A roofed or covered common pedestrian area within a covered mall building that serves as access for two or more tenants and not to exceed three levels that are open to each other. The term “mall” shall include open malls as defined below.

Open mall. An unroofed common pedestrian way serving a number of tenants not exceeding three levels. Circulation at levels above grade shall be permitted to include open exterior balconies leading to exits discharging at grade.

Open mall building. Several structures housing a number of tenants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses wherein two or more tenants have a main entrance into one or more open malls. Anchor buildings are not considered as a part of the open mall building.

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

CROWD MANAGER. An individual designated to maintain safe conditions and assist with evacuations prior to and during a special event where crowds exceed 500 attendees.

CRYOGENIC CONTAINER. A cryogenic vessel of any size used for the transportation, handling or storage of cryogenic fluids.

CRYOGENIC FLUID. A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).

CRYOGENIC VESSEL. A pressure vessel, low-pressure tank or atmospheric tank designed to contain a cryogenic fluid on which venting, insulation, refrigeration or a combination of these is used in order to maintain the operating pressure within the design pressure and the contents in a liquid phase.

[BG] CUSTODIAL CARE. Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living. Custodial care includes persons receiving care who have the ability to respond to emergency situations and evacuate at a slower rate and/or who have mental and psychiatric complications.

CYLINDER. A pressure vessel designed for pressures higher than 40 psia (275.6 kPa) and having a circular cross section. It does not include a portable tank, multiunit tank car tank, cargo tank or tank car.

DAMPER. See “Fire damper” and “Smoke damper.”

DAY BOX. A portable magazine designed to hold explosive materials and constructed in accordance with the requirements for a Type 3 magazine as defined and classified in Chapter 56.

DECORATIVE MATERIALS. All materials applied over the building interior finish for decorative, acoustical or other effect including, but not limited to, curtains, draperies, fabrics, streamers and all other materials utilized for decorative effect including, but not limited to, bulletin boards, artwork, posters, photographs, paintings, batting, cloth, cotton, hay, stalks, straw, vines, leaves, trees, moss and similar items, foam plastics and materials containing foam plastics. Decorative materials do not include wall coverings, ceiling coverings, floor coverings, ordinary window shades, interior finish and materials 0.025 inch (0.64 mm) or less in thickness applied directly to and adhering tightly to a substrate.

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DELUGE SYSTEM. A sprinkler system employing open sprinklers attached to a piping system connected to a water supply through a valve that is opened by the operation of a detection system installed in the same area as the sprinklers. When this valve opens, water flows into the piping system and discharges from all sprinklers attached thereto.

DESIGN PRESSURE. The maximum gauge pressure that a pressure vessel, device, component or system is designed to withstand safely under the temperature and conditions of use expected.

DESOVLENTIZING. The act of removing a solvent from a material.

DETACHED BUILDING. A separate single-story building, without a basement or crawl space, used for the storage or use of hazardous materials and located an approved distance from all structures.

DETEARING. A process for rapidly removing excess wet coating material from a dipped or coated object or material by passing it through an electrostatic field.

DETECTOR, HEAT. A fire detector that senses heat, either abnormally high temperature or rate of rise, or both.

DETONATING CORD. A flexible cord containing a center core of high explosive used to initiate other explosives.

DETONATION. An exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than the
velocity of sound. The principal heating mechanism is one of shock compression. Detonations have an explosive effect.

**DETONATOR.** A device containing any initiating or primary explosive that is used for initiating detonation. A detonator shall not contain more than 154.32 grains (10 grams) of total explosives by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors, and noninstantaneous and delay blasting caps which use detonating cord, shock tube or any other replacement for electric leg wires. All types of detonators in strengths through No. 8 cap should be rated at 1 ½ pounds (0.68 kg) of explosives per 1,000 caps. For strengths higher than No. 8 cap, consult the manufacturer.

**[BG] DETOXIFICATION FACILITIES.** Facilities that provide treatment for substance abuse serving care recipients who are incapable of self-preservation or who are harmful to themselves or others.

**DIP TANK.** A tank, vat or container of flammable or combustible liquid in which articles or materials are immersed for the purpose of coating, finishing, treating and similar processes.

**DISCHARGE SITE.** The immediate area surrounding the fireworks mortars used for an outdoor fireworks display.

**DISPENSING.** The pouring or transferring of any material from a container, tank or similar vessel, whereby vapors, dusts, fumes, mists or gases are liberated to the atmosphere.

**DISPENSING DEVICE, OVERHEAD TYPE.** A dispensing device that consists of one or more individual units intended for installation in conjunction with each other, mounted above a dispensing area typically within the motor fuel-dispensing facility canopy structure, and characterized by the use of an overhead hose reel.

**DISPLAY SITE.** The immediate area where a fireworks display is conducted. The display area includes the discharge site, the fallout area and the required separation distance from the mortars to spectator viewing areas. The display area does not include spectator viewing areas or vehicle parking areas.

**DOOR, BALANCED.** See “Balanced door.”

**DOOR, DUTCH.** See “Dutch door.”

**DOOR, LOW ENERGY POWER-OPERATED.** See “Low energy power-operated door.”

**DOOR, POWER-ASSISTED.** See “Power-assisted door.”

**DOOR, POWER-OPERATED.** See “Power-operated door.”

**DOORWAY, EXIT ACCESS.** See “Exit access doorway.”

**[BG] DORMITORY.** A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

**DRAFT CURTAIN.** A structure arranged to limit the spread of smoke and heat along the underside of the ceiling or roof.

**[BF] DRAFTSTOP.** A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.

**DRY-CHEMICAL EXTINGUISHING AGENT.** A powder composed of small particles, usually of sodium bicarbonate, potassium bicarbonate, urea-potassium-based bicarbonate, potassium chloride or monoammonium phosphate, with added particulate material supplemented by special treatment to provide resistance to packing, resistance to moisture absorption (caking) and the proper flow capabilities.

**DRY CLEANING.** The process of removing dirt, grease, paints and other stains from such items as wearing apparel, textiles, fabrics and rugs by use of nonaqueous liquids (solvents).

**DRY CLEANING PLANT.** A facility in which dry cleaning and associated operations are conducted, including the office, receiving area and storage rooms.

**DRY CLEANING ROOM.** An occupiable space within a building used for performing dry cleaning operations, the installation of solvent-handling equipment or the storage of dry cleaning solvents.

**DRY CLEANING SYSTEM.** Machinery or equipment in which textiles are immersed or agitated in solvent or in which dry cleaning solvent is extracted from textiles.

**DUTCH DOOR.** A door divided horizontally so that the top can be operated independently from the bottom.

**[BG] DWELLING.** A building that contains one or two dwelling units used, intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

**[BG] DWELLING UNIT.** A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

**EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER.** A sprinkler listed for early suppression fast-response performance.

**[BE] EGRESS COURT.** A court or yard which provides access to a public way for one or more exits.

**ELECTROSTATIC FLUIDIZED BED.** A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material that is electrically charged with a charge opposite to that of the object to be coated. Such object is transported through the container immediately above the charged and aerated materials in order to be coated.
ELEVATOR GROUP. A grouping of elevators in a building located adjacent or directly across from one another that respond to a common hall call button(s).

EMERGENCY ALARM SYSTEM. A system to provide indication and warning of emergency situations involving hazardous materials.

EMERGENCY CONTROL STATION. An approved location on the premises where signals from emergency equipment are received and which is staffed by trained personnel.

[BE] EMERGENCY ESCAPE AND RESCUE OPENING. An operable window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

EMERGENCY EVACUATION DRILL. An exercise performed to train staff and occupants and to evaluate their efficiency and effectiveness in carrying out emergency evacuation procedures.

EMERGENCY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection and ventilation systems in the event of a failure of the primary power. Emergency power systems are required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.

EMERGENCY SHUTOFF VALVE. A valve designed to shut off the flow of gases or liquids.

EMERGENCY SHUTOFF VALVE, AUTOMATIC. A fail-safe automatic-closing valve designed to shut off the flow of gases or liquids initiated by a control system that is activated by automatic means.

EMERGENCY SHUTOFF VALVE, MANUAL. A manually operated valve designed to shut off the flow of gases or liquids.

EMERGENCY VOICE/ALARM COMMUNICATIONS. Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as alert and evacuation signals pertaining to a fire emergency, to the occupants of a building.

[BG] EMPLOYEE WORK AREA. All or any portion of a space used only by employees and only for work. Corridors, toilet rooms, kitchenettes and break rooms are not employee work areas.

ENERGY MANAGEMENT SYSTEMS. An electronic system that protects stationary storage batteries from operating outside their safe operating parameters, and generates an alarm and trouble signal for off normal conditions.

[BG] EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairways, alternating tread devices and ladders necessary to access the platform (see Section 505.3 of the International Building Code).

EXCESS FLOW CONTROL. A fail-safe system or other approved means designed to shut off flow caused by a rupture in pressurized piping systems.

EXCESS FLOW VALVE. A valve inserted into a compressed gas cylinder, portable tank or stationary tank that is designed to positively shut off the flow of gas in the event that its predetermined flow is exceeded.

EXHAUSTED ENCLOSURE. An appliance or piece of equipment which consists of a top, a back and two sides providing a means of local exhaust for capturing gases, fumes, vapors and mists. Such enclosures include laboratory hoods, exhaust fume hoods and similar appliances and equipment used to retain and exhaust locally the gases, fumes, vapors and mists that could be released. Rooms or areas provided with general ventilation, in themselves, are not exhausted enclosures.

EXISTING. Buildings, facilities or conditions that are already in existence, constructed or officially authorized prior to the adoption of this code.

[BE] EXIT. That portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, interior exit stairways and ramps, exit passageways, exterior exit stairways and ramps and horizontal exits.

[BE] EXIT ACCESS. That portion of a means of egress system that leads from any occupied portion of a building or structure to an exit.

[BE] EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, corridor, exit access stairway or ramp.

[BE] EXIT ACCESS RAMP. A ramp within the exit access portion of the means of egress system.

[BE] EXIT ACCESS STAIRWAY. A stairway within the exit access portion of the means of egress system.

[BE] EXIT DISCHARGE. That portion of a means of egress system between the termination of an exit and a public way.

[BE] EXIT DISCHARGE, LEVEL OF. The story at the point at which an exit terminates and an exit discharge begins.

[BE] EXIT PASSAGEWAY. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to the exit discharge.

EXPANDED PLASTIC. A foam or cellular plastic material having a reduced density based on the presence of numerous small cavities or cells dispersed throughout the material.

EXPLOSION. An effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave or disruption, or both, of enclosing materials or structures. An explosion could result from any of the following:
1. Chemical changes such as rapid oxidation, deflagration or detonation, decomposition of molecules and runaway polymerization (usually detonations).

2. Physical changes such as pressure tank ruptures.

3. Atomic changes (nuclear fission or fusion).

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.

The term “Explosive” includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive other than consumer fireworks, 1.4G by the hazardous materials regulations of DOTn 49 CFR Parts 100-185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap where unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse lighters, fireworks, 1.3G and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms “high” and “low” explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (for example, the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1. Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2. Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3. Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4. Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5. Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6. Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

EXPLOSIVE MATERIAL. The term “explosive” material means explosives, blasting agents and detonators.

[BE] EXTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to yards, courts or public ways.

[BE] EXTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to yards, courts or public ways.

[BF] EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

EXTRA-HIGH-RACK COMBUSTIBLE STORAGE. Storage on racks of Class I, II, III or IV commodities that exceed 40 feet (12 192 mm) in height and storage on racks of high-hazard commodities that exceed 30 feet (9144 mm) in height.

FABRICATION AREA. An area within a semiconductor fabrication facility and related research and development areas in which there are processes using hazardous production materials. Such areas are allowed to include ancillary rooms or areas such as dressing rooms and offices that are directly related to the fabrication area processes.

[A] FACILITY. A building or use in a fixed location including exterior storage areas for flammable and combustible substances and hazardous materials, piers, wharves, tank farms and similar uses. This term includes...
recreational vehicles, mobile home and manufactured housing parks, sales and storage lots.

FAIL-SAFE. A design condition incorporating a feature for automatically counteracting the effect of an anticipated possible source of failure; also, a design condition eliminating or mitigating a hazardous condition by compensating automatically for a failure or malfunction.

FALLOUT AREA. The area over which aerial shells are fired. The shells burst over the area, and unsafe debris and malfunctioning aerial shells fall into this area. The fallout area is the location where a typical aerial shell dud falls to the ground depending on the wind and the angle of mortar placement.

FALSE ALARM. The willful and knowing initiation or transmission of a signal, message or other notification of an event of fire when no such danger exists.

FINES. Small pieces or splinters of wood byproducts that will pass through a 0.25-inch (6.4 mm) screen.

FIRE ALARM. The giving, signaling or transmission to any public fire station, company or to any officer or employee thereof, whether by telephone, spoken word or otherwise, of information to the effect that there is a fire at or near the place indicated by the person giving, signaling or transmitting such information.

FIRE ALARM BOX, MANUAL. See “Manual fire alarm box.”

FIRE ALARM CONTROL UNIT. A system component that receives inputs from automatic and manual fire alarm devices and may be capable of supplying power to detection devices and transponder(s) or off-premises transmitter(s). The control unit may be capable of providing a transfer of power to the notification appliances and transfer of condition to relays or devices.

FIRE ALARM SIGNAL. A signal initiated by a fire alarm-initiating device such as a manual fire alarm box, automatic fire detector, waterflow switch or other device whose activation is indicative of the presence of a fire or fire signature.

FIRE ALARM SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and announce the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

FIRE APPARATUS ACCESS ROAD. A road, not including alley ways, that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.

FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

FIRE CHIEF. The chief officer of the fire department serving the jurisdiction, or a duly authorized representative.

FIRE CODE OFFICIAL. The fire chief or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative.

FIRE COMMAND CENTER. The principal attended or unattended location where the status of detection, alarm communications and control systems is displayed, and from which the system(s) can be manually controlled.

FIRE DAMPER. A listed device installed in ducts and air transfer openings designed to close automatically upon detection of heat and resist the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic fire damper is tested and rated for closure under elevated temperature airflow.

FIRE DEPARTMENT MASTER KEY. A limited issue key of special or controlled design to be carried by fire department officials in command which will open key boxes on specified properties.

FIRE DETECTOR, AUTOMATIC. A device designed to detect the presence of a fire signature and to initiate action.

FIRE DOOR. The door component of a fire door assembly.

FIRE DOOR ASSEMBLY. Any combination of a fire door, frame, hardware and other accessories that together provide a specific degree of fire protection to the opening.

FIRE EXIT HARDWARE. Panic hardware that is listed for use on fire door assemblies.

FIRE FLOW. The flow rate of a water supply, measured at 20 psi (137 kPa) residual pressure that is available for firefighting.

FIRE LANE/EMERGENCY APPARATUS LANE. A road or other passageway developed to allow the passage of fire apparatus. A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

FIRE PARTITION. A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

FIRE POINT. The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame in accordance with ASTM D 92.

FIRE PROTECTION RATING. The period of time that an opening protective assembly will maintain the ability to confine a fire as determined by tests prescribed in Section 716 of the International Building Code. Ratings are stated in hours or minutes.

FIRE PROTECTION SYSTEM. Approved devices, equipment and systems or combinations of systems used to
detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

**[BF] FIRE RESISTANCE.** That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

**[BF] FIRE-RESISTANCE RATING.** The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703 of the International Building Code.

**[BF] FIRE-RESISTANT JOINT SYSTEM.** An assemblage of specific materials or products that are designed, tested and fire-resistance rated in accordance with either ASTM E 1966 or UL 2079 to resist for a prescribed period of time the passage of fire through joints made in or between fire-resistance-rated assemblies.

**FIRE SAFETY DIRECTOR.** A representative of the owner of the building who is responsible for implementing the Fire Safety and Evacuation Plan and providing information and training to staff tenants, residents, and guests. The director is responsible for directing the Fire Safety and Evacuation Plan during and after an emergency. The director is responsible for ensuring alternates are designated. The Fire Safety Director is the liaison to city agencies during emergencies.

**FIRE SAFETY FUNCTIONS.** Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

**[BF] FIRE SEPARATION DISTANCE.** The distance measured from the building face to one of the following:

1. The closest interior lot line.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the face of the wall.

**[BF] FIRE WALL.** A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

**FIRE WATCH.** A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire and notifying the fire department.

**[BF] FIREBLOCKING.** Building materials, or materials approved for use as fireblocking, installed to resist the free passage of flame to other areas of the building through concealed spaces.

**FIREWORKS.** Any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, deflagration or detonation that meets the definition of 1.4G fireworks or 1.3G fireworks.

**Fireworks, 1.4G.** Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the U.S. Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507, are not explosive materials for the purpose of this code.

**Fireworks, 1.3G.** Large fireworks devices, which are explosive materials, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, deflagration or detonation. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as Fireworks, UN 0335 by the DOTn.

**FIREWORKS DISPLAY.** A presentation of fireworks for a public or private gathering.

**[BG] FIXED BASE OPERATOR (FBO).** A commercial business granted the right by the airport sponsor to operate on an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance and flight instruction.

**[BE] FIXED SEATING.** Furniture or fixtures designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

**[BF] FLAME SPREAD.** The propagation of flame over a surface.

**[BF] FLAME SPREAD INDEX.** A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E 84 or UL 723.

**FLAMMABLE CRYOGENIC FLUID.** A cryogenic fluid that is flammable in its vapor state.

**FLAMMABLE FINISHES.** Coatings to articles or materials in which the material being applied is a flammable liquid, combustible liquid, combustible powder, fiberglass resin or flammable or combustible gel coating.

**FLAMMABLE GAS.** A material which is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] which:
1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or
2. Has a flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit.

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E 681.

**FLAMMABLE LIQUEFIED GAS.** A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and which is flammable.

**FLAMMABLE LIQUID.** A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

- **Class IA.** Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).
- **Class IB.** Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).
- **Class IC.** Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

The category of flammable liquids does not include compressed gases or cryogenic fluids.

**FLAMMABLE MATERIAL.** A material capable of being readily ignited from common sources of heat or at a temperature of 600°F (316°C) or less.

**FLAMMABLE SOLID.** A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.

**FLAMMABLE VAPOR AREA.** An area in which the concentration of flammable constituents (vapor, gas, fume, mist or dust) in air exceeds 25 percent of their lower flammable limit (LFL) because of the flammable finish processes operation. It shall include:

1. The interior of spray booths.
2. The interior of ducts exhausting from spraying processes.
3. Any area in the direct path of spray or any area containing dangerous quantities of air-suspended powder, combustible residue, dust, deposits, vapor or mists as a result of spraying operations.
4. The area in the vicinity of dip tanks, drain boards or associated drying, conveying or other equipment during operation or shutdown periods.

The fire code official is authorized to determine the extent of the flammable vapor area, taking into consideration the material characteristics of the flammable materials, the degree of sustained ventilation and the nature of the operations.

**FLAMMABLE VAPORS OR FUMES.** The concentration of flammable constituents in air that exceeds 25 percent of their lower flammable limit (LFL).

**FLASH POINT.** The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D 56, ASTM D 93 or ASTM D 3278.

**FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.** That portion of a commercial, industrial, governmental or manufacturing property where liquids used as fuels are stored and dispensed into the fuel tanks of motor vehicles that are used in connection with such businesses, by persons within the employ of such businesses.

**[BE] FLIGHT.** A continuous run of rectangular treads, winder(s), or combination thereof from one landing to another.

**FLOAT.** A floating structure normally used as a point of transfer for passengers and goods, or both, for mooring purposes.

**[BE] FLOOR AREA, GROSS.** The floor area within the inside perimeter of the exterior walls of the building under consideration, exclusive of vent shafts and courts, without deduction for corridors, stairways, ramps, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts.

**[BE] FLOOR AREA, NET.** The actual occupied area not including unoccupied accessory areas such as corridors, stairways, ramps, toilet rooms, mechanical rooms and closets.

**FLUE SPACES.**

- **Longitudinal flue space.** The flue space between rows of storage perpendicular to the direction of loading.
- **Transverse flue space.** The space between rows of storage parallel to the direction of loading.

**FLUIDIZED BED.** A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

**FOAM-EXTINGUISHING SYSTEM.** A special system discharging a foam made from concentrates, either mechanically or chemically, over the area to be protected.

**[BE] FOLDING AND TELESCOPIC SEATING.** Tiered seating having an overall shape and size that is capable of being reduced for purposes of moving or storing and is not a building element.
[BG] FOSTER CARE FACILITIES. facilities that provide care to more than five children, 2 ½ years of age or less.

FUEL CELL POWER SYSTEM, STATIONARY. A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC electricity) by an electrochemical process.

Field-fabricated fuel cell power system. A stationary fuel cell power system that is assembled at the job site and is not a preengineered or prepackaged factory-assembled fuel cell power system.

Preengineered fuel cell power system. A stationary fuel cell power system consisting of components and modules that are produced in a factory, and shipped to the job site for assembly.

Prepackaged fuel cell power system. A stationary fuel cell power system that is factory assembled as a single, complete unit and shipped as a complete unit for installation at the job site.

FUEL LIMIT SWITCH. A mechanism, located on a tank vehicle, that limits the quantity of product dispensed at one time.

FUMIGANT. A substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor utilized for the destruction or control of insects, fungi, vermin, germs, rats or other pests, and shall be distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases. Examples are methyl bromide, ethylene dibromide, hydrogen cyanide, carbon disulfide and sulfuryl fluoride.

FUMIGATION. The utilization within an enclosed space of a fumigant in concentrations that are hazardous or acutely toxic to humans.

FURNACE CLASS A. An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there is no potential explosion or fire hazard that could be occasioned by the presence of flammable volatiles or combustible materials processed or heated in the furnace.

Note: Such flammable volatiles or combustible materials can, for instance, originate from the following:

1. Paints, powders, inks, and adhesives from finishing processes, such as dipped, coated, sprayed and impregnated materials.
2. The substrate material.
3. Wood, paper and plastic pallets, spacers or packaging materials.
4. Polymerization or other molecular rearrangements.

Potentially flammable materials, such as quench oil, water-borne finishes, cooling oil or cooking oils that present a hazard are ventilated according to Class A standards.

FURNACE CLASS B. An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there are no flammable volatiles or combustible materials being heated.

FURNACE CLASS C. An oven or furnace that has a potential hazard due to a flammable or other special atmosphere being used for treatment of material in process. This type of furnace can use any type of heating system and includes a special atmosphere supply system. Also included in the Class C classification are integral quench furnaces and molten salt bath furnaces.

FURNACE CLASS D. An oven or furnace that operates at temperatures from above ambient to over 5,000°F (2760°C) and at pressures normally below atmospheric using any type of heating system. These furnaces can include the use of special processing atmospheres.

GAS CABINET. A fully enclosed, ventilated, noncombustible enclosure used to provide an isolated environment for compressed gas cylinders in storage or use. Doors and access ports for exchanging cylinders and accessing pressure-regulating controls are allowed to be included.

GAS DETECTION SYSTEM. A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

GAS ROOM. A separately ventilated, fully enclosed room in which only compressed gases and associated equipment and supplies are stored or used.

GAS ROOM, HYDROGEN FUEL. See “Hydrogen fuel gas room.”

GASEOUS HYDROGEN SYSTEM. An assembly of piping, devices and apparatus designed to generate, store, contain, distribute or transport a nontoxic, gaseous hydrogen-containing mixture having not less than 95-percent hydrogen gas by volume and not more than 1-percent oxygen by volume. Gaseous hydrogen systems consist of items such as compressed gas containers, reactors and appurtenances, including pressure regulators, pressure relief devices, manifolds, pumps, compressors and interconnecting piping and tubing and controls.

GLOVE BOX. A sealed enclosure in which items inside the box are handled exclusively using long gloves sealed to ports in the enclosure.

[BG] GRADE FLOOR OPENING. A window or other opening located such that the sill height of the opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.

[BG] GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at
exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

[BE] GRANDSTAND. Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see “Bleachers”).

[BG] GROUP HOME. A facility for social rehabilitation, substance abuse or mental health problems that contains a group housing arrangement that provides custodial care but does not provide medical care.

[BE] GUARD. A building component or a system of building components located at or near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to a lower level.

[BG] GUEST ROOM. A room used or intended to be used by one or more guests for living or sleeping purposes.

[BS] GYPSUM BOARD. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board or water-resistant gypsum backing board complying with the standards listed in Tables 2506.2 and 2507.2 and Chapter 35 of the International Building Code.

[BG] HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

HALOGENATED EXTINGUISHING SYSTEM. A fire-extinguishing system using one or more atoms of an element from the halogen chemical series: fluorine, chlorine, bromine and iodine.

HANDLING. The deliberate transport by any means to a point of storage or use.

[BE] HANDRAIL. A horizontal or sloping rail intended for grasping by the hand for guidance or support.

HAZARDOUS MATERIALS. Those chemicals or substances which are physical hazards or health hazards as defined and classified in this chapter, whether the materials are in usable or waste condition.

HAZARDOUS PRODUCTION MATERIAL (HPM). A solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or instability of Class 3 or 4 as ranked by NFPA 704 and which is used directly in research, laboratory or production processes which have, as their end product, materials that are not hazardous.

HEALTH HAZARD. A classification of a chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term “health hazard” includes chemicals that are toxic, highly toxic and corrosive.

HEAT DETECTOR. See “Detector, heat.”
occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

**HIGHLY VOLATILE LIQUID.** A liquefied compressed gas with a boiling point of less than 68°F (20°C).

**HIGHWAY.** A public street, public alley or public road.

[A] **HISTORIC BUILDINGS.** Any building or structure that is one or more of the following:
1. Listed, or certified as eligible for listing by the state historic preservation officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.
2. Designated as historic under an applicable state or local law.
3. Certified as a contributing resource within a national register, state designated or locally designated historic district.

[B] **HISTORIC BUILDINGS.** Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law.

**HOGGED MATERIALS.** Wood waste materials produced from the lumber production process.

[M] **HOOD.** An air-intake device used to capture by entrainment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

Type I. A kitchen hood for collecting and removing grease vapors and smoke.

Type II. A general kitchen hood for collecting and removing steam vapor, heat, odors and products of combustion.

[BF] **HORIZONTAL ASSEMBLY.** A fire-resistance-rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained.

[BE] **HORIZONTAL EXIT.** An exit component consisting of fire-resistance-rated construction and opening protectives intended to compartmentalize portions of a building thereby creating refuge areas that afford safety from fire and smoke from the area of fire origin.

[BG] **HOSPITALS AND PSYCHIATRIC HOSPITALS.** Facilities that provide care or treatment for the medical, psychiatric, obstetrical, or surgical treatment of inpatient care recipients that are incapable of self-preservation.

**HOT WORK.** Operations including cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar activity.

**HOT WORK AREA.** The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

**HOT WORK EQUIPMENT.** Electric or gas welding or cutting equipment used for hot work.

**HOT WORK PERMITS.** Permits issued by the responsible person at the facility under the hot work permit program permitting welding or other hot work to be done in locations referred to in Section 3503.3 and prepermitted by the fire code official.

**HOT WORK PROGRAM.** A permitted program, carried out by approved facilities-designated personnel, allowing them to oversee and issue permits for hot work conducted by their personnel or at their facility. The intent is to have trained, on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

**HPM.** See “Hazardous Production Material”

**HPM FACILITY.** See “Semiconductor fabrication facility.”

**HPM ROOM.** A room in conjunction with or serving a Group H-5 occupancy, where HPM is stored or used and which is classified as a Group H-2, H-3 or H-4 occupancy.

**HYDRAULICALLY MOST DEMANDING HYDRANT.** The fire hydrant that results in the most demanding flow and pressure requirement needed to supply the private fire distribution main(s).

**HYDROGEN FUEL GAS ROOM.** A room or space that is intended exclusively to house a gaseous hydrogen system.

**IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).** The concentration of air-borne contaminants that poses a threat of death, immediate or delayed permanent adverse health effects, or effects that could prevent escape from such an environment. This contaminant concentration level is established by the National Institute of Occupational Safety and Health (NIOSH) based on both toxicity and flammability. It generally is expressed in parts per million by volume (ppm v/v) or milligrams per cubic meter (mg/m³). Where adequate data do not exist for precise establishment of IDLH concentrations, an independent certified industrial hygienist, industrial toxicologist, appropriate regulatory agency or other source approved by the fire code official shall make such determination.

**IMPAIRMENT COORDINATOR.** The person responsible for the maintenance of a particular fire protection system.

**INCAPABLE OF SELF-PRESERVATION.** Persons who, because of age, physical limitations, mental limitations, chemical dependency or medical treatment, cannot respond as an individual to an emergency situation.
INCOMPATIBLE MATERIALS. Materials that, when mixed, have the potential to react in a manner which generates heat, fumes, gases or byproducts which are hazardous to life or property.

INERT GAS. A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.

INHABITED BUILDING. A building regularly occupied in whole or in part as a habitation for people, or any place of religious worship, schoolhouse, railroad station, store or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosive materials.

INITIATING DEVICE. A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch.

INSECTICIDAL FOGGING. The utilization of insecticidal liquids passed through fog-generating units where, by means of pressure and turbulence, with or without the application of heat, such liquids are transformed and discharged in the form of fog or mist blown into an area to be treated.

INTEGRATED TESTING (FIRE PROTECTION AND LIFE SAFETY SYSTEM). A testing procedure to establish the operational status, interaction and coordination of two or more fire protection and safety systems.

[BE] INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

[BE] INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

[BG] INTERIOR FINISH. Interior finish includes interior wall and ceiling finish and interior floor finish.

[BG] INTERIOR FLOOR-WALL BASE. Interior floor finish trim used to provide a functional or decorative border at the intersection of walls and floors.

[BG] INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including trim.

IRRITANT. A chemical which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of CPSC 16 CFR Part 1500.41 for an exposure of four or more hours or by other appropriate techniques, it results in an empirical score of 5 or more. A chemical is classified as an eye irritant if so determined under the procedure listed in CPSC 16 CFR Part 1500.42 or other approved techniques.

[A] JURISDICTION. The governmental unit that has adopted this code under due legislative authority.

KEY BOX. A secure device with a lock operable only by a fire department master key, and containing building entry keys and other keys that may be required for access in an emergency.

[A] LABELED. Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

LEVEL OF EXIT DISCHARGE. See “Exit discharge, level of.”

LIMITED SPRAYING SPACE. An area in which operations for touch-up or spot painting of a surface area of 9 square feet (0.84 m²) or less are conducted.

LIQUEFIED NATURAL GAS (LNG). A fluid in the liquid state composed predominantly of methane and which may contain minor quantities of ethane, propane, nitrogen or other components normally found in natural gas.

LIQUEFIED PETROLEUM GAS (LP-gas). A material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

LIQUID. A material having a melting point that is equal to or less than 68°F (20°C) or a boiling point which is greater than 68°F (20°C) at 14.7 pounds per square inch absolute (psia) (101 kPa). Where not otherwise identified, the term “liquid” includes both flammable and combustible liquids.

LIQUID OXYGEN AMBULATORY CONTAINER. A container used for liquid oxygen not exceeding 0.396 gallons (1.5 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended for portable therapeutic use and to be filled from its own base unit, a liquid oxygen home care container.

LIQUID OXYGEN HOME CARE CONTAINER. A container used for liquid oxygen not exceeding 15.8 gallons (60 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended to deliver gaseous oxygen for therapeutic use in a home environment.
LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

LIQUID STORAGE WAREHOUSE. A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the fire code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

LOCKDOWN. An emergency situation, in other than a Group I-3 occupancy, requiring that the occupants be sheltered and secured in place within a building when normal evacuation would put occupants at risk.

[BG] LODGING HOUSE. A one-family dwelling where one or more occupants are primarily permanent in nature and rent is paid for guest rooms.

LONGITUDINAL FLUE SPACE. See “Flue space—longitudinal.”

[A] LOT. A portion or parcel of land considered as a unit.

[A] LOT LINE. A line dividing one lot from another, or from a street or any public place.

[BE] LOW ENERGY POWER-OPERATED DOOR. Swinging door which opens automatically upon an action by a pedestrian such as pressing a push plate or waving a hand in front of a sensor. The door closes automatically, and operates with decreased forces and decreased speeds. See also “Power-assisted door” and “Power-operated door.”

LOW-PRESSURE TANK. A storage tank designed to withstand an internal pressure greater than 0.5 pound per square inch gauge (psig) (3.4 kPa) but not greater than 15 psig (103.4 kPa).

LOWER EXPLOSIVE LIMIT (LEL). See “Lower flammable limit.”

LOWER FLAMMABLE LIMIT (LFL). The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. The LFL is sometimes referred to as LEL or lower explosive limit.

LP-GAS CONTAINER. Any vessel, including cylinders, tanks, portable tanks and cargo tanks, used for transporting or storing LP-gases.

MAGAZINE. A building, structure or container, other than an operating building, approved for storage of explosive materials. Indoor. A portable structure, such as a box, bin or other container, constructed as required for Type 2, 4 or 5 magazines in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 so as to be fire resistant and theft resistant.

Indoor. A portable structure, such as a box, bin or other container, constructed as required for Type 2, 4 or 5 magazines in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 55 so as to be fire resistant and theft resistant.

Type 1. A permanent structure, such as a building or igloo, that is bullet resistant, fire resistant, theft resistant, weather resistant and ventilated in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

Type 2. A portable or mobile structure, such as a box, skid-magazine, trailer or semitrailer, constructed in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 that is fire resistant, theft resistant, weather resistant and ventilated. If used outdoors, a Type 2 magazine is also bullet resistant.

Type 3. A fire resistant, theft resistant and weather resistant “day box” or portable structure constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 used for the temporary storage of explosive materials.

Type 4. A permanent, portable or mobile structure such as a building, igloo, box, semitrailer or other mobile container that is fire resistant, theft resistant and weather resistant and constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

Type 5. A permanent, portable or mobile structure such as a building, igloo, box, bin, tank, semitrailer, bulk trailer, tank trailer, bulk truck, tank truck or other mobile container that is theft resistant, which is constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.MAGNESIUM. The pure metal and alloys, of which the major part is magnesium.

MAINTENANCE. The repair or replacement of defective or damaged equipment, systems or programming with an exact duplicate model. Maintenance also includes testing of equipment.

MALL. See “Covered mall building.”

MANUAL FIRE ALARM BOX. A manually operated device used to initiate an alarm signal.

MANUAL Stocking METHODS. Stocking methods utilizing ladders or other nonmechanical equipment to move stock.

MARINA. Any portion of the ocean or inland water, either naturally or artificially protected, for the mooring, servicing or safety of vessels and shall include artificially protected works, the public or private lands ashore, and structures or facilities provided within the enclosed body of water and ashore for the mooring or servicing of vessels or the servicing of their crews or passengers.

MARINE MOTOR FUEL-Dispensing FACILITY. That portion of property where flammable or combustible liquids or gases used as fuel for watercraft are stored and dispensed from fixed equipment on shore, piers, wharves,
floats or barges into the fuel tanks of watercraft and shall include all other facilities used in connection therewith.

**MATERIAL SAFETY DATA SHEET (MSDS).** Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally approved state OSHA plan.

**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.** The maximum amount of a hazardous material allowed to be stored or used within a control area inside a building or an outdoor control area. The maximum allowable quantity per control area is based on the material state (solid, liquid or gas) and the material storage or use conditions.

**[BE] MEANS OF EGRESS.** A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

**MECHANICAL STOCKING METHODS.** Stocking methods utilizing motorized vehicles or hydraulic jacks to move stock.

**[BF] MEDICAL CARE.** Care involving medical or surgical procedures, nursing or for psychiatric purposes.

**[BF] MEMBRANE-PENETRATION FIRESTOP SYSTEM.** An assemblage consisting of a fire-resistance-rated floor-ceiling, roof-ceiling or wall assembly, one or more penetrating items installed into or passing through the breach in one side of the assembly and the materials or devices, or both, installed to resist the spread of fire into the assembly for a prescribed period of time.

**MEMBRANE STRUCTURE.** An air-inflated, air-supported, cable or frame-covered structure as defined by the International Building Code and not otherwise defined as a tent. See Chapter 31 of the International Building Code.

**[BE] MERCHANDISE PAD.** A merchandise pad is an area for display of merchandise surrounded by aisles, permanent fixtures or walls. Merchandise pads contain elements such as nonfixed and moveable fixtures, cases, racks, counters and partitions as indicated in Section 105.2 of the International Building Code from which customers browse or shop.

**METAL HYDRIDE.** A generic name for compounds composed of metallic element(s) and hydrogen.

**METAL HYDRIDE STORAGE SYSTEM.** A closed system consisting of a group of components assembled as a package to contain metal-hydrogen compounds for which there exists an equilibrium condition where the hydrogen-absorbing metal alloy(s), hydrogen gas and the metal-hydrogen compound(s) coexist and where only hydrogen gas is released from the system in normal use.

**[BG] MEZZANINE.** An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505 of the International Building Code.

**MISCELLA.** A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.

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

**MOBILE FUELING.** The operation of dispensing liquid fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms “Mobile fleet fueling,” “Wet fueling” and “Wet hosing.”

**MODIFICATION.** Any change or reprogramming of any existing fire and life safety equipment or system regulated by this code, that is not the exact same model, area or programming from original equipment or installation.

**MORTAR.** A tube from which fireworks shells are fired into the air.

**MULTIPLE-STATION ALARM DEVICE.** Two or more single-station alarm devices that can be interconnected such that actuation of one causes all integral or separate audible alarms to operate. A multiple-station alarm device can consist of one single-station alarm device having connections to other detectors or to a manual fire alarm box.

**MULTIPLE-STATION SMOKE ALARM.** Two or more single-station alarm devices that are capable of interconnection such that actuation of one causes the appropriate alarm signal to operate in all interconnected alarms.

**NESTING.** A method of securing flat-bottomed compressed gas cylinders upright in a tight mass using a contiguous three-point contact system whereby all cylinders within a group have not less than three points of contact with other cylinders, walls or bracing.

**NET EXPLOSIVE WEIGHT (net weight).** The weight of explosive material expressed in pounds. The net explosive weight is the aggregate amount of explosive material contained within buildings, magazines, structures or portions thereof, used to establish quantity-distance relationships.

**NORMAL TEMPERATURE AND PRESSURE (NTP).** A temperature of 70°F (21°C) and a pressure of 1 atmosphere [14.7 psia (101 kPa)].

**[BE] NOSING.** The leading edge of treads of stairs and of landings at the top of stairway flights.

**NOTIFICATION ZONE.** See “Zone, notification.”

**NUISANCE ALARM.** An alarm caused by mechanical failure, malfunction, improper installation or lack of proper maintenance, or an alarm activated by a cause that cannot be determined.

**[BG] NURSING HOMES.** Facilities that provide care, including both intermediate care facilities and skilled nursing facilities, where any of the persons are incapable of self-preservation.

**OCCUPANCY CLASSIFICATION.** For the purposes of this code, certain occupancies are defined as follows:
[BG] Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation.

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

[BG] Small assembly spaces. The following rooms and spaces shall not be classified as assembly occupancies:
1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m²) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

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

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

[BG] Assembly Group A-1. Group A occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of performing arts or motion pictures including, but not limited to:
- Motion picture theaters
- Symphony and concert halls
- Television and radio studios admitting an audience
- Theaters

[BG] Assembly. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption including, but not limited to:
- Banquet halls
- Casinos (gaming areas)
- Night clubs
- Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)
- Taverns and bars

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

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

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

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

[BG] Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:
- Airport traffic control towers
- Ambulatory care facilities
- Animal hospitals, kennels and pounds
- Banks
- Barber and beauty shops
- Car wash
- Civic administration
- Clinic-outpatient
Dry cleaning and laundries: pick-up and delivery stations and self-service

Educational occupancies for students above the 12th grade

Electronic data processing

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

Laboratories: testing and research

Motor vehicle showrooms

Post offices

Print shops

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

Radio and television stations

Telephone exchanges

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

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

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

**[BG] Group E, day care facilities.** This group includes buildings and structures or portions thereof occupied by more than five children older than 2 ½ years of age who receive educational, supervision or personal care services for less than 24 hours per day.

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

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

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

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

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

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

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

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

High-hazard Group H. High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 5003.8.3, based on the maximum allowable quantity limits for control areas set forth in Tables 5003.1.1(1) and 5003.1.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code.

Uses other than Group H. The storage, use or handling of hazardous materials as described in one or more of the following items shall not cause the occupancy to be classified as Group H, but it shall be classified as the occupancy that it most nearly resembles:

- 1. Buildings and structures occupied for the application of flammable finishes, provided that such buildings or areas conform to the requirements of Chapter 24 of this code and Section 416 of the International Building Code.
- 2. Wholesale and retail sales and storage of flammable and combustible liquids in mercantile occupancies conforming to Chapter 57.
- 3. Closed piping system containing flammable or combustible liquids or gases utilized for the operation of machinery or equipment.
- 4. Cleaning establishments that utilize combustible liquid solvents having a flash point of 140°F (60°C) or higher in closed systems employing equipment listed by an approved testing agency, provided that this occupancy is separated from all other areas of the building by 1-hour fire barriers in accordance with Section 707 of the International Building Code or 1-hour horizontal assemblies in accordance with Section 711 of the International Building Code, or both.
- 5. Cleaning establishments that utilize a liquid solvent having a flash point at or above 200°F (93°C).
- 6. Liquor stores and distributors without bulk storage.
- 7. Refrigeration systems.
- 8. The storage or utilization of materials for agricultural purposes on the premises.
- 9. Stationary storage battery systems installed in accordance with Section 1206.2.
- 10. Corrosive personal or household products in their original packaging used in retail display.
- 11. Commonly used corrosive building materials.
- 12. Buildings and structures occupied for aerosol product storage shall be classified as Group S-1, provided that such buildings conform to the requirements of Chapter 51.
- 13. Display and storage of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in quantities not exceeding the maximum allowable quantity per control area in Group M or S occupancies complying with Section 5003.8.3.5.1.
- 14. The storage of black powder, smokeless propellant and small arms primers in Groups M and R-3 and special industrial explosive devices in Groups B, F, M and S, provided such storage conforms to the quantity limits and requirements of this code.
- 15. Stationary fuel cell power systems installed in accordance with this code.
- 16. Capacitor energy storage systems in accordance with this code.
- 17. Group B higher education laboratory occupancies complying with Section 428 of the International Building Code and Chapter 38 of this code.

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

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

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

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

2. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in H-3 occupancies.

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

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

Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the International Building Code.

Cryogenic fluids, flammable
Flammable gases
Organic peroxides, Class I
Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)
Pyrophoric liquids, solids and gases, nondetonable
Unstable (reactive) materials, Class 3, nondetonable
Water-reactive materials, Class 3

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

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

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the International Building Code.

Consumer fireworks, 1.4G (Class C, Common)
Cryogenic fluids, oxidizing
Flammable solids
Organic peroxides, Class II and III
Oxidizers, Class 2
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less
Oxidizing gases
Unstable (reactive) materials, Class 2
Water-reactive materials, Class 2

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

Corrosives
Highly toxic materials
Toxic materials

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

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

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

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

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

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

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

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

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

- Correctional centers
- Detention centers
- Jails
- Prerelease centers
- Prisons
- Reformatories

Buildings of Group I-3 shall be classified as one of the following occupancy conditions:

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

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

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

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

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

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

- Adult day care
- Child day care

[BG] Classification as Group E. A child day care facility that provides care for more than five but not more than 100 children 2 ½ years or less of age, where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.

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

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

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

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

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

[BG] Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the International Residential Code in accordance with Section 101.2 of the International Building Code.

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

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

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

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

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

- Buildings that do not contain more than two dwelling units
- Care facilities that provide accommodations for five or fewer persons receiving care

[BG] Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.1.3.1 or Section P2904 of the International Residential Code.

[BG] Lodging houses. Owner-occupied lodging houses with five or fewer guest rooms and 10 or fewer total
occupants shall be permitted to be constructed in accordance with the *International Residential Code*.

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

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

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

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

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

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

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

**[BG] Moderate-hazard storage, Group S-1.** Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

- Aerosols, Levels 2 and 3
- Aircraft hangar (storage and repair)
- Bags: cloth, burlap and paper
- Bamboos and rattan
- Baskets
- Belting: canvas and leather
- Books and paper in rolls or packs
- Boots and shoes
- Buttons, including cloth covered, pearl or bone
- Cardboard and cardboard boxes
- Clothing, woolen wearing apparel
- Cordage
- Dry boat storage (indoor)
- Furniture
- Furs
- Glues, mucilage, pastes and size
- Grains
- Horns and combs, other than celluloid
- Leather
- Linoleum
- Lumber
- Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials listed in Table 5003.1.1(1) (see Section 406.8 of the *International Building Code*)
- Photo engravings
- Resilient flooring
- Self-service storage facility (mini-storage)
- Silks
- Soaps
- Sugar
- Tires, bulk storage of
- Tobacco, cigars, cigarettes and snuff
- Upholstery and mattresses
- Wax candles

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

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

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

- Agricultural buildings
- Aircraft hangar, accessory to a oneor two-family residence (see Section 412.4 of the *International Building Code*)
- Barns
- Carports
- Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m²)
- Fences more than 6 feet (1829 mm) high
- Grain silos, accessory to a residential occupancy
- Greenhouses. Greenhouses not classified as another occupancy shall be classified as Use Group U.
- Livestock shelters
- Private garages
- Retaining walls
- Sheds
- Stables
- Tanks
- Towers

**[BG] OCCUPANT LOAD.** The number of persons for which the *means of egress* of a building or portion thereof is designed.

**OPEN-AIR ASSEMBLY SEATING.** Seating served by means of egress that is not subject to smoke accumulation within or under a structure and is open to the atmosphere.

**OPEN BURNING.** The burning of materials wherein products of combustion are emitted directly into the ambient air without passing through a stack or chimney from an enclosed chamber. Open burning does not include road flares, smudgepots and similar devices associated with safety or occupational uses typically considered open flames, *recreational fires* or use of portable outdoor fireplaces. For the purpose of this definition, a chamber shall be regarded as enclosed when, during the time combustion occurs, only apertures, ducts, stacks, flues or chimneys necessary to provide combustion air and permit the escape of exhaust gas are open.

**[BE] OPEN-ENDED CORRIDOR.** An interior *corridor* that is open on each end and connects to an exterior *stairway* or *ramp* at each end with no intervening doors or separation from the *corridor*.

**OPEN MALL.** See “Covered mall building.”

**OPEN MALL BUILDING.** See “Covered mall building.”

**[BG] OPEN PARKING GARAGE.** A structure or portion of a structure with the openings as described in Section 406.5.2 of the *International Building Code* on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.5 of the *International Building Code*.

**OPEN SYSTEM.** The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

**[BF] OPENING PROTECTIVE.** A fire door assembly, fire shutter assembly, fire window assembly or glass-block assembly in a fire-resistance-rated wall or partition.

**OPERATING.** To work or use a machine or apparatus; or perform some process of work or treatment.

**OPERATING BUILDING.** A building occupied in conjunction with the manufacture, transportation or use of *explosive materials*. Operating buildings are separated from one another with the use of intraplant or intraline distances.

**OPERATING LINE.** A group of buildings, facilities or workstations so arranged as to permit performance of the steps in the manufacture of an *explosive* or in the loading, assembly, modification and maintenance of ammunition or devices containing *explosive materials*.

**OPERATING PRESSURE.** The pressure at which a system operates.

**ORGANIC COATING.** A liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which, when spread in a thin film, convert to a durable protective and decorative finish.
ORGANIC PEROXIDE. An organic compound that contains the bivalent \(-O-O\) structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (\textit{detonation} or \textit{deflagration}) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.

\textbf{Class I.} Describes those formulations that are capable of \textit{deflagration} but not \textit{detonation}.

\textbf{Class II.} Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.

\textbf{Class III.} Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.

\textbf{Class IV.} Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.

\textbf{Class V.} Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.

\textbf{Unclassified detonable.} Organic peroxides that are capable of \textit{detonation}. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.

\textbf{OUTDOOR ASSEMBLY EVENT.} An outdoor gathering of persons for any purpose.

\textbf{OUTDOOR CONTROL AREA.} An outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of Table 5003.1.1(3) or Table 5003.1.1(4).

\textbf{OUTPATIENT CLINIC.} See “Clinic, outpatient.”

\textbf{OVERCROWDING.} A condition that exists when either there are more people in a building, structure or portion thereof than have been authorized or posted by the fire code official, or when the fire code official determines that a threat exists to the safety of the occupants due to persons sitting and/or standing in locations that may obstruct or impede the use of \textit{aisles}, \textit{passages}, \textit{corridors}, \textit{stairways}, \textit{exits} or other components of the \textit{means of egress}.

\textbf{[A] OWNER.} Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

\textbf{OXIDIZER.} A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.

\textbf{Class 4.} An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.

\textbf{Class 3.} An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.

\textbf{Class 2.} An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.

\textbf{Class 1.} An oxidizer that does not moderately increase the burning rate of combustible materials.

\textbf{OXIDIZING CRYSOGENIC FLUID.} An oxidizing gas in the cryogenic state.

\textbf{OXIDIZING GAS.} A gas that can support and accelerate combustion of other materials more than air does.

\textbf{OZONE-GAS GENERATOR.} Equipment which causes the production of ozone.

\textbf{[BE] PANIC HARDWARE.} A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel. See also “Fire exit hardware.”

\textbf{PASS-THROUGH.} An enclosure installed in a wall with a door on each side that allows chemicals, HPM, equipment, and parts to be transferred from one side of the wall to the other.

\textbf{PEDESTRIAN GATES.} Gates used by pedestrians to provide access to or egress from buildings, yards, courts, swimming pools and similar areas.

\textbf{[BG] PENTHOUSE.} An enclosed, unoccupied rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, and vertical shaft openings.

\textbf{PERMISSIBLE EXPOSURE LIMIT (PEL).} The maximum permitted 8-hour time-weighted-average concentration of an airborne contaminant. The exposure limits to be utilized are those published in DOL 29 CFR Part 1910.1000. The Recommended Exposure Limit (REL) concentrations published by the U.S. National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Time Weighted Average (TLV-TWA) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Workplace Environmental Exposure Level (WEEL) Guides published by the American Industrial Hygiene Association (AIHA), and other approved, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

\textbf{[A] PERMIT.} An official document or certificate issued by the fire code official that authorizes performance of a specified activity.
[A] PERSON. An individual, heirs, executors, administrators or assigns, and also includes a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

[BG] PERSONAL CARE SERVICE. The care of persons who do not require medical care. Personal care involves responsibility for the safety of the persons while inside the building.

PESTICIDE. A substance or mixture of substances, including fungicides, intended for preventing, destroying, repelling or mitigating pests and substances or a mixture of substances intended for use as a plant regulator, defoliant or desiccant. Products defined as drugs in the Federal Food, Drug and Cosmetic Act are not pesticides.

[BE] PHOTOLUMINESCENT. Having the property of emitting light that continues for a length of time after excitation by visible or invisible light has been removed.

PHYSICAL HAZARD. A chemical for which there is evidence that it is a combustible liquid, cryogenic fluid, explosive, flammable (solid, liquid or gas), organic peroxide (solid or liquid), oxidizer (solid or liquid), oxidizing gas, pyrophoric (solid, liquid or gas), unstable (reactive) material (solid, liquid or gas) or water-reactive material (solid or liquid).

PHYSIOLOGICAL WARNING THRESHOLD. A concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter (mg/m³), that represents the concentration at which persons can sense the presence of the contaminant due to odor, irritation or other quick-acting physiological responses. When used in conjunction with the permissible exposure limit (PEL), the physiological warning threshold levels are those consistent with the classification system used to establish the PEL. See the definition of “Permissible exposure limit (PEL).”

PIER. A structure built over the water, supported by pillars or piles, and used as a landing place, pleasure pavilion or similar purpose.

PLACE OF RELIGIOUS WORSHIP. See “Religious worship, place of.”

[M] PLENUM. An enclosed portion of the building structure, other than an occupiable space being conditioned, that is designed to allow air movement and thereby serve as part of an air distribution system.

PHYSOPHORIC MATERIAL. Two or more unmixed, commercially manufactured, prepackaged chemical substances including oxidizers, flammable liquids or solids, or similar substances that are not independently classified as explosives but which, when mixed or combined, form an explosive that is intended for blasting.

PLYWOOD AND VENEER MILLS. Facilities where raw wood products are processed into finished wood products, including waferboard, oriented strandboard, fiberboard, composite wood panels and plywood.

PORTABLE OUTDOOR FIREPLACE. A portable, outdoor, solid-fuel-burning fireplace that may be constructed of steel, concrete, clay or other noncombustible material. A portable outdoor fireplace may be open in design, or may be equipped with a small hearth opening and a short chimney or chimney opening in the top.

POWERED INDUSTRIAL TRUCK. A forklift, tractor, platform lift truck or motorized hand truck powered by an electrical motor or internal combustion engine. Powered industrial trucks do not include farm vehicles or automotive vehicles for highway use.

[BE] POWER-ASSISTED DOOR. Swinging door that opens by reduced pushing or pulling force on the door-operating hardware. The door closes automatically after the pushing or pulling force is released, and functions with decreased forces. See also “Low energy power-operated door” and “Power-operated door.”

[BE] POWER-OPERATED DOOR. Swinging, sliding, or folding door that opens automatically when approached by a pedestrian or opens automatically upon an action by a pedestrian. The door closes automatically and includes provisions such as presence sensors to prevent entrapment. See also “Low energy power-operated door” and “Power-assisted door.”

PREEMPTION DEVICE. An approved electronic device attached to a controlled access gate that is used to open the gate when an electronic signal is received from an emergency vehicle.

PRESSURE VESSEL. A closed vessel designed to operate at pressures above 15 psig (103 kPa).

PRIMARY CONTAINMENT. The first level of containment, consisting of the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

[BG] PRIVATE GARAGE. A building or portion of a building in which motor vehicles used by the owner or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

PROCESS TRANSFER. The transfer of flammable or combustible liquids between tank vehicles or tank cars and process operations. Process operations may include containers, tanks, piping and equipment.

PROPELLANT. The liquefied or compressed gas in an aerosol container that expels the contents from an aerosol container when the valve is actuated. A propellant is considered flammable if it forms a flammable mixture with air, or if a flame is self-propagating in a mixture with air.

PROXIMATE AUDIENCE. An audience closer to pyrotechnic devices than allowed by NFPA 1123.

[B] PSYCHIATRIC HOSPITALS. See “Hospitals.”

PUBLIC TRAFFIC ROUTE (PTR). Any public street, road, highway, navigable stream or passenger railroad that is used for through traffic by the general public.

[BE] PUBLIC-USE AREAS. Interior or exterior rooms or spaces that are made available to the general public.

[A] PUBLIC WAY. A street, alley or other parcel of land open to the outside air leading to a street, that has been deeded, dedicated or otherwise permanently appropriated
PYROPHORIC. A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).

PYROTECHNIC ARTICLE. A pyrotechnic device for use in the entertainment industry, which is not classified as fireworks.

PYROTECHNIC COMPOSITION. A chemical mixture that produces visible light displays or sounds through a self-propagating, heat-releasing chemical reaction which is initiated by ignition.

PYROTECHNIC SPECIAL EFFECT. A visible or audible effect for entertainment created through the use of pyrotechnic materials and devices.

PYROTECHNIC SPECIAL-EFFECT MATERIAL. A chemical mixture used in the entertainment industry to produce visible or audible effects by combustion, deflagration or detonation. Such a chemical mixture predominantly consists of solids capable of producing a controlled, self-sustaining and self-contained exothermic chemical reaction that results in heat, gas sound, light or a combination of these effects. The chemical reaction functions without external oxygen.

PYROTECHNICS. Controlled exothermic chemical reactions timed to create the effects of heat, hot gas, sound, dispersion of aerosols, emission of visible light or a combination of such effects to achieve the maximum effect from the least volume of pyrotechnic composition.

QUANTITY-DISTANCE (Q-D). The quantity of explosive material and separation distance relationships providing protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables. The separation distances specified afford less than absolute safety:

- Inhabited building distance (IBD). The minimum separation distance between an operating building or magazine containing explosive materials and an inhabited building or site boundary.
- Intermagazine distance (IMD). The minimum separation distance between magazines.
- Intraline distance (ILD) or Intraplant distance (IPD). The distance to be maintained between any two operating buildings on an explosives manufacturing site when at least one contains or is designed to contain explosives, or the distance between a magazine and an operating building.
- Minimum separation distance (Do). The minimum separation distance between adjacent buildings occupied in conjunction with the manufacture, transportation, storage or use of explosive materials where one of the buildings contains explosive materials and the other building does not.

RAILWAY. A steam, electric or other railroad or railway that carries passengers for hire.

[BE] RAMP. A walking surface that has a running slope steeper than one unit vertical in 20 units horizontal (5-percent slope).

RAMP, EXIT ACCESS. See “Exit access ramp.”

RAMP, EXTERIOR EXIT. See “Exterior exit ramp.”

RAMP, INTERIOR EXIT. See “Interior exit ramp.”

RAW PRODUCT. A mixture of natural materials such as tree, brush trimmings, or waste logs and stumps.

[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)”].

READY BOX. A weather-resistant container with a self-closing or automatic-closing cover that protects fireworks shells from burning debris. Tarpaulins shall not be considered as ready boxes.

[A] RECORD DRAWINGS. Drawings (“as built”) that document the location of all devices, appliances, wiring, sequences, wiring methods and connections of the components of a fire alarm system as installed.

RECREATIONAL FIRE. An outdoor fire burning materials other than rubbish where the fuel being burned is not contained in an incinerator, outdoor fireplace, portable outdoor fireplace, barbeque grill or barbeque pit and has a total fuel area of 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height for pleasure, religious, ceremonial, cooking, warmth or similar purposes.

REDUCED FLOW VALVE. A valve equipped with a restricted flow orifice and inserted into a compressed gas cylinder, portable tank or stationary tank that is designed to reduce the maximum flow from the valve under full-flow conditions. The maximum flow rate from the valve is determined with the valve allowed to flow to atmosphere with no other piping or fittings attached.

REFINERY. A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

REFRIGERANT. The fluid used for heat transfer in a refrigeration system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

[M] REFRIGERATING (REFRIGERATION) SYSTEM. A combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat.

[A] REGISTERED DESIGN PROFESSIONAL. An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.
[BG] RELIGIOUS WORSHIP, PLACE OF. A building or portion thereof intended for the performance of religious services.

REMOTE EMERGENCY SHUTOFF DEVICE. The combination of an operator-carried signaling device and a mechanism on the tank vehicle. Activation of the remote emergency shutoff device sends a signal to the tank-mounted mechanism and causes fuel flow to cease.

REMOTE SOLVENT RESERVOIR. A liquid solvent container enclosed against evaporative losses to the atmosphere during periods when the container is not being utilized, except for a solvent return opening not larger than 16 square inches (10 322 mm2). Such return allows pump-cycled used solvent to drain back into the reservoir from a separate solvent sink or work area.

REMOTELY LOCATED, MANUALLY ACTIVATED SHUTDOWN CONTROL. A control system that is designed to initiate shutdown of the flow of gases or liquids that is manually activated from a point located some distance from the delivery system.

REPAIR GARAGE. A building, structure or portion thereof used for servicing or repairing motor vehicles.

RESIN APPLICATION AREA. An area where reinforced plastics are used to manufacture products by hand lay-up or spray-fabrication methods.

RESPONSIBLE PERSON. A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to issuing permits as part of the hot work permit program and following up as the job progresses.

RETAIL DISPLAY AREA. The area of a Group M occupancy open for the purpose of viewing or purchasing merchandise offered for sale. Individuals in such establishments are free to circulate among the items offered for sale which are typically displayed on shelves, racks or the floor.

ROLL COATING. The process of coating, spreading and impregnating fabrics, paper or other materials as they are passed directly through a tank or trough containing flammable or combustible liquids, or over the surface of a roller revolving partially submerged in a flammable or combustible liquid.

RUBBISH (TRASH). Combustible and noncombustible waste materials, including residue from the burning of coal, wood, coke or other combustible material, paper, rags, cartons, tin cans, metals, mineral matter, glass crockery, dust and discarded refrigerators, and heating, cooking or incinerator-type appliances.

SAFETY CAN. An approved container of not more than 5-gallon (19 L) capacity having a spring-closing lid and spout cover so designed that it will relieve internal pressure when subjected to fire exposure.

SAFETY DATA SHEET (SDS). Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally approved state OSHA plan. A document titled as a Material Safety Data Sheet (MSDS) is equivalent to an SDS for the purposes of this code.

[BE] SCISSOR STAIRWAY. Two interlocking stairways providing two separate paths of egress located within one exit enclosure.

SECONDARY CONTAINMENT. That level of containment that is external to and separate from primary containment.

SEED COTTON. See “Cotton.”

SEGREGATED. Storage in the same room or inside area, but physically separated by distance from incompatible materials.

[BF] SELF-CLOSING. As applied to a fire door or other opening, means equipped with an approved device that will ensure closing after having been opened.

[BE] SELF-LUMINOUS. Illuminated by a self-contained power source, other than batteries, and operated independently of external power sources.

SELF-PRESERVATION, INCAPABLE OF. See “Incapable of self-preservation.”

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY. That portion of motor fuel-dispensing facility where liquid motor fuels are dispensed from fixed approved dispensing equipment into the fuel tanks of motor vehicles by persons other than a motor fuel-dispensing facility attendant.

SEMICONDUCTOR FABRICATION FACILITY. A building or a portion of a building in which electrical circuits or devices are created on solid crystalline substances having electrical conductivity greater than insulators but less than conductors. These circuits or devices are commonly known as semiconductors.

SERVICE CORRIDOR. A fully enclosed passage used for transporting HPM and purposes other than required means of egress.

SHELF STORAGE. Storage on shelves less than 30 inches (762 mm) deep with the distance between shelves not exceeding 3 feet (914 mm) vertically. For other shelving arrangements, see the requirements for rack storage.

SHELL BUILDING. A shell building is a structure with empty spaces that have not yet been classified with a known tenant. This condition will remain until a future tenant proposes a use to the building department.

SINGLE-STATION SMOKE ALARM. An assembly incorporating the detector, the control equipment and the alarm-sounding device in one unit, operated from a power source, other than batteries, and operated independently of external power sources.

SIGNAGE. Required fire department signage shall be either .80 3M aluminum or Arizona Department of Transportation (ADOT) approved aluminum composite material or equivalent.

[BG] SITE. A parcel of land bounded by a lot line or a designated portion of a public right-of-way.
[BG] SITE-FABRICATED STRETCH SYSTEM. A system, fabricated on site and intended for acoustical, tackable or aesthetic purposes that is composed of three elements:

1. A frame constructed of plastic, wood, metal or other material used to hold fabric in place;
2. A core material (infill, with the correct properties for the application); and
3. An outside layer, comprised of a textile, fabric or vinyl that is stretched taut and held in place by tension or mechanical fasteners via the frame.

SKY LANTERN. An unmanned device with a fuel source that incorporates an open flame in order to make the device airborne.

[BG] SLEEPING UNIT. A single unit providing rooms or spaces for one or more persons that includes permanent provisions for sleeping also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

SMALL ARMS AMMUNITION. A shotgun, rifle or pistol cartridge and any cartridge for propellant-actuated devices. This definition does not include military ammunition containing bursting charges or incendiary, trace, spotting or pyrotechnic projectiles.

SMALL ARMS PRIMERS. Small percussion-sensitive explosive charges, encased in a cap, used to ignite propellant powder.

SMOKE ALARM. A single or multiple-station alarm responsive to smoke. See also “Single-station smoke alarm” and “Multiple-station smoke alarm.”

[BF] SMOKE BARRIER. A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly that is designed and constructed to restrict the movement of smoke.

[BG] SMOKE COMPARTMENT. A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

[BF] SMOKE DAMPER. A listed device installed in ducts and air transfer openings designed to resist the passage of smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a fire command center.

SMOKE DETECTOR. A listed device that senses visible or invisible particles of combustion.

[BG] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E 84.

SMOKE PARTITION. A wall assembly that extends from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

[BE] SMOKE-PROTECTED ASSEMBLY SEATING. Seating served by means of egress that is not subject to smoke accumulation within or under a structure for a specified design time by means of passive design or by mechanical ventilation.

SMOKELESS PROPELLANTS. Solid propellants, commonly referred to as smokeless powders, used in small arms ammunition, cannons, rockets, propellant-actuated devices and similar articles.

[BF] SMOKEPROOF ENCLOSURE. An interior exit stairway designed and constructed so that the movement of the products of combustion produced by a fire occurring in any part of the building into the enclosure is limited.

SOLID. A material that has a melting point and decomposes or sublimes at a temperature greater than 68°F (20°C).

SOLID BIOFUEL. Densified biomass made in the form of cubiform, polyhedral, polyhydric or cylindrical units, produced by compressing milled biomass.

SOLID BIOMASS FEEDSTOCK. The basic materials of which solid biofuel is composed, manufactured or made.

SOLID SHELVING. Shelving that is solid, slatted or of other construction located in racks and which obstructs sprinkler discharge down into the racks.

SOLVENT DISTILLATION UNIT. An appliance that receives contaminated flammable or combustible liquids and which distills the contents to remove contaminants and recover the solvents.

SOLVENT OR LIQUID CLASSIFICATIONS. A method for classifying solvents or liquids according to the following classes:

- Class I solvents. Liquids having a flash point below 100°F (38°C).
- Class II solvents. Liquids having a flash point at or above 100°F (38°C) and below 140°F (60°C).
- Class IIIA solvents. Liquids having a flash point at or above 140°F (60°C) and below 200°F (93°C).
- Class IIB solvents. Liquids having a flash point at or above 200°F (93°C).
- Class IV solvents. Liquids classified as nonflammable.

SPECIAL AMUSEMENT BUILDING. A building that is temporary, permanent or mobile that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available because of the mode of conveyance through the building or structure.
[A] SPECIAL EXPERT. An individual who has demonstrated qualifications in a specific area, outside the practice of architecture or engineering, through education, training and experience.

SPECIAL INDUSTRIAL EXPLOSIVE DEVICE. An explosive power pack containing an explosive charge in the form of a cartridge or construction device. The term includes but is not limited to explosive rivets, explosive bolts, explosive charges for driving pins or studs, cartridges for explosive-actuated power tools and charges of explosives used in automotive air bag inflators, jet tapping of open hearth furnaces and jet perforation of oil well casings.

SPRAY BOOTH. A mechanically ventilated appliance of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

SPRAY ROOM. A room designed to accommodate spraying operations, constructed in accordance with the International Building Code and separated from the remainder of the building by a minimum 1-hour fire barrier.

SPRAYING SPACE. An area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes. The fire code official is authorized to define the limits of the spraying space in any specific case.

SPREAD NUMBERS. Numbers attached to a building that show the unit number of each dwelling unit on each floor of that residential building in a multibuilding residential complex.

[BE] STAIR. A change in elevation, consisting of one or more risers.

[BE] STAIRWAY. One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

STAIRWAY, EXIT ACCESS. See “Exit access stairway.”

STAIRWAY, EXTERIOR EXIT. See “Exterior exit stairway.”

STAIRWAY, INTERIOR EXIT. See “Interior Exit Stairway.”

STAIRWAY, SCISSOR. See “Scissor stairway.”

[BE] STAIRWAY, SPIRAL. A stairway having a closed circular form in its plan view with uniform section-shaped treads attached to and radiating from a minimum-diameter supporting column.

STANDBY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required building, hazardous materials or ventilation systems in the event of a failure of the primary power. Standby power systems are required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.

STANDPIPE SYSTEM, CLASSES OF. Standpipe system classes are as follows:

Class I system. A system providing 2 ½-inch (64 mm) hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.

Class II system. A system providing 1½-inch (38 mm) hose stations to supply water for use primarily by the building occupants or by the fire department during initial response.

Class III system. A system providing 1½-inch (38 mm) hose stations to supply water for use by building occupants and 2½-inch (64 mm) hose connections to supply a larger volume of water for use by fire departments and those trained in handling heavy fire streams.

STANDPIPE, TYPES OF. Standpipe types are as follows:

Automatic dry. A dry standpipe system, normally filled with pressurized air that is arranged through the use of a device, such as a dry pipe valve, to admit water into the system piping automatically upon the opening of a hose valve. The water supply for an automatic dry standpipe system shall be capable of supplying the system demand automatically.

Automatic wet. A wet standpipe system that has a water supply that is capable of supplying the system demand automatically.

Manual dry. A dry standpipe system that does not have a permanent water supply attached to the system. Manual dry standpipe systems require water from a fire department pumper to be pumped into the system through the fire department connection in order to supply the system demand.

Manual wet. A wet standpipe system connected to a water supply for the purpose of maintaining water within the system but which does not have a water supply capable of delivering the system demand attached to the system. Manual wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system in order to supply the system demand.

Semiautomatic dry. A dry standpipe system that is arranged through the use of a device, such as a deluge valve, to admit water into the system piping upon activation of a remote control device located at a hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic dry standpipe system shall be capable of supplying the system demand.

STATIC PILES. Piles in which processed wood product or solid biomass feedstock is mounded and is not being turned or moved.

STATIONARY BATTERY ARRAY. An arrangement of individual stationary storage batteries in close proximity to each other, mounted on storage racks or in modules, battery cabinets or other enclosures.

STEEL. Hot or cold-rolled as defined by the International Building Code.
STORAGE, HAZARDOUS MATERIALS. The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.

[BG] STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (see “Basement,” “Building height,” “Grade plane” and “Mezzanine”). A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

[BG] STORY ABOVE GRADE PLANE. Any story having its finished floor surface entirely above grade plane, or in which the finished surface of the floor next above is:

1. More than 6 feet (1829 mm) above grade plane; or
2. More than 12 feet (3658 mm) above the finished ground level at any point.

SUBORDINATE (FIRE PROTECTION AND LIFE SAFETY SYSTEM). A system that is activated by another fire protection or life safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be “subordinate” to the fire alarm system.

SUPERVISING STATION. A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.

SUPERVISORY SERVICE. The service required to monitor performance of guard tours and the operative condition of fixed suppression systems or other systems for the protection of life and property.

SUPERVISORY SIGNAL. A signal indicating the need of action in connection with the supervision of guard tours, the fire suppression systems or equipment, or the maintenance features of related systems.

SUPERVISORY SIGNAL-INITIATING DEVICE. An initiating device such as a valve supervisory switch, water level indicator, or low-air pressure switch on a dry-pipe sprinkler system whose change of state signals an off-normal condition and its restoration to normal of a fire protection or life safety system; or a need for action in connection with guard tours, fire suppression systems or equipment, or maintenance features of related systems.

SYSTEM. An assembly of equipment consisting of a tank, container or containers, appurtenances, pumps, compressors and connecting piping.

TANK. A vessel containing more than 60 gallons (227 L).

TANK, ATMOSPHERIC. A storage tank designed to operate at pressures from atmospheric through 1.0 pound per square inch gauge (760 mm Hg through 812 mm Hg) measured at the top of the tank.

TANK, PORTABLE. A packaging of more than 60-gallon (227 L) capacity and designed primarily to be loaded into or on or temporarily attached to a transport vehicle or ship and equipped with skids, mountings or accessories to facilitate handling of the tank by mechanical means. It does not include any cylinder having less than a 1,000-pound (454 kg) water capacity, cargo tank, tank car tank or trailers carrying cylinders of more than 1,000-pound (454 kg) water capacity.

TANK, PRIMARY. A listed atmospheric tank used to store liquid. See “Primary containment.”

TANK, PROTECTED ABOVE GROUND. A tank listed in accordance with UL 2085 consisting of a primary tank provided with protection from physical damage and fire-resistive protection from a high-intensity liquid pool fire exposure. The tank may provide protection elements as a unit or may be an assembly of components, or a combination thereof.

TANK, STATIONARY. Packaging designed primarily for stationary installations not intended for loading, unloading or attachment to a transport vehicle as part of its normal operation in the process of use. It does not include cylinders having less than a 1,000-pound (454 kg) water capacity.

TANK VEHICLE. A vehicle other than a railroad tank car or boat, with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable or combustible liquids, LP-gas or hazardous chemicals. Tank vehicles include self-propelled vehicles and full trailers and semitrailers, with or without motive power, and carrying part or all of the load.

TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground-supported structure, platform, stage scaffolding or rigging, canopy, tower supporting audio or visual effects equipment or similar structures not regulated within the scope of the International Building Code.

TEMPORARY STAGE CANOPY. A temporary ground-supported membrane-covered frame structure used to cover stage areas and support equipment in the production of outdoor entertainment events.

[BG] TENT. A structure, enclosure or shelter, with or without sidewalls or drops, constructed of fabric or pliable material supported by any manner except by air or the contents that it protects.

THEFT RESISTANT. Construction designed to deter illegal entry into facilities for the storage of explosive materials.

TIMBER AND LUMBER PRODUCTION FACILITIES. Facilities where raw wood products are processed into finished wood products.

[BF] THROUGH-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor, floor-ceiling or wall assembly, one or more penetrating items passing through the breaches in both sides.
of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

TIPPING AREA. An area within a solid waste management facility or recycling facility for vehicles to unload solid wastes or recyclables.

TIRES, BULK STORAGE OF. Storage of tires where the area available for storage exceeds 20,000 cubic feet (566 m³).

TOOL. A device, storage container, workstation or process machine used in a fabrication area.

TORCH-APPLIED ROOF SYSTEM. Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

[A] TOWNHOUSE. A single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on not less than two sides.

TOXIC. A chemical falling within any of the following categories:

1. A chemical that has a median lethal dose (LD₅₀) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2. A chemical that has a median lethal dose (LD₅₀) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.

3. A chemical that has a median lethal concentration (LC₅₀) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

TRAFFIC CALMING DEVICES. Traffic calming devices are design elements of fire apparatus access roads such as street alignment, installation of barriers, and other physical measures intended to reduce traffic and cut-through volumes, and slow vehicle speeds.

[BG] TRANSIENT. Occupancy of a dwelling unit or sleeping unit for not more than 30 days.

[BG] TRANSIENT AIRCRAFT. Aircraft based at another location and that is at the transient location for not more than 90 days.

TRANSVERSE FLUE SPACE. See “Flue space—Transverse.”

TRASH. See “Rubbish.”

TROUBLE SIGNAL. A signal initiated by the fire alarm system or device indicative of a fault in a monitored circuit or component.

TUBE TRAILER. A semitrailer on which a number of tubular gas cylinders have been mounted. A manifold is typically provided that connects the cylinder valves enabling gas to be discharged from one or more tubes or cylinders through a piping and control system.

TWENTY-FOUR HOUR BASIS. See “24-hour basis” before the “A” entries.

UMBRELLA STRUCTURE. A structure, enclosure or shelter with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole or poles (see “Tent”).

UNAUTHORIZED DISCHARGE. A release or emission of materials in a manner which does not conform to the provisions of this code or applicable public health and safety regulations.

UNSTABLE (REACTIVE) MATERIAL. A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:

Class 4. Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.

Class 3. Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.

Class 2. Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.

Class 1. Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressure.

UNWANTED FIRE. A fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

USE (MATERIAL). Placing a material into action, including solids, liquids and gases.

VAPOR PRESSURE. The pressure exerted by a volatile fluid as determined in accordance with ASTM D 323.
VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VESSEL. A motorized watercraft, other than a seaplane on the water, used or capable of being used as a means of transportation. Non-transportation vessels, such as houseboats and boathouses, are included in this definition.

VISIBLE ALARM NOTIFICATION APPLIANCE. A notification appliance that alerts by the sense of sight.

WATER MIST SYSTEM, AUTOMATIC. See “Automatic water mist system.”

WATER-REACTION MATERIAL. A material that explodes; violently reacts; produces flammable, toxic or other hazardous gases; or evolves enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Water-reactive materials are subdivided as follows:

Class 3. Materials that react explosively with water without requiring heat or confinement.

Class 2. Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture.

Class 1. Materials that react with water with some release of energy, but not violently.

WET-CHEMICAL EXTINGUISHING AGENT. A solution of water and potassium-carbonate-based chemical, potassium-acetate-based chemical or a combination thereof, forming an extinguishing agent.

WET FUELING. See “Mobile fueling.”

WET HOSING. See “Mobile fueling.”

WHARF. A structure or bulkhead constructed of wood, stone, concrete or similar material built at the shore of a harbor, lake or river for vessels to lie alongside of, and to anchor piers or floats.

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.

WINDER. A tread with nonparallel edges.

WIRELESS PROTECTION SYSTEM. A system or a part of a system that can transmit and receive signals without the aid of wire.

WORKSTATION. A defined space or an independent principal piece of equipment using HPM within a fabrication area where a specific function, laboratory procedure or research activity occurs. Approved or listed hazardous materials storage cabinets, flammable liquid storage cabinets or gas cabinets serving a workstation are included as part of the workstation. A workstation is allowed to contain ventilation equipment, fire protection devices, detection devices, electrical devices and other processing and scientific equipment.

YARD. An open space, other than a court, unobstructed from the ground to the sky, except where specifically provided by the International Building Code, on the lot on which a building is situated.

ZONE. A defined area within the protected premises. A zone can define an area from which a signal can be received, an area to which a signal can be sent or an area in which a form of control can be executed.

ZONE, NOTIFICATION. An area within a building or facility covered by notification appliances which are activated simultaneously.
CHAPTER 3
GENERAL REQUIREMENTS

User note:
About this chapter: Chapter 3 provides general requirements for asphalt kettles, combustible waste material, ignition sources, motion picture projection rooms and film, open burning, recreational fires, portable outdoor fireplaces, open flames, powered industrial trucks and equipment, smoking, vacant premises, vehicle impact protection, fueled equipment, indoor displays, miscellaneous storage, outdoor pallet storage, hazards to fire fighters, roof gardens and landscaped roofs, laundry carts and mobile food preparation vehicles. These are intended to improve premises safety for everyone, including construction workers, tenants, operations and maintenance personnel, and emergency response personnel.

SECTION 301
GENERAL

301.1 Scope. The provisions of this chapter shall govern the occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire and general requirements of fire safety.

301.2 Permits. Permits shall be required as set forth in Section 105.6 for the activities or uses regulated by Sections 306, 307, 308 and 315.

SECTION 302
DEFINITIONS

302.1 Definitions. The following terms are defined in Chapter 2:
BONFIRE.
HI-BOY.
HIGH-VOLTAGE TRANSMISSION LINE.
OPEN BURNING.
PORTABLE OUTDOOR FIREPLACE.
POWERED INDUSTRIAL TRUCK.
RECREATIONAL FIRE.
SKY LANTERN.

SECTION 303
ASPHALT KETTLES

303.1 Transporting. Asphalt (tar) kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating. All kettle doors shall be tightly closed and latched when in transit.

Exception: Asphalt (tar) kettles in the process of patching road surfaces.

303.2 Location. Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means. Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block means of egress, gates, roadways or entrances. Asphalt kettles and fuel containers shall not be left unattended in a street or roadway.

303.3 Location of fuel containers. Fuel containers shall be located at least 10 feet (3048 mm) from the burner.

Exception: Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.

303.4 Attendant. An operating kettle shall be attended by a minimum of one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.

303.5 Fire extinguishers. There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40B:C rating within 25 feet (7620 mm) of each asphalt (tar) kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered.

303.6 Lids. Asphalt (tar) kettles shall be equipped with tightfitting lids.

303.7 Hi-boys. Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.

303.8 Roofing kettles. Roofing kettles shall be constructed of noncombustible materials.

303.9 Fuel containers under air pressure. Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be approved.

303.10 Maintenance. Asphalt kettles and all integral working parts shall be in good working condition and shall be maintained free of excessive residue.

SECTION 304
COMBUSTIBLE WASTE MATERIAL

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

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

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

304.1.3 Space underneath seats. Spaces underneath grandstand and bleacher seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour fire-resistance-rated construction in accordance with the International Building Code,

304.1.3.1 Spaces underneath grandstand and bleachers. Spaces underneath grandstand and bleachers shall not be occupied or utilized for purposes other than means of egress except where equipped with an automatic sprinkler system in accordance with Section 903.2.1.5.1 or separated with fire barriers and horizontal assemblies in accordance with Section 1029.1.1.1

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

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

304.3.1 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. Contents of such containers shall be removed and disposed of daily.

304.3.2 Capacity exceeding 5.33 cubic feet. Containers with a capacity exceeding 5.33 cubic feet (40 gallons) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

Exception: Wastebaskets complying with Section 808.

304.3.3 Capacity exceeding 1.5 cubic yards. Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m³)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

Exception:

1. Dumpsters or containers that are located in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction.

3. Dumpsters or containers that are located in buildings where the exterior area is protected by an approved automatic sprinkler system.

304.3.4 Capacity of 1 cubic yard or more. Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m³)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the dumpsters are constructed of noncombustible materials or of combustible materials with a peak rate of heat release not exceeding 300 kW/m² where tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation.

Exceptions:

1. Dumpsters in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.

SECTION 305 IGNITION SOURCES

305.1 Clearance from ignition sources. Clearance between ignition sources, such as luminaires, heaters, flame-producing devices and combustible materials, shall be maintained in an approved manner.

305.2 Hot ashes and spontaneous ignition sources. Hot ashes, cinders, smoldering coals or greasy or oily materials subject to spontaneous ignition shall not be deposited in a combustible receptacle, within 10 feet (3048 mm) of other combustible material including combustible walls and partitions or within 2 feet (610 mm) of openings to buildings.

Exception: The minimum required separation distance to other combustible materials shall be 2 feet (610 mm) where the material is deposited in a covered, noncombustible receptacle placed on a noncombustible floor, ground surface or stand.

305.3 Open-flame warning devices. Open-flame warning devices shall not be used along an excavation, road, or any place where the dislodgment of such device might permit the device to roll, fall or slide on to any area or land containing combustible material.

305.4 Deliberate or negligent burning. It shall be unlawful to deliberately or through negligence set fire to or cause the burning of combustible material in such a manner as to endanger the safety of persons or property.

305.5 Unwanted fire ignitions. Acts or processes that have caused repeated ignition of unwanted fires shall be modified to prevent future ignition.
SECTION 306
MOTION PICTURE PROJECTION ROOMS AND FILM

306.1 Motion picture projection rooms. Electric arc, xenon or other light source projection equipment that develops hazardous gases, dust or radiation and the projection of ribbon-type cellulose nitrate film, regardless of the light source used in projection, shall be operated within a motion picture projection room complying with Section 409 of the International Building Code.

306.2 Cellulose nitrate film storage. Storage of cellulose nitrate film shall be in accordance with NFPA 40.

SECTION 307
OPEN BURNING, RECREATIONAL FIRES AND PORTABLE OUTDOOR FIREPLACES

307.1 General. A person shall not kindle or maintain or authorize to be kindled or maintained any open burning unless conducted and approved in accordance with Sections 307.1.1 through 307.5.

307.1.1 Prohibited open burning. Open burning shall be prohibited when atmospheric conditions or local circumstances make such fires hazardous.

Exception: Prescribed burning for the purpose of reducing the impact of wildland fire when authorized by the fire code official.

307.2 Permit required. A permit shall be obtained from the fire code official in accordance with Section 105.6 prior to kindling a fire for recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or a bonfire. Application for such approval shall only be presented by and permits issued to the owner of the land upon which the fire is to be kindled.

307.2.1 Authorization. Where required by state or local law or regulations, open burning shall only be permitted with prior approval from the state or local air and water quality management authority, provided that all conditions specified in the authorization are followed.

307.3 Extinguishment authority. Where open burning creates or adds to a hazardous situation, or a required permit for open burning has not been obtained, the fire code official is authorized to order the extinguishment of the open burning operation.

307.4 Location. The location for open burning shall be not less than 50 feet (15 240 mm) from any structure, and provisions shall be made to prevent the fire from spreading to within 50 feet (15 240 mm) of any structure.

Exceptions:
1. Fires in approved containers that are not less than 15 feet (4572 mm) from a structure.
2. The minimum required distance from a structure shall be 25 feet (7620 mm) where the pile size is 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height.

307.5 Attendance. Open burning, bonfires, recreational fires and use of portable outdoor fireplaces shall be constantly attended until the fire is extinguished. Not fewer than one portable fire extinguisher complying with Section 906 and with a minimum 4-A rating or other approved on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization.

SECTION 308
OPEN FLAMES

308.1 General. Open flame, fire and burning on all premises shall be in accordance with Sections 308.1.1 through 308.4.1 and with other applicable sections of this code.

308.1.1 Where prohibited. A person shall not take or utilize an open flame or light in a structure, vessel, boat or other place where highly flammable, combustible or explosive material is utilized or stored. Lighting appliances shall be well-secured in a glass globe and wire mesh cage or a similar approved device.

308.1.2 Throwing or placing sources of ignition. A person shall not throw or place, or cause to be thrown or placed, a lighted match, cigar, cigarette, matches, or other flaming or glowing substance or object on any surface or article where it can cause an unwanted fire.

308.1.3 Torches for removing paint. Persons utilizing a torch or other flame-producing device for removing paint from a structure shall provide not less than one portable fire extinguisher complying with Section 906 and with a minimum 4-A rating, two portable fire extinguishers, each with a minimum 2-A rating, or a water hose connected to the water supply on the premises where such burning is done. The person doing the burning shall remain on the premises 1 hour after the torch or flame-producing device is utilized.

308.1.4 Open-flame cooking devices. Charcoal burners and other open-flame cooking devices shall not be operated on combustible balconies or within 10 feet (3048 mm) of combustible construction.
GENERAL REQUIREMENTS

Exceptions:
1. One and two-family dwellings.
2. In other than Group R-1 & R-2 occupancies where buildings, balconies and decks are protected by an automatic sprinkler system
3. LP-gas cooking devices having LP-gas container with a water capacity not greater than 2 ½ pounds [nominal 1 pound (0.454 kg) LP-gas capacity].
4. Approved electric barbecues and electric radiant heat devices used in accordance with the manufacturer’s instructions
5. Approved stationary fuel-fired barbecues complying with the following:
   a. Connected to plumbing approved by the Planning & Development Department.
   b. Listed for the fuel being utilized.
   c. Used in accordance with the manufacturer’s instructions.

308.1.5 Location near combustibles. Open flames such as from candles, lanterns, kerosene heaters and gas-fired heaters shall not be located on or near decorative material or similar combustible materials.

308.1.6 Open-flame devices. Torches and other devices, machines or processes liable to start or cause fire shall not be operated or used in or on wildfire risk areas, except by a permit in accordance with Sections 105.6 from the fire code official. Exception: Use within inhabited premises or designated campsites that are not less than 30 feet (9144 mm) from grass-, grain-, brush or forest-covered areas.

308.1.6.1 Signals and markers. Flame-employing devices, such as lanterns or kerosene road flares, shall not be operated or used as a signal or marker in or on wildfire risk areas. Exception: The proper use of fuses at the scenes of emergencies or as required by standard railroad operating procedures.

308.1.6.2 Portable fueled open-flame devices. Portable open-flame devices fueled by flammable or combustible gases or liquids shall be enclosed or installed in such a manner as to prevent the flame from contacting combustible material. Exceptions:
1. LP-gas-fueled devices used for sweating pipe joints or removing paint in accordance with Chapter 61.
2. Cutting and welding operations in accordance with Chapter 35.
3. Torches or flame-producing devices in accordance with Section 308.4.
4. Candles and open-flame decorative devices in accordance with Section 308.3.

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

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

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

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

308.1.8.1 Dispensing. Flammable or combustible liquids used in the preparation of flaming foods or beverages shall be dispensed from one of the following:
1. A 1-ounce (29.6 ml) container; or
2. A container not exceeding 1-quart (946.5 ml) capacity with a controlled pouring device that will limit the flow to a 1-ounce (29.6 ml) serving.

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

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

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

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

308.2 Permits required. Permits shall be obtained from the fire code official in accordance with Section 105.6 prior to engaging in the following activities involving open flame, fire and burning:
1. Use of a torch or flame-producing device to remove paint from a structure.
2. Use of open flame, fire or burning in connection with Group A or E occupancies.
3. Use or operation of torches and other devices, machines or processes liable to start or cause fire in or upon wildfire risk areas.

308.3 Group A occupancies. Open-flame devices shall not be used in a Group A occupancy.

Exceptions:
1. Open-flame devices are allowed to be used in the following situations, provided that approved precautions are taken to prevent ignition of a combustible material or injury to occupants:
   1.1. Where necessary for ceremonial or religious purposes in accordance with Section 308.1.7.
   1.2. On stages and platforms as a necessary part of
restrictions:

308.3.1 Open-flame decorative devices. Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids and LP-gas shall not be used.
2. Liquid or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
3. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
4. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees from vertical.
   Exception: Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
5. The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
6. Chimneys shall be made of noncombustible materials and securely attached to the open-flame device.
   Exception: A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.
7. Fuel canisters shall be safely sealed for storage.
8. Storage and handling of combustible liquids shall be in accordance with Chapter 57.
9. Shades, where used, shall be made of noncombustible materials and securely attached to the open flame device holder or chimney.
10. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

308.3.2 Theatrical performances. Where approved, open-flame devices used by fire performers or in conjunction with theatrical performances are allowed to be used where adequate safety precautions have been taken in accordance with NFPA 160.

308.4 Group R occupancies. Open flame, fire and burning in Group R occupancies shall comply with the requirements of Sections 308.1 through 308.1.6.3 and Section 308.4.1.

308.4.1 Group R-2 dormitories. Candles, incense and similar open-flame-producing items shall not be allowed in sleeping units in Group R-2 dormitory occupancies.

SECTION 309
POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

309.1 General. Powered industrial trucks and similar equipment including, but not limited to, floor scrubbers and floor buffers, shall be operated and maintained in accordance with Section 309.2 through 309.6.

309.2 Use in hazardous (classified) locations. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with NFPA 70 shall be listed and labeled to use in the environment intended in accordance with NFPA 505.

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

309.4 Ventilation. Ventilation shall be provided in an approved manner in battery-charging areas to prevent a dangerous accumulation of flammable gases.

309.5 Fire extinguishers. Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the battery charger.

309.6 Refueling. Powered industrial trucks using liquid fuel, LP-gas or hydrogen shall be refueled outside of buildings or in areas specifically approved for that purpose. Fixed fuel dispensing equipment and associated fueling operations shall be in accordance with Chapter 23. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 57 for flammable and combustible liquids or Chapter 61 for LP-gas.

309.7 Repairs. Repairs to fuel systems, electrical systems and repairs utilizing open flame or welding shall be done in approved locations outside of buildings or in areas specifically approved for that purpose.

SECTION 310
SMOKING

310.1 General. The smoking or carrying of a lighted pipe, cigar, cigarette or any other type of smoking paraphernalia or
material is prohibited in the areas indicated in Sections 310.2 through 310.8.

310.2 Prohibited areas. Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable or combustible materials are stored or handled.

310.3 “No Smoking” signs. The fire code official is authorized to order the posting of “No Smoking” signs in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required “No Smoking” signs shall be approved.

Exception: In Group I-2 occupancies where smoking is prohibited, “No Smoking” signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

310.4 Removal of signs prohibited. A posted “No Smoking” sign shall not be obscured, removed, defaced, mutilated or destroyed.

310.5 Compliance with “No Smoking” signs. Smoking shall not be permitted nor shall a person smoke, throw or deposit any lighted or smoldering substance in any place where “No Smoking” signs are posted.

310.6 Ash trays. Where smoking is permitted, suitable noncombustible ash trays or match receivers shall be provided on each table and at other appropriate locations.

310.7 Burning objects. Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manner that could cause ignition of other combustible material.

310.8 Hazardous environmental conditions. When the fire code official determines that hazardous environmental conditions necessitate controlled use of smoking materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in approved designated smoking areas.

SECTION 311
VACANT PREMISES

311.1 General. Temporarily unoccupied buildings, structures, premises or portions thereof, including tenant spaces, shall be safeguarded and maintained in accordance with Sections 311.1.1 through 311.5.5.

311.1.1 Abandoned premises. Buildings, structures and premises for which an owner cannot be identified or located by dispatch of a certificate of mailing to the last known or registered address, which persistently or repeatedly become unprotected or unsecured, which have been occupied by unauthorized persons or for illegal purposes, or which present a danger of structural collapse or fire spread to adjacent properties shall be considered to be abandoned, declared unsafe and abated by demolition or rehabilitation in accordance with the International Property Maintenance Code and the International Building Code.

311.1.2 Tenant spaces. Storage and lease plans required by this code shall be revised and updated to reflect temporary or partial vacancies.

311.2 Safeguarding vacant premises. Temporarily unoccupied buildings, structures, premises or portions thereof shall be secured and protected in accordance with Sections 311.2.1 through 311.2.3.

311.2.1 Security. Exterior and interior openings accessible 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.

311.2.2 Fire protection. Fire alarm, sprinkler and standpipe systems shall be maintained in an operable condition at all times.

Exceptions:

1. When the premises have been cleared of all combustible materials and debris and, in the opinion of the fire code official, the type of construction, fire separation distance and security of the premises do not create a fire hazard.

2. Where approved by the fire code official, buildings that will not be heated and where fire protection systems will be exposed to freezing temperatures, fire alarm and sprinkler systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided the building has no contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.

3. Where approved by the fire code official, fire alarm and sprinkler systems are permitted to be placed out of service in seasonally occupied buildings: that will not be heated; where fire protection systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided the building has no contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.

311.2.3 Fire separation. Fire-resistance-rated partitions, fire barriers and fire walls separating vacant tenant spaces from the remainder of the building shall be maintained. Openings, joints and penetrations in fire-resistance-rated assemblies shall be protected in accordance with Chapter 7.

311.3 Removal of combustibles. Persons owning, or in charge or control of, a vacant building or portion thereof, shall remove therefrom all accumulations of combustible materials, flammable or combustible waste or rubbish and shall securely lock or otherwise secure doors, windows and other openings to prevent entry by unauthorized persons. The premises shall be maintained clear of waste or hazardous materials.

Exceptions:

1. Buildings or portions of buildings undergoing additions, alterations, repairs or change of occupancy in accordance with the International Building Code, where waste is controlled and removed as required by Section 304.

2. Seasonally occupied buildings.
311.4 Removal of hazardous materials. Persons owning or having charge or control of a vacant building containing hazardous materials regulated by Chapter 50 shall comply with the facility closure requirements of Section 5001.6.

311.5 Placards. Any vacant or abandoned buildings or structures determined to be unsafe pursuant to Section 110 of this code relating to structural or interior hazards shall be marked as required by Sections 311.5.1 through 311.5.5.

311.5.1 Placard location. Placards shall be applied on the front of the structure and be visible from the street. Additional placards shall be applied to the side of each entrance to the structure and on penthouses.

311.5.2 Placard size and color. Placards shall be 24 inches by 24 inches (610 mm by 610 mm) minimum in size with a red background, white reflective stripes and a white reflective border. The stripes and border shall have a 2-inch (51 mm) minimum stroke.

311.5.3 Placard date. Placards shall bear the date of their application to the building and the date of the most recent inspection.

311.5.4 Placard symbols. The design of the placards shall use the following symbols:

1. □ This symbol shall mean that the structure had normal structural conditions at the time of marking.
2. □ This symbol shall mean that structural or interior hazards exist interior fire-fighting or rescue operations should be conducted with extreme caution.
3. □ This symbol shall mean that structural or interior hazards exist to a degree that consideration should be given to limit firefighting to exterior operations only, with entry only occurring for known life hazards.
4. Vacant marker hazard identification symbols: The following symbols shall be used to designate known hazards on the vacant building marker. They shall be placed directly above the symbol.
   4.1. R/O—Roof open
   4.2. S/M—Stairs, steps and landing missing
   4.3. F/E—Avoid fire escapes
   4.4. H/F—Holes in floor

311.5.5 Informational use. The use of these symbols shall be informational only and shall not in any way limit the discretion of the on-scene incident commander.

311.6 Unoccupied tenant spaces in mall buildings. Unoccupied tenant spaces in covered and open mall buildings shall be:

1. Kept free from the storage of any materials.
2. Separated from the remainder of the building by partitions of not less than 0.5-inch-thick (12.7 mm) gypsum board or an approved equivalent to the underside of the ceiling of the adjoining tenant spaces.
3. Without doors or other access openings other than one door that shall be kept key locked in the closed position except during that time when opened for inspection.
4. Kept free from combustible waste and be broom swept clean.

SECTION 312
VEHICLE IMPACT PROTECTION

312.1 General. Vehicle impact protection required by this code shall be provided by posts that comply with Section 312.2 or by other approved physical barriers that comply with Section 312.3.

312.2 Posts. Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

312.3 Other barriers. Barriers, other than posts specified in Section 312.2 that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall permit where approved.

SECTION 313
FUELED EQUIPMENT

313.1 General. Fueled equipment including, but not limited to, motorcycles, mopeds, lawn-care equipment, portable generators and portable cooking equipment, shall not be stored, operated or repaired within a building.

Exceptions:

1. Auto dealerships.

Except as follows:

1. Buildings or rooms constructed for such use in accordance with the International Building Code.
2. Where allowed by Section 314.
3. Storage of equipment utilized for maintenance purposes is allowed in approved locations when the aggregate fuel capacity of the stored equipment does not exceed 10 gallons (38 L) and the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

313.1.1 Removal. The fire code official is authorized to require removal of fueled equipment from locations where the presence of such equipment is determined by the fire code official to be hazardous.
313.2 Group R occupancies. Vehicles powered by flammable liquids, Class II combustible liquids or compressed flammable gases shall not be stored within the living space of Group R buildings.

SECTION 314
INDOOR DISPLAYS

314.1 General. Indoor displays constructed within any occupancy shall comply with Sections 314.2 through 314.4.

314.2 Fixtures and displays. Fixtures and displays of goods for sale to the public shall be arranged so as to maintain free, immediate and unobstructed access to exits as required by Chapter 10.

314.3 Highly combustible goods. The display of highly combustible goods, including but not limited to fireworks, flammable or combustible liquids, liquefied flammable gases, oxidizing materials, pyroxylin plastics and agricultural goods, or within 5 feet (1524 mm) of entrances to exits and exterior exit doors is prohibited when a fire involving such goods would rapidly prevent or obstruct egress.

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

**Exception:** Auto dealerships

1. Batteries are disconnected, except where the fire code official requires that the batteries remain connected to maintain safety features.
2. Fuel in fuel tanks does not exceed one-quarter tank or 5 gallons (19 L) (whichever is least).
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, boats or other motorcraft equipment are not fueled or defueled within the building.

SECTION 315
GENERAL STORAGE

315.1 General. Storage shall be in accordance with Sections 315.2 through 315.6. Outdoor pallet storage shall be in accordance with Sections 315.2 and 315.7.7.

**Exception:** Wood and wood composite pallets stored outdoors at pallet manufacturing and recycling facilities and complying with Section 2810.

315.2 Permit required. A permit for miscellaneous combustible storage shall be required as set forth in Sections 105.6.

315.2.1 Fire protection plan. The owner or operator shall prepare a fire protection plan for any facilities processing and/or storing finished lumber products, and solid biofuel products, in quantities requiring a permit. The fire protection plan shall address monitoring for, controlling, and extinguishing fires. The fire protection plan shall be submitted to the fire code official.

The fire protection plan shall include the following:

1. A scaled and dimensioned site plan indicating property lines, buildings, access roads, fire hydrants, location of storage areas, storage contents, and storage heights.
2. Fire suppression methods and emergency plans.
3. Other procedures and methods to reduce fire within stacks.
4. Employee training.
5. Equipment and resources available on-site, and through contract, for fire prevention and suppression.
6. Thresholds for calling 9-1-1.
7. Reports and other justifications if requesting to exceed this standard.

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

315.3.1 Ceiling clearance. Storage shall be maintained 2 feet (610 mm) or more below the ceiling in nonsprinklered areas of buildings or a minimum of 18 inches (457 mm) below sprinkler head deflectors in sprinklered areas of buildings.

**Exceptions:**

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

315.3.2 Means of egress. Combustible materials shall not be stored in exits or enclosures for stairways and ramps. Combustible materials in the means of egress during construction, demolition, remodeling or alterations shall comply with Section 311.3.

315.3.3 Equipment rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms or electrical equipment rooms.

315.3.4 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour fire-resistance-rated construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than 1 ¾ inches (44.5 mm) in thickness. Storage shall not be placed on exposed joists.

**Exceptions:**

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

315.4 Outside storage. Outside storage of combustible materials shall not be located within 10 feet (3048 mm) of a lot line.
315.4.1 Storage beneath overhead projections from buildings. Where buildings are protected by an automatic sprinkler system, the outdoor storage, display and handling of combustible materials under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

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

315.4.3 Stacking. The method of stacking shall be solid piles in an orderly array.

315.4.4 Separation from buildings. Outside storage of combustible materials or combustible waste shall not be located within 20 feet (6096 mm) of a building.

Exception:

315.4.5 Size of piles. The maximum size of piles shall be 20 feet (6096 mm) wide by 150 feet (45 700 mm) long.

315.4.6 Aisles width. Aisles shall be a minimum of 20 feet (6096 mm) wide and shall be maintained clear and unobstructed at all times.

315.4.7 Dead ends. No dead-end aisles shall be allowed within the facility.

315.4.8 Fencing. An approved minimum 6-foot-high (1829 mm) noncombustible security fence or wall shall be provided.

315.4.9 Fire apparatus access roads. Fire apparatus access roads shall be provided to within 150 feet (45 700 mm) of all combustible materials piles in compliance with Chapter 5. Fire apparatus access gates shall be in accordance with Chapter 5.

315.4.10 Fire hydrants and water supply. Approved fire hydrants and water supply shall be provided in compliance with Chapter 5.

315.4.11 Fire extinguishing equipment. Fire extinguishing equipment shall be provided throughout the facility in accordance with NFPA 10, Portable Fire Extinguishers. Travel distance to reach fire-extinguishing equipment shall not exceed 75 feet.

315.4.12 Additional equipment. A reliable means of rotating the combustible materials shall be readily available on the property (for example, pallet jack, front end loader or back hoe with bucket).

315.4.13 Vegetation. Weeds, grass and similar vegetation shall be eliminated throughout the entire yard.

315.4.14 Fire watch. When required by the fire code official, a fire watch shall be provided in accordance with Section 114.

315.4.15 Sources of ignition.

315.4.15.1 Smoking. Smoking shall be prohibited within the storage area and shall comply with Section 310.

315.4.15.2 Clearance from sources of ignition. No heating equipment, including salamanders, braziers, portable heaters and other open fires, shall be located or used in the storage area. Potential sources of ignition such as hot work; warming or open fires and heating devices shall not be allowed within 60 feet (18 288 mm) of storage piles.

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

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

315.7 Outdoor pallet storage. Pallets stored outdoors shall comply with Sections 315.7 through 315.7.8. Pallets stored within a building shall be protected in accordance with Chapter 32.

315.7.1 Storage beneath overhead projections from buildings. Where buildings are equipped throughout with an automatic sprinkler system, the outdoor storage of pallets under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

315.7.2 Distance to lot line. Pallet storage shall not be located within 10 feet (3048 mm) of a lot line.

315.7.3 Storage height. Pallet storage shall not exceed 20 feet (6096 mm) in height.

315.7.4 Pallet pile stability and size. Pallet stacks shall be arranged to form stable piles. Individual pallet piles shall cover an area not greater than 400 square feet (37 m²).

315.7.5 Pallet types. Pallets shall be all wood, with slatted or solid top or bottom, with metal fasteners, or shall be plastic or composite pallets, listed and labeled in accordance with UL 2335 or FM 4996. Plastic pallets shall be both solid and gridded deck, independent of the pallet manufacturing process, type of resin used in fabrication or geometry of the pallet.

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

315.7.6.1 Building separation. Pallet stacks and piles shall be separated from buildings in accordance with Table 315.7.6(1) for wood pallets and Table 315.7.6(2) for plastic pallets.
315.7.6.2 Separation from other pallets and on-site storage. Pallets shall be separated from other pallet piles and other storage in accordance with Table 315.7.6(3) for wood pallets and Table 315.7.6(4) for plastic pallets.

315.7.7 Prohibited locations. Pallets shall not be stored underneath high-voltage transmission lines, elevated roadways.

315.7.8 Fire protection plan. A fire protection plan, in accordance with 315.2.1, for outdoor pallet storage shall be submitted to the fire code official.

SECTION 316
HAZARDS TO FIRE PERSONNEL

316.1 Trapdoors to be closed. Trapdoors and scuttle covers, other than those that are within a dwelling unit or automatically operated, shall be kept closed at all times except when in use.

Exception: Restrooms and unoccupied telecommunication structures of noncombustible construction less than 15 feet (4572 mm) in height.

316.2 Shaftway markings. Vertical shafts shall be identified as required by this section.

316.2.1 Exterior access to shaftways. Outside openings accessible to the fire department and which 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 at least 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.

316.2.2 Interior access to shaftways. Door or window openings to a hoistway or shaftway from the interior of the building shall be plainly marked with the word SHAFTWAY in red letters at least 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible.

Exception: Marking shall not be required on shaftway openings which are readily discernible as openings onto a shaftway by the construction or arrangement.

316.3 Pitfalls. The intentional design or alteration of buildings to disable, injure, maim or kill intruders is prohibited. No person shall install and use firearms, sharp or pointed objects, razor wire, explosives, flammable or combustible liquid containers, or dispensers containing highly toxic, toxic, irritant or other hazardous materials in a manner which may passively or actively disable, injure, maim or kill a fire fighter who forcibly enters a building for the purpose of controlling or extinguishing a fire, rescuing trapped occupants or rendering other emergency assistance; or a fire code official who enters a building or premise for the purpose of conducting inspections, or to perform the duties authorized by this code.

316.4 Obstructions on roofs. Wires, cables, ropes, antennas, or other suspended obstructions installed on the roof of a building having a roof slope of less than 30 degrees (0.52 rad) shall not create an obstruction that is less than 7 feet (2133 mm) high above the surface of the roof.

Exceptions:
1. Such obstruction shall be permitted where the wire, cable, rope, antenna or suspended obstruction is encased in a white, 2-inch (51 mm) minimum diameter plastic pipe or an approved equivalent.
2. Such obstruction shall be permitted where there is a solid obstruction below such that accidentally walking into the wire, cable, rope, antenna or suspended obstruction is not possible.

316.5 Security device. Any security device or system that emits any medium that could obscure a means of egress in any building, structure or premise shall be prohibited.

316.6 Structures underneath high-voltage transmission lines. Structures and outdoor storage underneath high-voltage transmission lines shall comply with Sections 315.4 through 315.4.15.3.

316.6.1 Structures. Structures shall not be constructed within the utility easement beneath high-voltage transmission lines.

Exception: Restrooms and unoccupied telecommunications structures of noncombustible construction less than 15 feet (4572 mm) in height.

316.6.2 Outdoor storage. Outdoor storage within the utility easement underneath high-voltage transmission lines shall be limited to noncombustible material. Storage of hazardous materials including, but not limited to, flammable and combustible liquids is prohibited.

Exception: Combustible storage, including vehicles and fuel storage for backup power equipment serving public utility equipment, is allowed, provided that a plan indicating the storage configuration is submitted and approved.

SECTION 317
ROOFTop Gardens and landscaped roofs

317.1 General. Rooftop gardens and landscaped roofs shall be installed and maintained in accordance with Sections 317.2 through 317.5 and Sections 1505 and 1507.16 of the International Building Code.

317.2 Rooftop garden or landscaped roof size. Rooftop garden or landscaped roof areas shall not exceed 15,625 square feet (1450 m²) in size for any single area with a maximum dimension of 125 feet (3715 mm) in length or width. A minimum 6-foot-wide (1829 mm) clearance consisting of a Class A rated roof system complying with ASTM E 108 or UL 790 shall be provided between adjacent rooftop gardens or landscaped roof areas.

317.3 Rooftop structure and equipment clearance. For all vegetated roofing systems abutting combustible vertical surfaces, a Class A-rated roof system complying with ASTM E 108 or UL 790 shall be achieved for a minimum 6-foot-wide (1829 mm) continuous border placed around rooftop structures and all rooftop equipment including, but not limited to, mechanical and machine rooms, penthouses, skylights, roof vents, solar panels, antenna supports, and building service equipment.
317.4 Vegetation. Vegetation shall be maintained in accordance with Sections 317.4.1 and 317.4.2.

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

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

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

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

SECTION 318
LAUNDRY CARTS

318.1 Laundry carts with a capacity of 1 cubic yard or more. Laundry carts with an individual capacity of 1 cubic yard [200 gallons (0.76 m³)] or more, used in laundries within Group B, F-1, I and R-1 occupancies shall be constructed of noncombustible materials or materials having a peak rate of heat release not exceeding 300 kW/m² at a flux of 50 kW/m² where tested in a horizontal orientation in accordance with ASTM E 1354.

Exceptions:

1. Laundry carts in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1

2. Laundry carts in coin-operated laundries.

SECTION 319
MOBILE FOOD PREPARATION VEHICLES

319.1 General. Mobile food preparation vehicles that are equipped with appliances that produce smoke or grease-laden vapors shall comply with this section.

319.2 Permit required. Permits shall be required as set forth in Section 105.6.

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

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

319.4.1 Fire protection for cooking equipment. Cooking equipment shall be protected by automatic fire extinguishing systems in accordance with Section 904.12.

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

319.5 Appliance connection to fuel supply piping. Gas cooking appliances shall be secured in place and connected to fuel-supply piping with an appliance connector complying with ANSI Z21.69/CSA 6.16. The connector installation shall be configured in accordance with the manufacturer’s installation instructions. Movement of appliances shall be limited by restraining devices installed in accordance with the connector and appliance manufacturers’ instructions.

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

319.7 Cooking oil storage tanks. Cooking oil storage tanks within mobile food preparation vehicles shall comply with Sections 319.7.1 through 319.7.5.2.

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

319.7.2 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be installed in accordance with the tank manufacturer’s instructions and shall comply with both of the following:

1. Tanks shall be listed for use with cooking oil, including maximum temperature to which the tank will be exposed during use.

2. Tank capacity shall not exceed 200 gallons (757 L) per tank.

319.7.3 Cooking oil storage system components. Metallic and nonmetallic cooking oil storage system components shall include, but are not limited to, piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil.

319.7.4 Design criteria. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

319.7.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

319.7.5.1 Normal vents. Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents are not required to vent to the exterior.

319.7.5.2 Emergency vents. Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents are not required to discharge to the exterior.

319.8 LP-gas systems. Where LP-gas systems provide fuel for cooking appliances, such systems shall comply with Chapter 61 and Sections 319.8.1 through 319.8.5.
319.8.1 Maximum aggregate volume. The maximum aggregate capacity of LP-gas containers transported on the vehicle and used to fuel cooking appliances only shall not exceed 200 pounds (91 kg) propane capacity.

319.8.2 Protection of container. LP-gas containers installed on the vehicle shall be securely mounted and restrained to prevent movement.

319.8.3 LP-gas container construction. LP-gas containers shall be manufactured in compliance with the requirements of NFPA 58.

319.8.4 Protection of system piping. LP-gas system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage, and damage from vibration.

319.8.5 LP-gas alarms. A listed LP-gas alarm shall be installed within the vehicle in the vicinity of LP-gas system components, in accordance with the manufacturer’s instructions.

319.9 CNG systems. Where CNG systems provide fuel for cooking appliances, such systems shall comply with Sections 319.9.1 through 319.9.4.

319.9.1 CNG containers supplying only cooking fuel. CNG containers installed solely to provide fuel for cooking purposes shall be in accordance with Sections 319.9.1.1 through 319.9.1.3

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

319.9.1.2 Protection of container. CNG containers shall be securely mounted and restrained to prevent movement. Containers shall not be installed in locations subject to a direct vehicle impact.

319.9.1.3 CNG container construction. CNG containers shall be an NGV-2 cylinder.

319.9.2 CNG containers supplying transportation and cooking fuel. Where CNG containers and systems are used to supply fuel for cooking purposes in addition to being used for transportation fuel, the installation shall be in accordance with NFPA 52.

319.9.3 Protection of system piping. CNG system piping, including valves and fittings, shall be adequately protected to prevent tampering, impact damage and damage from vibration.

319.9.4 Methane alarms. A listed methane gas alarm shall be installed within the vehicle in accordance with manufacturer’s instructions.

319.10 Maintenance. Maintenance of systems on mobile food preparation vehicles shall be in accordance with Sections 319.10.1 through 319.10.3.

319.10.1 Exhaust system. The exhaust system, including hood, grease-removal devices, fans, ducts and other appurtenances, shall be inspected and cleaned in accordance with Section 607.3.

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

319.10.3 Fuel gas systems. LP-gas containers installed on the vehicle and fuel-gas piping systems shall be inspected annually by an approved inspection agency or a company that is registered with the U.S. Department of Transportation to requalify LP-gas cylinders, to ensure that system components are free from damage, suitable for the intended service and not subject to leaking. CNG containers shall be inspected every 3 years in a qualified service facility. CNG containers shall not be used past their expiration date as listed on the manufacturer’s container label. Upon satisfactory inspection, the approved inspection agency shall affix a tag on the fuel gas system or within the vehicle indicating the name of the inspection agency and the date of satisfactory inspection.

SECTION 320
EXCAVATIONS AND CONFINED SPACES

320.1 Scope. This section shall apply to any man-made cut, cavity, trench or depression in an earth surface formed by earth removal and procedures to protect employees from the hazards of entry into confined spaces.

320.2.1 Excavations and trenches. Excavations and trenches shall be in accordance with Title 29, Code of Federal Regulations, Part 1926.650–1926.652, Subpart P.

320.2.2 Confined spaces. Confined spaces shall be in accordance with Title 29, Code of Federal Regulations, Part 1910.

320.2.3 Unsafe conditions. When, in the opinion of the fire code official, an unsafe condition exists, excavation and confined space operations shall cease and all persons be removed until such time as adequate means have been taken to provide for the safety of persons working in or around the excavation or confined space.

SECTION 321
SWIMMING POOL BARRIERS

321.1 General. Swimming pool barriers shall be maintained in accordance with Section 3109 of the International Building Code.
CHAPTER 4
EMERGENCY PLANNING AND PREPAREDNESS

User note:

About this chapter: Chapter 4 addresses the human contribution to life safety in buildings when a fire or other emergency occurs. The requirements for continuous training and scheduled fire, evacuation and lockdown drills can be as important as the required periodic inspections and maintenance of built-in fire protection features. The level of preparation by the occupants also improves the emergency responders' abilities during an emergency. The International Building Code focuses on built-in fire protection features, such as automatic sprinkler systems, fire-resistance-rated construction and properly designed egress systems, whereas this chapter fully addresses the human element.

SECTION 401
GENERAL

401.1 Scope. Reporting of emergencies, coordination with emergency response forces, emergency plans and procedures for managing or responding to emergencies shall comply with the provisions of this section.

Exception: Firms that have approved on-premises firefighting organizations and that are in compliance with approved procedures for fire reporting.

401.2 Approval. Where required by this code, fire safety plans, emergency procedures and employee training programs shall be approved by the fire code official.

401.3 Emergency responder notification. Notification of emergency responders shall be in accordance with Sections 401.3.1 through 401.3.3.

401.3.1 Fire events. In the event an unwanted fire occurs on a property, the owner or occupant shall immediately report such condition to the fire department.

401.3.2 Alarm activations. Upon activation of a fire alarm signal, employees or staff shall immediately notify the fire department.

401.3.3 Delayed notification. A person shall not, by verbal or written directive, require any delay in the reporting of a fire to the fire department.

401.4 Required plan implementation. In the event an unwanted fire is detected in a building or a fire alarm activates, the emergency plan shall be implemented.

401.5 Making false report. A person shall not give, signal or transmit a false alarm.

401.6 Emergency evacuation drills. The sounding of a fire alarm signal and the carrying out of an emergency evacuation drill in accordance with the provisions of Section 405 shall be allowed.

401.7 Unplanned evacuation. Evacuations made necessary by the unplanned activation of a fire alarm system or by any other emergency shall not be substituted for a required evacuation drill.

401.8 Interference with fire department operations. It shall be unlawful to interfere with, attempt to interfere with, conspire to interfere with, obstruct or restrict the mobility of or block the path of travel of a fire department emergency vehicle in any way, or to interfere with, attempt to interfere with, conspire to interfere with, obstruct or hamper any fire department operation.

401.9 Fire or emergency alarm initiation. No person shall silence a fire or emergency alarm system, alarm-initiating device or component until the fire department arrives.

401.10 Monitoring stations. Monitoring stations shall immediately notify the fire department of alarm signals initiated by manual fire alarm boxes, automatic fire detectors, water flow from the automatic sprinkler system or actuation of other fire extinguishing or detection systems or equipment. Any monitoring station shall notify the fire department of an alarm signal prior to contacting the subscriber.

SECTION 402
DEFINITIONS

402.1 Definitions. The following terms are defined in Chapter 2:

CROWD MANAGER
EMERGENCY EVACUATION DRILL.
FIRE SAFETY DIRECTOR.
LOCKDOWN.

SECTION 403
EMERGENCY PREPAREDNESS REQUIREMENTS

403.1 General. In addition to the requirements of Section 401, occupancies, uses and outdoor locations shall comply with the emergency preparedness requirements set forth in Sections 403.1 through 403.3.5. Where a fire safety and evacuation plan is required by Sections 403.2 through 403.11.2, evacuation drills shall be in accordance with Section 405 and employee training shall be in accordance with Section 406.
403.2 Group A occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group A occupancies, other than those occupancies used exclusively for purposes of religious worship with an occupant load less than 2,000, and for buildings containing both a Group A occupancy and an atrium. Group A occupancies shall comply with Sections 403.2.1 through 403.2.4.

403.2.1 Seating plan. In addition to the requirements of Section 404.2, the fire safety and evacuation plans for assembly occupancies shall include a detailed seating plan, occupant load and occupant load limit. Deviations from the approved plans shall be provided that the occupant load limit for the occupancy is not exceeded and the aisles and exit accessways remain unobstructed.

403.2.2 Announcements. In theaters, motion picture theaters, auditoriums and similar assembly occupancies in Group A used for noncontinuous programs, an audible announcement shall be made not more than 10 minutes prior to the start of each program to notify the occupants of the location of the exits to be used in the event of a fire or other emergency.

Exception: In motion picture theaters, the announcement is allowed to be projected on the screen in a manner approved by the fire code official.

403.2.3 Fire watch personnel. Fire watch personnel shall be provided where required by Section 403.12.1.

403.2.4 Crowd managers. Crowd managers shall be provided where required by Section 403.12.3.

403.3 Ambulatory care facilities. Ambulatory care facilities shall comply with the requirements of Sections 401, 403.3.1 through 403.3.4 and 404 through 406.

403.3.1 Fire evacuation plan. The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. This shall include procedures for stabilizing patients in a defend-in-place response, staged evacuation, or full evacuation in conjunction with the entire building if part of a multitenant facility.

403.3.2 Fire safety plan. A copy of the plan shall be maintained at the facility at all times. The plan shall include all of the following in addition to the requirements of Section 404:

1. Locations of patients who are rendered incapable of self-preservation.
2. Maximum number of patients rendered incapable of self-preservation.
3. Area and extent of each ambulatory care facility.
4. Location of adjacent smoke compartments or refuge areas, where required.
5. Path of travel to adjacent smoke compartments.
6. Location of any special locking, delayed egress or access control arrangements.

403.3.3 Staff training. Employees shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by the staff not less than every two months. A copy of the plan shall be readily available at all times within the facility.

403.3.4 Emergency evacuation drills. Emergency evacuation drills shall comply with Section 405. Emergency evacuation drills shall be conducted not less than four times per year.

Exception: The movement of patients to safe areas or to the exterior of the building is not required.

403.4 Group B occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group B occupancy where the Group B occupancy has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge and for buildings having an ambulatory care facility.

403.5 Group E occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group E occupancies and for buildings containing both a Group E occupancy and an atrium. Group E occupancies shall comply with Sections 403.5.1 through 403.5.3.

403.5.1 First emergency evacuation drill. The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

403.5.2 Time of day. Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when the school is at assembly, during the recess or gymnastic periods, or during other times to avoid distinction between drills and actual fires.

403.5.3 Assembly points. Outdoor assembly areas shall be designated and shall be located a safe distance from the building being evacuated so as to avoid interference with fire department operations. The assembly areas shall be arranged to keep each class separate to provide accountability of all individuals.

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

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

403.7 Group H occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group H occupancies.

403.7.1 Group H-5 occupancies. Group H-5 occupancies shall comply with Sections 403.7.1.1 through 403.7.1.4.

403.7.1.1 Plans and diagrams. In addition to the requirements of Section 404 and Section 407.6, plans and diagrams shall be maintained in approved locations indicating the approximate plan for each area, the amount
and type of HPM stored, handled and used, locations of shutoff valves for HPM supply piping, emergency telephone locations and locations of exits.

403.7.1.2 Plan updating. The plans and diagrams required by Sections 404, 403.7.1.1 and 407.6 shall be maintained up to date and the fire code official and fire department shall be informed of major changes.

403.7.1.3 Emergency response team. Responsible persons shall be designated as an on-site emergency response team and trained to be liaison personnel for the fire department. These persons shall aid the fire department in preplanning emergency responses, identifying locations where HPM is stored, handled and used, and be familiar with the chemical nature of such material. An adequate number of personnel for each work shift shall be designated.

403.7.1.4 Emergency drills. Emergency drills of the on-site emergency response team shall be conducted on a regular basis but not less than once every three months. Records of drills conducted shall be maintained.

403.8 Group I occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group I occupancies. Group I occupancies shall comply with Sections 403.8.1 through 403.8.3.4.

403.8.1 Group I-1 occupancies. Group I-1 occupancies shall comply with Sections 403.8.1.1 through 403.8.1.7.

403.8.1.1 Fire safety and evacuation plan. The fire safety and evacuation plan required by Section 404 shall include special employee actions, including fire protection procedures necessary for residents, and shall be amended or revised upon admission of any resident with unusual needs.

403.8.1.1.1 Fire evacuation plan. The fire evacuation plan required by Section 404 shall include a description of special staff actions. In addition to the requirements of Section 404, plans in Group I-1 Condition 2 occupancies shall include procedures for evacuation through a refuge area in an adjacent smoke compartment and then to an exterior assembly point.

403.8.1.1.2 Fire safety plans. A copy of the fire safety plan shall be maintained at the facility at all times. Plans shall include the following in addition to the requirements of Section 404:
1. Location and number of resident sleeping rooms.
2. Location of special locking or egress control arrangements.

403.8.1.2 Employee training. Employees shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Such instruction shall be reviewed by employees at intervals not exceeding two months. A copy of the plan shall be readily available at all times within the facility.

403.8.1.3 Resident training. Residents capable of assisting in their own evacuation shall be trained in the proper actions to take in the event of a fire. In Group I-1 Condition 2 occupancies, training shall include evacuation through an adjacent smoke compartment and then to an exterior assembly point. The training shall include actions to take if the primary escape route is blocked. Where the resident is given rehabilitation or habilitation training, methods of fire prevention and actions to take in the event of a fire shall be a part of the rehabilitation training program. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

403.8.1.4 Drill frequency. In addition to the evacuation drills required in Section 405.2, employees shall participate in drills an additional two times a year on each shift. Twelve drills with all occupants shall be conducted in the first year of operation. Drills are not required to comply with the time requirements of Section 405.4.

403.8.1.5 Drill times. Drill times are not required to comply with Section 405.4.

403.8.1.6 Resident participation in drills. Emergency evacuation drills shall involve the actual evacuation of residents to a selected assembly point and shall provide residents with experience in exiting through all required exits. All required exits shall be used during emergency evacuation drills.

403.8.1.7 Emergency evacuation drill deferral. In severe climates, the fire code official shall have the authority to modify the emergency evacuation drill frequency specified in Section 405.2.

403.8.2 Group I-2 occupancies. Group I-2 occupancies shall comply with Sections 401, 403.8.2.1 through 403.8.2.3 as well as 401 and 404 through 406.

403.8.2.1 Fire evacuation plans. The fire safety and evacuation plans required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:
1. Procedures for evacuation for patients with needs for containment or restraint and post-evacuation containment, where present.
2. A written plan for maintenance of the means of egress.
4. Procedures for a full-floor or building evacuation, where necessary.

403.8.2.2 Fire safety plans. A copy of the plan shall be maintained at the facility at all times. Plans shall include all of the following in addition to the requirements of Section 404:
1. Location and number of patient sleeping rooms and operating rooms.
2. Location of adjacent smoke compartments or refuge areas.
3. Path of travel to adjacent smoke compartments.
4. Location of special locking, delayed egress or access control arrangements.
5. Location of elevators utilized for patient movement in accordance with the fire safety plan, where provided.

403.8.2.3 Emergency evacuation drills. Emergency evacuation drills shall comply with Section 405.

Exceptions:
1. The movement of patients to safe areas or to the exterior of the building is not required.
2. Where emergency evacuation drills are conducted after visiting hours or where patients or residents are expected to be asleep, a coded announcement shall be an acceptable alternative to audible alarms.

403.8.3 Group I-3 occupancies. Group I-3 occupancies shall comply with Sections 403.8.3.1 through 403.8.3.4.

403.8.3.1 Employee training. Employees shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment. Training of new employees shall be provided promptly upon entrance to duty. Refresher training shall be provided not less than annually.

403.8.3.2 Employee staffing. Group I-3 occupancies shall be provided with 24-hour staffing. An employee shall be within three floors or 300 feet (91 440 mm) horizontal distance of the access door of each resident housing area. In Group I-3 Conditions 3, 4 and 5, as defined in Chapter 2, the arrangement shall be such that the employee involved can start release of locks necessary for emergency evacuation or rescue and initiate other necessary emergency actions within 2 minutes of an alarm.

Exception: An employee shall not be required to be within three floors or 300 feet (91 440 mm) horizontal distance of the access door of each resident housing area in areas in which all locks are unlocked remotely and automatically in accordance with Section 408.4 of the International Building Code.

403.8.3.3 Notification. Provisions shall be made for residents in Group I-3 Conditions 3, 4 and 5, as defined in Chapter 2, to readily notify an employee of an emergency.

403.8.3.4 Keys. Keys necessary for unlocking doors installed in a means of egress shall be individually identifiable by both touch and sight.

403.9 Group M occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group M occupancy where the Group M occupancy has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge and for buildings containing both a Group M occupancy and an atrium.

403.10 Group R occupancies. Group R occupancies shall comply with Sections 403.10.1 through 403.10.3.6.

403.10.1 Group R-1 occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-1 occupancies. Group R-1 occupancies shall comply with Sections 403.10.1.1 through 403.10.1.3.

403.10.1.1 Evacuation diagrams. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each hotel or motel sleeping unit.

403.10.1.2 Emergency duties. Upon discovery of a fire or suspected fire, hotel and motel employees shall perform the following duties:
1. Activate the fire alarm system, where provided.
2. Notify the public fire department.
3. Take other action as previously instructed.

403.10.1.3 Fire safety and evacuation instructions. Information shall be provided in the fire safety and evacuation plan required by Section 404 to allow guests to decide whether to evacuate to the outside, evacuate to an area of refuge, remain in place, or any combination of the three.

403.10.2 Group R-2 occupancies. Group R-2 occupancies shall comply with Sections 403.10.2.1 through 403.10.2.3.

403.10.2.1 College and university buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-2 college and university buildings. Group R-2 college and university buildings shall comply with Sections 403.10.2.1.1 and 403.10.2.1.2.

403.10.2.1.1 First emergency evacuation drill. The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

403.10.2.1.2 Time of day. Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when school is at assembly, during recess or gymnastic periods or during other times to avoid distinction between drills and actual fires. One required drill shall be held during hours after sunset or before sunrise.

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

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

403.10.2.2.2 Emergency guide maintenance. Emergency guides shall be reviewed and approved by the fire code official.
403.10.2.2.3 Emergency guide distribution. A copy of the emergency guide shall be given to each tenant prior to initial occupancy.

403.10.2.3 Evacuation diagrams for dormitories. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each dormitory sleeping unit. Evacuation diagrams shall be reviewed and updated as needed to maintain accuracy.

403.10.3 Group R-4 occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-4 occupancies. Group R-4 occupancies shall comply with Sections 403.10.3.1 through 403.10.3.6.

403.10.3.1 Fire safety and evacuation plan. The fire safety and evacuation plan required by Section 404 shall include special employee actions, including fire protection procedures necessary for residents, and shall be amended or revised upon admission of a resident with unusual needs.

403.10.3.1.1 Fire safety plans. A copy of the plan shall be maintained at the facility at all times. Plans shall include the following in addition to the requirements of Section 404:

1. Location and number of resident sleeping rooms.
2. Location of special locking or egress control arrangements.

403.10.3.2 Employee training. Employees shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by employees at intervals not exceeding two months. A copy of the plan shall be readily available at all times within the facility.

403.10.3.3 Resident training. Residents capable of assisting in their own evacuation shall be trained in the proper actions to take in the event of a fire. The training shall include actions to take if the primary escape route is blocked. Where the resident is given rehabilitation or habilitation training, methods of fire prevention and actions to take in the event of a fire shall be a part of the rehabilitation training program. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

403.10.3.4 Drill frequency. In addition to the evacuation drills required in Section 405.2, employees shall participate in drills an additional two times a year on each shift. Twelve drills with all occupants shall be conducted in the first year of operation.

403.10.3.5 Drill times. Drill times are not required to comply with Section 405.4.

403.10.3.6 Resident participation in drills. Emergency evacuation drills shall involve the actual evacuation of residents to a selected assembly point and shall provide residents with experience in exiting through all required exits. All required exits shall be used during emergency evacuation drills.

Exception: Actual exiting from emergency escape and rescue windows shall not be required. Opening the emergency escape and rescue window and signaling for help shall be an acceptable alternative.

403.11 Special uses. Special uses shall be in accordance with Sections 403.11.1 through 403.11.4.

403.11.1 Covered and open mall buildings. Covered and open mall buildings shall comply with the requirements of Sections 403.11.1.1 through 403.11.1.6.

403.11.1.1 Malls and mall buildings exceeding 50,000 square feet. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for covered malls exceeding 50,000 square feet (4645 m2) in aggregate floor area and for open mall buildings exceeding 50,000 square feet (4645 m2) in aggregate area within the perimeter line.

403.11.1.2 Lease plan. In addition to the requirements of Section 404.2.2, a lease plan that includes the following information shall be prepared for each covered and open mall building:

1. Each occupancy, including identification of tenant.
2. Exits from each tenant space.
3. Fire protection features, including the following:
   3.1. Fire department connections.
   3.2. Fire command center.
   3.3. Smoke management system controls.
   3.4. Elevators, elevator machine rooms and controls.
   3.5. Hose valve outlets.
   3.6. Sprinkler and standpipe control valves.
   3.7. Automatic fire-extinguishing system areas.

403.11.1.3 Lease plan approval. The lease plan shall be submitted to the fire code official for approval, and shall be maintained on site for immediate reference by responding fire service personnel.

403.11.1.4 Lease plan revisions. The lease plans shall be revised annually or as often as necessary to keep them current. Modifications or changes in tenants or occupancies shall not be made without prior approval of the fire code official and building official.

403.11.1.5 Tenant identification. Tenant identification shall be provided for secondary exits from occupied tenant spaces that lead to an exit corridor or directly to the exterior of the building. Tenant identification shall be posted on the exterior side of the exit or exit access door and shall identify the business name and address using plainly legible letters and numbers that contrast with their background.
Exception: Tenant identification is not required for anchor stores.

403.11.1.6 Unoccupied tenant spaces. The fire safety and evacuation plan shall provide for compliance with the requirements for unoccupied tenant spaces in Section 311.

403.11.2 High-rise buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for high-rise buildings.

403.11.3 Underground buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for underground buildings.

403.11.4 Buildings using occupant evacuation elevators. In buildings using occupant evacuation elevators in accordance with Section 3008 of the International Building Code, the fire safety and evacuation plan and the training required by Sections 404 and 406, respectively, shall incorporate specific procedures for the occupants using such elevators.

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

1. The high-piled storage area exceeds 500,000 square feet (46 450 m²) for Class I-IV commodities.
2. The high-piled storage area exceeds 300,000 square feet (27 870 m²) for high-hazard commodities.
3. The high-piled storage is located in a Group H occupancy.
4. The high-piled storage is located in a Group F occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
5. The high-piled storage is located in a Group M occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
6. Where required by the fire code official for other high-piled storage areas.

403.12 Special requirements for public safety. Special requirements for public safety shall be in accordance with Sections 403.12.1 through 403.12.3.3.

403.12.1 Fire watch personnel. Where, in the opinion of the fire code official, it is essential for public safety in a place of assembly or any other place where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the owner, agent or lessee shall provide one or more fire watch personnel, as required and approved. Fire watch personnel shall comply with Sections 115, 403.12.1.1 and 403.12.2. Such fire watch personnel shall not be required or permitted, while on duty, to perform any other duties than those specified herein, in accordance with Section 114.

403.12.1.1 Duty times. Fire watch personnel shall remain on duty while places requiring a fire watch are open to the public, or when an activity requiring a fire watch is being conducted.

403.12.1.2 Duties. On-duty fire watch personnel shall have the following responsibilities:

1. Keep diligent watch for fires obstructions to means of egress and other hazards.
2. Take prompt measures for remediation of hazards and extinguishment of fires that occur.
3. Take prompt measures to assist in the evacuation of the public from the structures.

403.12.2 Public safety plan for gatherings. Where the fire code official determines that an indoor or outdoor gathering of persons has an adverse impact on public safety through diminished access to buildings, structures, fire hydrants and fire apparatus access roads or where such gatherings adversely affect public safety services of any kind, the fire code official shall have the authority to order the development of or prescribe a public safety plan that provides an approved level of public safety and addresses the following items:

1. Emergency vehicle ingress and egress.
2. Fire protection.
3. Emergency egress or escape routes.
4. Emergency medical services.
5. Public assembly areas.
6. The directing of both attendees and vehicles, including the parking of vehicles.
7. Vendor and food concession distribution.
8. The need for the presence of law enforcement.
9. The need for fire and emergency medical services personnel.
10. The need for a weather monitoring person.

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

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

Exceptions:

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

**403.12.3.3 Duties.** The duties of crowd managers shall include, but not be limited to:

1. Conduct an inspection of the area of responsibility and identify and address any egress barriers.
2. Conduct an inspection of the area of responsibility to identify and mitigate any fire hazards.
3. Verify compliance with all permit conditions, including those governing pyrotechnics and other special effects.
4. Direct and assist the event attendees in evacuation during an emergency.
5. Assist emergency response personnel where requested.
6. Other duties required by the fire code official.
7. Other duties as specified in the fire safety plan.

## SECTION 404
**FIRE SAFETY, EVACUATION AND LOCKDOWN PLANS**

**404.1 General.** Where required by Section 403, fire safety, evacuation and lockdown plans shall comply with Sections 404.2 through 404.4.1.

**404.2 Contents.** Fire safety, evacuation and lockdown plan contents shall be in accordance with Sections 404.2.1 through 404.2.3.2.

**404.2.1 Fire evacuation plans.** Fire evacuation plans shall include the following:

1. Emergency egress or escape routes and whether evacuation of the building is to be complete by selected floors or areas only or with a defend-in-place response.
2. Procedures for employees who must remain to operate critical equipment before evacuating.
3. Procedures for the use of elevators to evacuate the building where occupant evacuation elevators complying with Section 3008 of the International Building Code are provided.
4. Procedures for assisted rescue for persons unable to use the general means of egress unassisted.
5. Procedures for accounting for employees and occupants after evacuation has been completed.
6. Identification and assignment of personnel responsible for rescue or emergency medical aid.
7. The preferred and any alternative means of notifying occupants of a fire or emergency.
8. The preferred and any alternative means of reporting fires and other emergencies to the fire department or designated emergency response organization.
9. Identification and assignment of personnel who can be contacted for further information or explanation of duties under the plan.
10. A description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages, where provided.

**404.2.2 Fire safety plans.** Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy including the following:
   1. Procedures for notifying occupants, including areas with a private mode alarm system.
   3. Procedures for evacuating occupants, including those who need evacuation assistance.
3. Site plans indicating the following:
   1. The occupancy assembly point.
   2. The locations of fire hydrants.
   3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
   1. Exits.
   2. Primary evacuation routes.
   4. Accessible egress routes.
      1. Areas of refuge.
      2. Exterior areas for assisted rescue.
   5. Refuge areas associated with smoke barriers and horizontal exits.
   7. Portable fire extinguishers.
   8. Occupant-use hose stations.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.

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

**404.2.3.1 Lockdown plan contents.** Lockdown plans shall include the following:
1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
4. Means and methods of initiating a lockdown plan for each threat, including:
   4.1. The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.
   4.2. Identification of each door or other access point that will be secured.
   4.3. A description of the means or methods used to secure doors and other access points.
   4.4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.
5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the means of egress has been returned to normal operations upon termination of the lockdown.
11. Training procedures and frequency of lockdown plan drills.

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

**404.3 Maintenance.** Fire safety and evacuation plans shall be reviewed or updated annually or as necessitated by changes in staff assignments, occupancy or the physical arrangement of the building.

**404.4 Availability.** Fire safety and evacuation plans shall be available in the workplace for reference and review by employees, and copies shall be furnished to the fire code official for review on request.

**404.4.1 Distribution.** The fire safety and evacuation plans shall be distributed to the tenants and building service employees by the owner or owner’s agent. Tenants shall distribute to their employees’ applicable parts of the fire safety plan affecting the employees’ actions in the event of a fire or other emergency.

**SECTION 405 EMERGENCY EVACUATION DRILLS**

**405.1 General.** Emergency evacuation drills complying with Sections 405.2 through 405.9 shall be conducted not less than annually where fire safety and evacuation plans are required by Section 403 or where required by the fire code official. Drills shall be designed in cooperation with the local authorities.

**405.2 Frequency.** Required emergency evacuation drills shall be held at the intervals specified in Table 405.2 or more frequently where necessary to familiarize all occupants with the drill procedure.

**TABLE 405.2 FIRE AND EVACUATION DRILL FREQUENCY AND PARTICIPATION**

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**405.3 Leadership.** Responsibility for the planning and conduct of drills shall be assigned to competent persons designated to exercise leadership.

**Effective July 19, 2019**

2018 INTERNATIONAL FIRE CODE WITH PHOENIX AMENDMENTS
405.4 Time. Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in case of fire.

405.5 Record keeping. Records shall be maintained of required emergency evacuation drills and include the following information:
   1. Identity of the person conducting the drill.
   2. Date and time of the drill.
   3. Notification method used.
   4. Employees on duty and participating.
   5. Number of occupants evacuated.
   6. Special conditions simulated.
   7. Problems encountered.
   8. Weather conditions when occupants were evacuated.
   9. Time required to accomplish complete evacuation.

405.6 Notification. Where required by the fire code official, prior notification of emergency evacuation drills shall be given to fire code official.

Prior to activating a fire alarm signal, for conducting an evacuation drill, the building owner or authorized representative shall contact fire department dispatch at 602-495-5555. The building owner or authorized representative shall notify fire department dispatch on completion of the evacuation drill.

405.7 Initiation. Where a fire alarm system is provided, emergency evacuation drills shall be initiated by activating the fire alarm system.

405.8 Accountability. As building occupants arrive at the assembly point, efforts shall be made to determine if all occupants have been successfully evacuated or have been accounted for.

405.9 Recall and reentry. An electrically or mechanically operated signal used to recall occupants after an evacuation shall be separate and distinct from the signal used to initiate the evacuation. The recall signal initiation means shall be manually operated and under the control of the person in charge of the premises or the official in charge of the incident. Persons shall not reenter the premises until authorized to do so by the official in charge.

SECTION 406
EMPLOYEE TRAINING AND RESPONSE PROCEDURES

406.1 General. Where fire safety and evacuation plans are required by Section 403, employees shall be trained in fire emergency procedures based on plans prepared in accordance with Section 404.

406.2 Frequency. Employees shall receive training in the contents of fire safety and evacuation plans and their duties as part of new employee orientation and not less than annually thereafter. Records of training shall be maintained.

406.3 Employee training program. Employees shall be trained in fire prevention, evacuation and fire safety in accordance with Sections 406.3.1 through 406.3.4.

406.3.1 Fire prevention training. Employees shall be apprised of the fire hazards of the materials and processes to which they are exposed. Each employee shall be instructed in the proper procedures for preventing fires in the conduct of their assigned duties.

406.3.2 Evacuation training. Employees shall be familiarized with the fire alarm and evacuation signals, their assigned duties in the event of an alarm or emergency, evacuation routes, areas of refuge, exterior assembly areas and procedures for evacuation.

406.3.3 Fire safety training. Employees assigned firefighting duties shall be trained to know the locations and proper use of portable fire extinguishers or other manual fire-fighting equipment and the protective clothing or equipment required for its safe and proper use.

406.4 Emergency lockdown training. Where a facility has a lockdown plan, employees shall be trained on their assigned duties and procedures in the event of an emergency lockdown.

SECTION 407
HAZARD COMMUNICATION

407.1 General. The provisions of Sections 407.2 through 407.7 shall be applicable where hazardous materials subject to permits under Section 5001.5 are located on the premises or where required by the fire code official.

407.2 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) for all hazardous materials shall be either readily available on the premises as a paper copy, or where approved, shall be permitted to be readily retrievable by electronic access.

407.3 Identification. Individual containers of hazardous materials, cartons or packages shall be marked or labeled in accordance with applicable federal regulations. Buildings, rooms and spaces containing hazardous materials shall be identified by hazard warning signs in accordance with Section 5003.5.

407.4 Training. Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of a fire, leak or spill. Responsible persons shall be designated and trained to be liaison personnel for the fire department. These persons shall aid the fire department in preplanning emergency responses and identification of where hazardous materials are located, and shall have access to Material Safety Data Sheets and be knowledgeable in the site emergency response procedures.

407.5 Hazardous Materials Inventory Statement. Where required by the fire code official, each application for a permit shall include a Hazardous Materials Inventory Statement (HMIS) in accordance with Section 5001.5.2.
407.6 Hazardous Materials Management Plan. Where required by the fire code official, each application for a permit shall include a Hazardous Materials Management Plan (HMMP) in accordance with Section 5001.5.1. The fire code official is authorized to accept a similar plan required by other regulations.

407.7 Facility closure plans. The permit holder or applicant shall submit to the fire code official a facility closure plan in accordance with Section 5001.6.3 to terminate storage, dispensing, handling or use of hazardous materials.
Part III—Building and Equipment Design Features

CHAPTER 5
FIRE SERVICE FEATURES

User note:

About this chapter: Chapter 5 provides requirements that apply to all buildings and occupancies and pertain to access roads, access to building openings and roofs, premises identification, key boxes, fire protection water supplies, fire command centers, fire department access to equipment and emergency responder radio coverage in buildings. Although many safety features are part of the building design, features such as proper fire department access roads and radio coverage are necessary in case of emergency and are important tools for emergency responders for public safety and their own safety.

GENERAL
SECTION 501

501.1 Scope. Fire service features for buildings, structures and premises shall comply with this chapter.

501.2 Permits. A permit shall be required as set forth in Sections 105.6 and 105.8.

501.3 Construction documents. Construction documents for proposed fire apparatus access, location of fire lanes, security gates/barriers across fire apparatus access roads and construction documents and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

501.4 Timing of installation. Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where approved alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection where construction of new roadways allows passage by vehicles in accordance with Section 505.5.

501.5 Inspection of fire apparatus access roads. Roads used for apparatus access shall be subject to field inspection and may be subject to testing using fire apparatus. The owner is responsible for any repairs necessary due to the inadequate design of the fire apparatus access road.

SECTION 502
DEFINITIONS

502.1 Definitions. The following terms are defined in Chapter 2:

AGENCY.
FIRE APPARATUS ACCESS ROAD.
FIRE COMMAND CENTER.
FIRE DEPARTMENT MASTER KEY.
FIRE FLOW.
FIRE LANE, EMERGENCY ACCESS LANE.
KEY BOX.
PEDESTRIAN GATES.

PREEMPTION DEVICE.
SIGNAGE.
SPREAD NUMBERS.
TRAFFIC CALMING DEVICES.

SECTION 503
FIRE APPARATUS ACCESS ROADS

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

The Phoenix Fire Department is the only authority authorized to designate a fire apparatus access road.

503.1.1 Buildings and facilities. Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.

Exception:

1. The fire code official is authorized to increase the dimension to 350 feet (106 680 mm) where any of the following conditions occur:

1.1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.

1.3. There are not more than two Group R-3 or Group U occupancies.
2. Where approved by the fire code official, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.

3. The facility is equipped with an automatic stand-pipe system in accordance with Section 905.

503.1.2 Additional access. The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

503.1.3 High-piled storage. Fire department vehicle access to buildings used for high-piled combustible storage shall comply with the applicable provisions of Chapter 32.

503.2 Specifications. Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.10.

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 14 feet (4267 mm).

503.2.1.1 Vehicle passing points. When fire department access roads exceed 300 feet (91 440 mm) in length, vehicle passing points shall be installed at intervals not to exceed 300 feet (91 440 mm). Vehicle passing points shall be a minimum of 30 feet (9144 mm) in width exclusive of shoulders and 50 feet (15 240 mm) in length.

Exception: When code compliant fire lanes are continuous through a property leading to an approved exit point, no passing points are required.

503.2.1.2 Loading areas and passenger drop-off areas. On private property, where fire apparatus access roads are utilized for loading or unloading or are utilized for passenger drop off or pickup, an additional 8 feet (2438 mm) of width shall be added to the fire apparatus access road. This width is in addition to the minimum 20-foot (6096 mm) access road width exclusive of shoulders. Fire apparatus access roads established and approved per Phoenix Fire Department or Planning and Development Department site plan prior to June 20, 2007 are not required to be widened if maintained and marked in accordance with this chapter.

503.2.2 Authority. The fire code official shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire or rescue operations or where necessary to meet the public safety objectives of the jurisdiction.

503.2.3 Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all weather driving capabilities in accordance with Maricopa Association of Governments standards.

503.2.3.1 Stabilized edge. A stabilized edge meeting Maricopa Association of Governments standards or equivalent is required on fire apparatus access roads.

503.2.3.2 Live loads. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be designed and maintained to support the imposed live load of 70,000 pounds (31 752 kg) with a maximum axle load of 28,000 pounds (12 701 kg).

503.2.3.3 Alternative surface. Fire apparatus access roads not conforming to a Maricopa Association of Governments standard shall be in accordance with this section, Maricopa Association of Governments standards.

503.2.4 Turning radius. The required turning radius of a fire apparatus access road shall have a minimum 45-foot (13 716 mm) centerline radius [35-foot (10 668 mm) inside radius, 55-foot (16 764 mm) outside radius] on curves.

503.2.5 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus.

503.2.6 Bridges and elevated surfaces. Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges where required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces that are not designed for such use, approved barriers, approved signs or both shall be installed and maintained where required by the fire code official.

503.2.7 Grade. The grade of the fire apparatus access road shall not exceed 15 percent (15 feet in 100 feet) (4572 mm in 30 480 mm). Cross-slope of an access road shall not exceed a depth of 6 inches (152 mm)

503.2.7.1 Drainage. Water drainage shall be directed away from or piped under the fire apparatus access roads. Ponding of water on an access road shall not exceed a depth of 6 inches (152 mm).

503.2.8 Angles of approach and departure. The angles of approach and departure for fire apparatus access roads shall be within the limits established by the fire code official based on the fire department’s apparatus.

503.2.9 Curbs. A rolled curb meeting Maricopa Association of Governments standards or equivalent shall be installed at the entrances to fire apparatus access roads.

503.2.10 Maintenance. Fire apparatus access roads shall be maintained as approved, by the owner at all times.

503.3 Marking. Where required by the fire code official, approved signs or other approved notices or markings that include the words NO PARKING—FIRE LANE shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. See Appendix D.
The means by which fire lanes are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired where necessary to provide adequate visibility.

503.3.1 Signage. Required fire department signage shall be either .80” 3M aluminum or Arizona Department of Transportation (ADOT) approved aluminum composite material or equivalent. See Appendix D.

503.3.2 Fire apparatus access road signs. Fire apparatus access roads less than 36 feet (10972 mm) wide shall be identified by fire lane signs (see Appendix D) and red curbs on both sides of the road as follows:

1. Signs shall be attached to an approved stationary pole set in concrete a minimum of depth of 18 inches (457 mm).
2. The bottom of each sign shall be 7 feet (2137 mm) above grade.
3. The signs shall face oncoming traffic.
4. The signs shall be set back from the curb line or sidewalk a minimum of 12 inches (305 mm) to maximum of 18 inches (457 mm).
5. Signs shall be plainly visible at all times. Vegetation or other obstructions shall be located such that a minimum 3-foot (914 mm) clearance is maintained along the line of sight.
6. Spacing of signs and marking of curbs shall be as follows:
   a. A sign shall be installed a maximum of 15 feet (4572 mm) from the beginning and end of the fire lane.
   b. When spacing between signs does not exceed 75 feet (22 860 mm), the curb on the sign side of the fire lane shall be painted red.
   c. When spacing between signs does not exceed 100 feet (30 480 mm), curb on the sign side of the fire lane shall be painted red and stenciled “FIRE LANE --NO PARKING” midway between signs.

Exceptions:
1. A fire apparatus access road that is greater than 36 ft in width shall not be required to have signs and red painted curbs on either side of the fire apparatus access road.

503.4 Obstruction of fire apparatus access roads. Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Sections 503.2.1 and 503.2.2 shall be maintained at all times.

503.4.1 Traffic calming devices. Traffic calming devices shall be prohibited unless approved by the fire code official.

503.4.2 Fences and pedestrian gates. When distances from an approved fire department access road exceed the maximum distance allowed in Section 503 and fences are installed a pedestrian gate shall be provided in the fence to maintain the required fire department access. The gate shall be a minimum 4 feet (1219 mm) in width and be equipped with a key box in accordance with Section 506.

503.4.3 Other obstructions to access. When other obstructions are installed that cause the distances from an approved fire department access road to exceed the maximum distance allowed in Section 503, the fire code official is authorized to require additional fire protection as specified in Section 901.4.4.

503.5 Required gates or barricades. The fire code official is authorized to require the installation and maintenance of gates or other approved barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

503.5.1 Secured gates and barricades. Where required, gates and barricades shall be secured in an approved manner. Roads, trails and other accessways that have been closed and obstructed in the manner prescribed by Section 503.5 shall not be trespassed on or used unless authorized by the owner and the fire code official. Chains alone across a fire apparatus access road are prohibited.

Exception: The restriction on use shall not apply to public officers acting within the scope of duty.

503.6 Security gates. The installation of security gates across a fire apparatus access road shall be approved by the fire code official. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200. Fire apparatus access gates shall be designed and installed such that they do not obstruct the ingress or egress of emergency vehicles.

503.6.1 Group R-3. Where access to the primary access door is obstructed by an automatic gate in single family
detached Group R-3 occupancies a key switch shall be provided, on the exterior side. Key switch shall be identified with an approved sign reading “FD Access”.

**Exception:**
Single family residences where the primary access door is not obstructed by the restrictions of fences or gates shall not require a permit.

503.7 Preemption devices. Preemption devices are required on all new automatic fire access gates installed after January 1, 2001, at multi-family residential properties, gated communities with more than 2 Group R-3 occupancies, and other occupancies as required by the fire code official. Gates installed without permits or proof of installation date, require preemption devices. Voluntary installations of preemption devices shall comply with the requirements of this policy.

**Exception:** Access road serving three or fewer Group R-3 occupancies.

503.7.1 Locations. The devices shall be installed such that the gate will open for both ingress and egress of emergency vehicles.

503.7.2 Minimum installation standards. The installation of preemption devices shall comply with the following:

1. Detectors shall be mounted 8 feet to 10 feet (2439 mm to 3048 mm) above grade.
2. Detectors shall be located a minimum of 18 inches (457 mm) from the gate on the property side.
3. Detectors shall be mounted on a separate 4 inch by 4 inch (102 mm by 102 mm) metal post and not on the guidepost. The metal post shall be cemented a minimum of 18 inches (457 mm) below grade.
4. Detectors shall activate at a minimum of 150 feet (45 720 mm) from the gate.
5. Detectors shall point toward both the approach and the exit path of the emergency vehicle.
6. The sight path of the detector shall be free of visual obstructions such as signs, covered parking, canopies and vegetation.
7. Individual detectors shall be mounted together with the power module in the dual detector-mounting box. Detectors shall be approved and tested by the fire department.

504.2 Maintenance of exterior doors and openings. Exterior doors and their function shall not be eliminated without prior approval. Exterior doors that have been rendered nonfunctional and that retain a functional door exterior appearance shall have a sign affixed to the exterior side of the door with the words THIS DOOR BLOCKED. The sign shall consist of letters having a principal stroke of not less than .75 inch (19.1 mm) wide and not less than 6 inches (152 mm) high on a contrasting background. Required fire department access doors shall not be obstructed or eliminated. Exit and exit access doors shall comply with Chapter 10. Access doors for high-piled combustible storage shall comply with Section 3206.6.1.

504.2.1 Exterior door access. Required exterior doors shall have a key cylinder or other means to be opened from the exterior.

504.2.2 Exterior stairwells. When determined by the fire code official where access is necessary for life-saving or fire-fighting purposes exterior stairwells providing access to fire protection equipment shall be marked in accordance with Section 503.3.1.

504.3 Stairway access to roof. New buildings four or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3 percent slope), shall be provided with a stairway to the roof. Stairway access to the roof shall be in accordance with Section 1011.12. Such stairway shall be marked at street and floor levels with a sign indicating that the stairway continues to the roof. Where roofs are used for roof gardens or for other purposes, stairways shall be provided as required for such occupancy classification.

**SECTION 505**
**PREMISES IDENTIFICATION**

505.1 Address identification. New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of ½ inch (12.7 mm). Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of ½ inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way or the building is a podium building or has multiple fire separations with interior corridors, a monument, pole or other sign or means shall be used to identify the structure and features in accordance with 505.1.3.4. Address identification shall be maintained clearly visible and free from obstructions, including landscaping, and shall be kept current.

505.1.1 Residential Occupancies. Individually addressed town homes and detached single-family homes. The
address numbers shall be provided and be a minimum of 4 inches (102 mm) high, with a minimum \( \frac{1}{2} \)-inch (12.7 mm) brush stroke on a contrasting background.

505.1.1 All other residential occupancies. The address, individual building, spread, and dwelling numbers shall be in accordance with this Section.

505.1.1.2. Building or site address. The building or site address shall be a minimum of 12 inches (305 mm) high designation which must be clearly visible from the fire apparatus access road. The building address is required to be internally or externally illuminated.

505.1.1.3 Building identification. Each building shall display its specific alphabetical or numerical designation which must be clearly visible from the fire apparatus access road. The building identification shall be a minimum of 18 inches (457 mm) high with a minimum 3-inch (76 mm) brush stroke on contrasting color. The building identification is required to be internally or externally illuminated.

505.1.1.4 Spread numbers. Spread numbers shall be provided adjacent to the building identification to indicate the apartment or unit numbers by floors in the building. Spread numbers shall be a minimum of 7 inches (178 mm) high with a 1-inch (25 mm) brush stroke on a contrasting background. The spread numbers are required to be internally or externally illuminated.

505.1.1.5 Unit identification at entrances. Spread plates are required where more than one dwelling or unit is accessed from a building entrance, a spread plate is required.

505.1.1.6 Apartment or unit numbers. Individual apartment or unit numbers shall be a minimum of 4 inches (102 mm) high with a minimum \( \frac{1}{2} \)-inch (9.52 mm) brush stroke on a contrasting background.

505.1.1.7 Additional identification signs. Where a building is not visible from the fire apparatus access road, a directional sign indicating the location of the unit is required.

505.1.1.8 Buildings more than 100 feet (30 480 mm) long. Where buildings are more than 100 feet (30 480 mm) long a minimum of two building address numbers shall be provided.

505.1.1.9 Buildings with multiple fire apparatus access points. Where buildings have multiple fire apparatus access points, numbers and addresses shall be provided at each access point.


505.1.2.1 Buildings less than 200 feet. Buildings less than 200 feet (60 960 mm) long and less than 100 feet (30 480 mm) from the edge of the road shall be identified with building address that is a minimum of 12 inches (305 mm) high with a minimum 2-inch (51 mm) brush stroke on contrasting background. The address shall be visible from all access directions. The building identification is required to be internally or externally illuminated.

505.1.2.2 Buildings more than 200 feet. When buildings are more than 200 feet (60 960 mm) long and set back from the road 100 feet or more (30 480 mm) they shall be identified with building address that are a minimum of 24 inches (610 mm) high with a 4-inch (102 mm) brush stroke of a contrasting color. The address shall be visible from all access directions.

505.1.2.3 Buildings more than 500 feet. When buildings are greater than 500 feet (152 400 mm) in length, building address shall be visible from all access directions.

505.1.2.4 Multi-tenant buildings. Individual tenant spaces in multitenant buildings shall have their address or suite identification posted at the front entrance and rear access doors. This building identification shall be a minimum of 6 inches (152 mm) high with a 1-inch (25 mm) brush stroke on a contrasting background.

505.1.2.5 Multiple buildings at a single address. Each building shall display its specific alphabetical or numerical designation that are visible from the fire apparatus access road(s). The designation shall be a minimum of 18 inches (457 mm) high with a minimum 3-inch (76 mm) brush stroke on contrasting color. Where buildings have multiple fire apparatus access points, specific alphabetical or numerical designation shall be provided at each access point.

505.1.2.6 Premises. When buildings are not present, premises shall be identified. Identification shall be a minimum of 12 inches (305 mm) high with a minimum 2-inch (51 mm) brush stroke on contrasting background shall be within 10 feet of the entrance to the property. The address shall be visible from all access directions. Identification is required to be internally or externally illuminated.

505.1.3 Address Directories. When required. An approved address directory shall be provided at properties containing any one of the following:

1. More than one principal building.
2. Buildings with unit identification numbers randomly numbered or sequenced.
3. When, in the opinion of the fire code official, emergency response may be delayed due to the physical layout of the complex.

505.1.3.1 Specifications. Address directories shall be constructed and installed in accordance the following:

505.1.3.1.1 Dimensions. The number of buildings in the complex shall determine the minimum dimensions of the address directory. Minimum address directory dimensions shall be as follows:

1. Complexes containing 12 or fewer buildings require a minimum 3 by 3 feet (914 by 914 mm)
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[9 square feet (0.836 m²)] site directory.

2. Complexes containing 13 to 30 buildings require a minimum 4 by 4 feet (1219 by 1219 mm) [16 square feet (1.486 m²)] site directory.

3. Complexes containing 31 or more buildings require a minimum 5 by 5 feet (1524 by 1524 mm) [(25 square feet (2.323 m²)] site directory.

4. Stanchions or supports shall not be included in the required size of the address directory.

505.1.3.1.2 Framing. Framing materials shall not encroach upon the address directory face by more than 1½ inches (38 mm).

505.1.3.1.3 Protection. The address directory shall be protected against vandalism and disfigurement by a clear polycarbonate cover, which shall have a minimum thickness of ⅛-inch (3.17 mm) and be sealed to protect the directory from weather.

505.1.3.1.4 Illumination. Address directories shall be internally illuminated utilizing white light.

505.1.3.2 Installation requirements. Support posts or stanchions shall be set in concrete. Directories with dimensions of 3 by 3 feet (914 by 914 mm) [9 square feet (0.836 m²)] shall be mounted with the bottom of the address directory not less than 36 inches (914 mm) above grade.

505.1.3.3 Large address directories. Address directories with dimensions of 4 by 4 feet (1219 by 1219 mm) [16 square feet (1.486 m²)] and 5 feet by 5 feet (1524 by 1524 mm) [25 square feet (2.323 m²)] shall be mounted with the bottom of the address directory not less than 24 inches (610 mm) above grade.

505.1.3.4 Depictions. All depictions must be clear, easily understood, and legible at a distance of 8 feet (2438 mm). The address directory shall depict structures, building numbers, units, apartment or space numbers, tennis courts, swimming pools, elevators, driveways, streets, laundry rooms, fire hydrants, fire apparatus access roads and other features as determined by the fire department. The depictions shall comply with the following:

1. Address directories shall be a dark print on a contrasting light background. Buildings shown on the address directory shall not be the same color as other features indicated on the address directory.

2. The name and address of the complex are required and shall not exceed 10 percent of the total size of the site directory.

3. Swimming pools, canals, and waterway areas shall be translucent blue.

4. Tennis courts and recreational courts shall be translucent green.

5. Fire hydrants shall be a ¼-inch (6.35 mm) diameter black circle filled in with a translucent yellow center. The abbreviation “HYD” must be affixed by the location of the fire hydrant on the address directory.

6. The address directory shall be properly oriented to the viewer with a red dot that is 1 inch (25 mm) in diameter, that is with the words “YOU ARE HERE” affixed at the appropriate location on the address directory.

7. A north arrow shall be included in the upper-right quadrant of the address directory. The arrow shall be a minimum of 3 inches (76 mm) in length with a minimum 1-inch (25 mm) brush stroke.

8. Interior fire apparatus access roads, where provided, shall be marked on the address directory with red crosshatching.

505.1.3.5 Setbacks. The address directory shall be installed on the occupancy’s property, at locations approved by the fire department. Placement of the address directory shall be as follows:

1. The address directory shall be set back from the street or curbing at least 25 feet (7620 mm) to allow emergency vehicles to clear the public right-of-way.

2. Shall not exceed a distance of 4 feet (1219 mm) from the edge of the fire apparatus access road facing the direction of oncoming traffic.

3. Shall not conflict with traffic visibility zones as provided for by other ordinances.

4. Shall be immediately visible and free from obstructions including architectural design and landscaping.

505.1.3.6 Prohibitions. Information such as advertising or additional art work shall not be allowed on the address directory.

505.2 Street or road signs. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new road-approved size, weather resistant and be maintained until replaced by permanent signs.

SECTION 506
KEY BOXES

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, or when buildings are monitored off-site for security, fire or other service that notifies the fire department, the fire code official is authorized to require a key box to be installed in an approved location. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and approved by the fire code official. The key box shall be of an approved type listed in accordance with
UL1037, and shall contain keys, toggle switch or other devices to gain necessary access as required by the fire code official.

Exception: Group R-3 Occupancies.

506.1.1 Locks. An approved lock shall be installed on gates or similar barriers where required by the fire code official.

506.1.2 Key boxes for nonstandardized fire service elevator keys. Key boxes provided for nonstandardized fire service elevator keys shall comply with Section 506.1 and all of the following:

1. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and approved by the fire code official.

2. The front cover shall be permanently labeled with the words "Fire Department Use Only-Elevator Keys."

3. The key box shall be mounted at each elevator bank at the lobby nearest to the lowest level of fire department access.

4. The key box shall be mounted 5 feet 6 inches (1676 mm) above the finished floor to the right side of the elevator bank.

5. Contents of the key box are limited to fire service elevator keys. Additional elevator access tools, keys and information pertinent to emergency planning or elevator access shall be permitted where authorized by the fire code official.

6. In buildings with two or more elevator banks, a single key box shall be permitted to be used when where such elevator banks are separated by not more than 30 feet (9144 mm). Additional key boxes shall be provided for each individual elevator or elevator bank separated by more than 30 feet (9144 mm).

   Exception: A single key box shall be permitted to be located adjacent to a fire command center or the non-standard fire service elevator key shall be permitted to be secured in a key box used for other purposes and located in accordance with Section 506.1.

506.1.3 Key box installation height. The key box shall be mounted between 4 to 5½ feet (1219 mm to 1677 mm) above grade.

506.1.4 Visibility. The key box shall be illuminated to be immediately visible to fire personnel from the emergency apparatus. Posts, fences, vehicles, growth, trash, storage, and other materials shall not be placed or kept near key boxes in a manner that would prevent the key boxes from being immediately discernible.

506.1.5 Marking of keys for fire department access. Keys that are required to access secured areas for a function not listed below, shall be provided with water-resistant tags. The tags shall be marked in a contrasting color with the key’s function and room number. The terminology used to mark the tags shall provide immediate understanding as to the key function.

Each key shall be color-coded to identify its function as follows:

1. Green for access gates.
2. Yellow for elevators.
3. Red for the Fire Command Center.
4. Blue for keys related to water access (e.g., gates to swimming pools).
5. White for master keys.

506.1.6 Number of sets of keys. All keys shall be provided in full sets a minimum of 3 sets for access shall be provided. Buildings with stairways shall provide an additional 3 sets per stairway. Buildings with elevators shall provide an additional 3 sets per fire service designated elevator.

506.1.7 Swimming pool gates. All pedestrian gates in multi-family and commercial occupancies that provide access to swimming pools and are locked shall be provided with an approved key box in accordance with Section 506. If a card reader system is installed a Phoenix Fire Department key box with a toggle switch must be installed.

506.2 Key box maintenance. The operator of the building shall immediately notify the fire code official and provide the new key where a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

SECTION 507
FIRE PROTECTION WATER SUPPLIES

507.1 Required water supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises prior to combustibles being on site upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction. Water supplies for manual fire suppression and fire hydrants shall be in accordance with Appendix B.

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

507.2.1 Private fire service mains. Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

507.2.2 Fire mains. Fire mains and appurtenances shall be sized to accommodate the calculated fire flow but shall not be less than 6 inches (152 mm) in diameter. Dead-end fire mains shall not be less than 8 inches (203 mm) in diameter unless calculations determine otherwise.

507.2.2 Water tanks. Water tanks for private fire protection shall be installed in accordance with NFPA 22.

507.3 Fire flow. Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method.

507.3.1 Exterior storage. Exterior storage of combustible or hazardous materials. When there is exterior storage of
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combustible or hazardous materials the required fire flow to protect exterior storage shall be determined by an engineering analysis. If the fire flow required to protect the exterior storage exceeds the fire flow required to protect the building, the higher flow shall be provided.

507.3.2 Minimum standards. When a water supply for fire protection is not available from the City of Phoenix, or if the flow rate, pressure, or duration of the water supply available from the city does not meet the minimum requirements of the Phoenix Fire code, the owner shall be responsible for installing all the infrastructure required to meet the fire flow, pressure, and duration requirements of the Phoenix Fire code.

507.3.3 Failure to maintain water supply. Failure to provide and maintain water supply. Failure to provide and maintain the required water supply necessary for fire protection shall be considered a hazard to life or property and is subject to enforcement under Section 104 of the Phoenix Fire code.

507.4 Water supply test. The fire code official shall be notified prior to the water supply test. Water supply tests shall be witnessed by the fire code official or approved documentation of the test shall be provided to the fire code official prior to final approval of the water supply system.

507.5 Fire hydrant systems. Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6.

507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (121 920 mm) from a building, on-site fire hydrants and mains shall be provided where required by the fire code official. For secondary hydrants the distance requirement shall be 700 feet (213 360 mm).

507.5.1.1 Hydrant for standpipe systems. Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (480 mm) of the fire department connections.

Exception: The distance shall be permitted to exceed 100 feet (480 mm) where approved by the fire code official.

507.5.1.2 City of Phoenix hydrant specifications.

507.5.1.2.1 Phoenix threads. Fire hydrants shall be provided with Phoenix threads.

507.5.1.2.2 Color of hydrants. The color of hydrants shall be Maricopa Association of Government Standards, standard fire hydrant yellow. Private fire hydrants shall have the bonnet painted reflective white. Hydrants not intended for fire department use shall have the bonnet painted black. The red bonnet indicates a hydrant coming off a substandard main, or a low flow hydrant, normally coming off a 4-inch (101 mm) feed.

507.5.1.2.3 Height. Fire hydrants shall be installed so that the centerline of the lowest outlet is not less than 18 inches (457 mm) above grade and the highest outlet does not exceed 30 inches (762 mm) above grade.

507.5.1.2.4 Hydrant location. New hydrants shall be located on the right-hand (passenger) side of the street. Fire hydrants shall be located not less than 1 foot (305 mm) and not more than 6 feet (1829 mm) from the back of the curb of the access road or other vehicle access point. The largest outlet on the hydrant shall face the access road.

507.5.1.2.5 Hydrants on major streets. Fire hydrants on major streets, collector streets, or any other streets that are not divided by raised median islands or light-rail tracks can be included in the coverage analysis. If those streets classes are divided by raised median islands or light-rail tracks, then the existing hydrant can only be included in the coverage analysis if its location is on the same side of the median as the new development.

507.5.1.2.6 First new hydrant. The first new fire hydrant shall be located at the street intersection or at the main entrance(s) into a subdivision, apartment complex or commercial development.

507.5.1.2.7 Additional hydrants. Additional hydrants shall be spaced approximately 500 feet (152 400 mm) apart in single-family residential developments and shall be approximately 300 feet (91 440 mm) apart in all other development types. The distance between hydrants shall be measured along the path of the fire apparatus access road.

507.5.1.2.8 Parking areas. In open-air, on-grade parking areas, at least one fire hydrant shall be located within 600 feet (182 800 mm) of all areas.

507.5.1.2.9 Distance. Distance to fire department connection (FDC). At least one fire hydrant shall be located within 200 feet (60 960 mm) of a FDC supplying building fire protection systems. The distance between the hydrant and FDC shall be measured along the path of the fire apparatus access road and as fire fighters would lay hose. See also section 912.

507.5.1.2.10 Tampering and obstructions. Vehicle parking shall be prohibited within 15 feet (4572 mm) in either direction, of a fire hydrant installed parallel to a curb line. For hydrants that are set back from the curb, the 15-foot (4572 mm) clearance shall be measured from the curb line.

507.5.1.2.11 Accessibility. Fire hydrants shall be accessible to the fire department apparatus by roads meeting the requirements of Section 503. The largest outlet on the hydrant shall face the fire apparatus access road.

507.5.1.2.12 Sectional valves. Sectional valves shall be provided to ensure minimal impairments to fire protection should any mains require repair or alteration.
1. Every looped private main shall have backflow prevention serving a minimum two sectional valves at the point of connection on each leg of the loop and a minimum of one sectional valve separating the supply line in two approximately equal sections. The backflow valve assembly can serve as a sectional valve.

2. One sectional valve shall be placed on the private main supply to isolate every four to six connections to either sprinkler systems or hydrants, which each sprinkler lead-in and hydrant feed require their own control valves by NFPA 13 and NFPA 24. When a large private fire main has six or more connections to the main, multiple sectional valves are required to minimize impairments.

3. The backflow supply valve installed on connection from City of Phoenix public water mains is required outside the City of Phoenix right-of-way. The backflow valve assembly may serve as the fire sprinkler connection valve only for a dedicated sprinkler system supply.

4. If the sprinkler riser supply piping is run more than 5 feet (1524 mm) under the building, a Post Indicator Valve (PIV) shall be provided adjacent to the foundation, within 25 feet (7620 mm) to isolate the pipe running under the foundation.

507.5.2 Inspection, testing and maintenance. Fire hydrant systems shall be subject to periodic tests as required by the fire code official. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall comply with approved standards. Records of tests and required maintenance shall be maintained.

507.5.3 Private fire service mains and water tanks. Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants of all types: Inspection annually and after each operation; flow test and maintenance annually.

2. Fire service main piping: Inspection of exposed, annually; flow test every 5 years.

3. Fire service main piping strainers: Inspection and maintenance after each use.

Records of tests and required maintenance shall be maintained.

507.5.4 Obstruction. Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

507.5.5 Clear space around hydrants. A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or approved.

507.5.6 Physical protection. Where fire hydrants are subject to impact by a motor vehicle, guard posts or other approved means shall comply with Section 312.

SECTION 508
FIRE COMMAND CENTER

508.1 General. Where required by other sections of this code and in all buildings classified as high-rise buildings by the International Building Code, a fire command center for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.6.

508.1.1 Location, access and identification. The location and accessibility of the fire command center shall be approved by the fire code official. The fire command center shall be identified by permanent easily visible sign noting “Fire Department Command Center” located on the door to the fire command center. See Appendix D.

508.1.2 Separation. The fire command center shall be separated from the remainder of the building by not less than a 1-hour fire barrier constructed in accordance with Section 707 of the International Building Code or horizontal assembly constructed in accordance with Section 711 of the International Building Code, or both.

508.1.3 Size. The fire command center shall be not less than 0.015 percent of the total building area of the facility served or 200 square feet (19 m²) in area, whichever is greater, with a minimum dimension of 0.7 times the square root of the room area or 10 feet (3048 mm), whichever is greater.

508.1.4 Layout approval. A layout of the fire command center and all features required by this section to be contained therein shall be submitted for approval prior to installation.

508.1.5 Storage. Storage unrelated to operation of the fire command center shall be prohibited.

508.1.6 Required features. The fire command center shall comply with NFPA 72 and shall contain and maintain current the following features:

1. The emergency voice/alarm communication system control unit.

2. The fire department communications system.

3. Fire detection and alarm system annunciator.

4. Annunciator unit visually indicating the location of the elevators and whether they are operational.

5. Status indicators and controls for air distribution systems.

6. The firefighter’s control panel required by Section 909.16 for smoke control systems installed in the building.

7. Controls for unlocking interior exit stairway doors simultaneously.

8. Sprinkler valve and water-flow detector display panels.

9. Emergency and standby power status indicators.

10. A telephone for fire department use with controlled
access to the public telephone system.

11. Fire pump status indicators.

12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, fire-fighter air-replenishment systems, firefighting equipment and fire department access, and the location of fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions.

13. An approved Building Information Card that includes, but is not limited to, all of the following information:

13.1. General building information that includes: property name, address, the number of floors in the building (above and below grade), use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend;

13.2. Building emergency contact information that includes: a list of the building’s emergency contacts including but not limited to building manager, building engineer, fire alarm and sprinkler contractor, security system contractor, and elevator contractor and their respective work phone number, cell phone number and e-mail address;

13.3 Building construction information that includes: the type of building construction including but not limited to, floors, walls, columns, and roof assembly;

13.4 Exit access stairway and exit stairway information that includes: number of access stairways and exit stairways in the building, each access stairways and exit stairways designation and floors served; location where each exit stair access stairways and exit stairways discharge, stairways that are pressurized, exit stairways provided with emergency lighting; each exit stairway that allows reentry; exit stairways providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby, location of freight elevator banks;

13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service;

13.6. Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire pump connections, floors protected by automatic sprinklers and location of different types of automatic sprinkler systems installed including but not limited to dry, wet, and pre-action;

13.7. Hazardous material information that includes: location of hazardous material and quantity of hazardous material.


15. Generator supervision devices, manual start and transfer features.

16. Public address system, where specifically required by other sections of this code.

17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.

18. Elevator emergency or standby power selector switch(es), where emergency or standby power is provided.

19. A key box shall be permanently installed near the door to the fire command center. The key box shall be located 4 to 5½ feet (1219 mm to 1677 mm) above grade in a clearly visible location, with a minimum of 6 and a maximum of 8 sets of keys, unless additional keys are required by the fire code official.

SECTION 509
FIRE PROTECTION AND UTILITY EQUIPMENT IDENTIFICATION AND ACCESS

509.1 Identification. Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning systems, sprinkler risers and valves, or other fire detection, suppression or control elements shall be identified for the use of the fire department. Approved signs required to identify fire protection equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible. See Appendix D.

509.1.1 Utility identification. Where required by the fire code official, gas shut-off valves, electric meters, service switches and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an approved manner, readily visible and shall be maintained.

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.

SECTION 510
EMERGENCY RESPONDER RADIO COVERAGE

510.1 Emergency responder radio coverage in new buildings. New buildings shall have approved radio coverage for emergency responders within the building based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction measured at the exterior of the building. This section shall not require
improvement of the existing public safety communication systems.

Exceptions:

1. Where approved by the building official and the fire code official, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained in lieu of an approved radio coverage system.

2. Where it is determined by the fire code official that the radio coverage system is not needed.

3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

510.2 Emergency responder radio coverage in existing buildings. Existing buildings shall be provided with approved radio coverage for emergency responders as required in Chapter 11.

510.3 Permit required. A construction permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.5. Maintenance performed in accordance with this code is not considered a modification specified in Section 105.7.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.4 Technical requirements. Systems, components and equipment required to provide the emergency responder radio coverage system shall comply with Sections 510.4.1 through 510.4.2.8.

510.4.1 Emergency responder communication enhancement system signal strength. The building shall be considered to have acceptable emergency responder radio coverage where signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 through 510.4.1.3.

510.4.1.1 Minimum signal strength into the building. The minimum inbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The inbound signal level shall be sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-InterferencePlus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building. The minimum outbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The outbound signal level shall be sufficient to provide not less than a DAQ of 3.0 or an equivalent SINR applicable to the technology for either analog or digital signals.

510.4.1.3 System performance. Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the fire code official in Section 510.4.2.2.

510.4.2 System design. The emergency responder radio coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8 and NFPA 1221.

510.4.2.1 Amplification systems and components. Buildings and structures that cannot support the required level of radio coverage shall be equipped with systems and components to enhance the public safety radio signals and achieve the required level of radio coverage specified in Sections 510.4.1 through 510.4.1.3. Public safety communications enhancement systems utilizing radio-frequency-emitting devices and cabling shall be approved by the fire code official. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.

510.4.2.2 Technical criteria. The fire code official shall maintain a document providing the specific technical information and requirements for the emergency responder communications coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design.

510.4.2.3 Standby power. Emergency responder radio coverage systems shall be provided with dedicated standby batteries or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 1203. The standby power supply shall be capable of operating the emergency responder radio coverage system at 100-percent system capacity for a duration of not less than 12 hours.

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer’s Association (NEMA) 4-type waterproof cabinet.

2. Battery systems used for the emergency power source shall be contained in a NEMA 3R or higher rated cabinet.

3. Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.

4. Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
510.4.2.5 System monitoring. The emergency responder radio enhancement system shall be monitored by a listed fire alarm control unit, or where approved by the fire code official, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signals shall include the following:

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent reduction of operating capacity.
6. Failure of critical system components.
7. The communications link between the fire alarm system and the emergency responder radio enhancement system.

510.4.2.6 Additional frequencies and change of frequencies. The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority.

510.4.2.7 Design documents. The fire code official shall have the authority to require “as-built” design documents and specifications for emergency responder communications coverage systems. The documents shall be in a format acceptable to the fire code official.

510.4.2.8 Radio communication antenna density. Systems shall be engineered to minimize the nearfar effect. Radio enhancement system designs shall include sufficient antenna density to address reduced gain conditions.

Exceptions:

1. Class A narrow band signal booster devices with independent AGC/ALC circuits per channel.
2. Systems where all portable devices within the same band use active power control features.

510.5 Installation requirements. The installation of the public safety radio coverage system shall be in accordance with NFPA 1221 and Sections 510.5.1 through 510.5.4.

510.5.1 Approval prior to installation. Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC or other radio licensing authority shall not be installed without prior coordination and approval of the fire code official.

510.5.2 Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

1. A valid FCC-issued general radio operator’s license.
2. Certification of in-building system training issued by an approved organization, or approved school or certificate issued by the manufacturer of the equipment being installed.

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.

510.5.3 Acceptance test procedure. Where an emergency responder radio coverage system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency’s radio communications system or equipment approved by the fire code official.
3. Failure of not more than one test area shall not result in failure of the test.
4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency’s radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.
6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to
reestablish the gain values.

7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and subsequent annual inspections.

8. Systems incorporating Class B signal-booster devices or Class B broadband fiber remote devices shall be tested using two portable radios simultaneously. The second portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keying up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

510.5.4 FCC compliance. The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

510.6 Maintenance. The emergency responder radio coverage system shall be maintained operational at all times in accordance with Sections 510.4.1 through 510.6.4.

510.6.1 Testing and proof of compliance. The owner of the building or owner’s authorized agent shall have the emergency responder radio coverage system be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.

2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.

3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.

4. Other active components shall be checked to verify operation within the manufacturer’s specifications.

5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the fire code official.

510.6.2 Additional frequencies. The building owner shall modify or expand the emergency responder radio coverage system at his or her expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority. Prior approval of a public safety radio coverage system on previous frequencies does not exempt this section.

510.6.3 Field testing. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

510.6.3 Nonpublic safety system. Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the emergency responder communications coverage system, the nonpublic safety amplification system shall be corrected or removed.

SECTION 511
HILLSIDE DEVELOPMENT

511.1 Sprinkler requirement. An automatic sprinkler system shall be installed in Group R-3 and R-4 occupancies on hillside areas where the gradient for a fire apparatus access road exceed 15 percent, or hydrant spacing does not comply with this Section 508.4, or a reliable water supply is not available.

Group R-4 occupancies up to four stories in height shall require a minimum NFPA 13R automatic sprinkler system to be installed.

Group R-3 occupancies, one-and two-family dwellings and manufactured homes, shall require a minimum NFPA 13D automatic sprinkler system to be installed.

SECTION 512
CONTROLLED ACCESS/SECURITY GATES OR BARRIERS

512.1 General. The installation of controlled access/security gates or barriers across a fire apparatus access road shall be approved by the fire code official and meet the requirements of Section 512.

512.1.1 Permits. Permits shall be required to install or modify controlled access gates.

512.1.2 Gate installation companies. When gates are installed at any location that obstructs a fire apparatus access road, the installing company shall be licensed by the Arizona Registrar of Contractors as L-5 or C-5.

512.1.3 Egress. Fire apparatus access/security gates or barriers shall be designed and installed such that they do not obstruct the egress or departure of emergency vehicles.

512.1.3.1 Pedestrian gates. Pedestrian gates installed as part of the means of egress shall comply with the Phoenix Building Code and Chapter 10 of this code.

512.1.4 Maintenance. All fire apparatus access gates shall be maintained operable at all times and shall be inspected at least annually. Copies of the annual inspection report shall be maintained and be accessible for fire department review.
512.1.5 **Inoperable gates.** *Controlled access gates* that are inoperable and impede the entrance of fire apparatus shall be chained open or removed at the owner’s expense.

512.1.6 **Illegal gates.** *Controlled access gates* that cross *fire apparatus access roads* that have been installed without a *permit* shall be chained open or removed at the owner’s or installing contractor’s expense until a *permit* and final approval has been obtained from the fire department.

512.2 **Fire apparatus access gates.**

512.2.1 **General.** Access openings are required to be automatic where no turnaround is provided for fire apparatus.

512.2.2 **Main entrance identification.** Access openings shall have signs that identify the location of the property’s primary entrance, and signs shall be bolted on the street side of the fire apparatus access gate (see Appendix D).

512.2.3 **Marking and signage.** Manual and automatic access openings are required to be marked in accordance with Section 512.3.5. Signage shall be provided in accordance with Section 512.5.2.

512.3 **Controlled access gate specifications.** When controlled access gates are installed across a *fire apparatus access road* the specifications in Section 512.2 shall apply.

512.3.1 **Opening width.** When the gate is fully opened, a minimum 20-foot (6096 mm) clear width shall be provided for both the entrance and exit gates. Gates installed and approved prior to Nov. 8, 2003, shall be maintained in accordance with the original approval. The *fire code official* shall require additional width opening when a 45-foot (13716 mm) fire apparatus turning radius cannot be met.

**Exception:** Access roads serving three or fewer Group R-3 occupancies within 350 feet (106680 mm) from the street to each residence’s main entrance, as the fire fighters travel shall be exempt from the requirement of 20 feet (6096 mm).

512.3.2 **Electric and solar voltaic power system operated gates.** Electric and solar operated gates shall be installed in accordance with this section.

512.3.2.1 **Standby power systems.** Electric and solar operated gates shall be provided with a standby power system. Standby power is permitted to be, but not limited to, battery back-up or connection to an emergency generator. The activation of the system shall open gates and maintain them in the open position until primary power is restored to the system. Standby power systems are required to comply with the *National Electrical Code* Article 701.

**Exception:** Controlled access gates installed at occupancies other than multifamily residential properties may remain closed until the emergency gate switch is activated and shall then remain open while the standby power system is operating the gate.

512.3.3 **Opening time.** Electric and solar operated controlled access gates shall open at a minimum rate of 1 foot per second (0.305 m/s).

512.3.4 **Key switch.** Each electric and solar operated controlled access gate shall be equipped with an approved key switch on both sides of the gate. When separate entry and exit gates are provided, the emergency key switch shall open the entrance and exit gates.

512.3.5 **Key switch identification.** An approved sign reading “F.D. ACCESS” shall be installed within 12 inches (305 mm) of the emergency key switch. The key switch shall be illuminated so as to be visible from fire apparatus (see Appendix D).

512.3.6 **Height.** The key switch shall be mounted between 5 ½ and 6 feet (1676 to 1829 mm) above grade.
512.3.6.1 Solar photovoltaic cell location. The solar cell shall be located a minimum of 7 feet (2133 mm) above grade. The photovoltaic cell shall be located on the 4 by 4-inch preemption post as shown in the solar powered gate detail (see Appendix D).

512.3.7 Obstruction and impairment. Posts, fences, vehicles, growth, trash, storage and other materials shall not be kept near key switches in a manner that would prevent the key switches from being visible.

512.3.8 Bypass of systems. When activated, the emergency key switch shall bypass all occupant and loop switch systems.

512.4 Preemption devices. Preemption devices are required on all new automatic fire access gates installed after Jan. 1, 2001, at residential properties. Gates installed without permits or proof of installation date require preemption devices. Voluntary installations of preemption devices shall comply with the requirements of Section 512.4.2.

Exception: Access road serving three or fewer Group R-3 occupancies.

512.4.1 Locations. The devices shall be installed such that the gate will open for both ingress and egress of emergency vehicles.

512.4.2 Minimum installation standards. The installation of preemption devices shall comply with the following:

1. Detectors shall be mounted 8 to 10 feet (2439 to 3048 mm) above grade.
2. Detectors shall be located a minimum of 18 inches (457 mm) behind the gate on the property side.
3. Detectors shall be mounted on a separate 4 by 4-inch (102 to 102 mm) metal post and not on the guide post. The metal post shall be cemented a minimum of 18 inches (457 mm) below grade.
4. Detectors shall activate at a minimum of 150 feet (45 720 mm) from the gate.
5. Detectors shall point toward both the approach and the exit path of the emergency vehicle.
6. The sight path of the detector shall be free of visual obstructions such as signs, covered parking, canopies and vegetation.
7. Individual detectors shall be mounted together with the power module in the dual detector-mounting box. Detectors shall be approved by the fire department. A list of approved devices will be maintained by the fire department and available to the public.

512.5 Manual controlled access gates. Manual controlled access gates that cross a fire apparatus access road shall comply with Section 512.3

512.5.1 Locking mechanism. All manual controlled access gates that cross a fire apparatus access road shall use an approved dual padlock mechanism (see Appendix D). Gates installed and approved prior to Nov. 8, 2003, shall be maintained in accordance with the original approval.

512.5.2 Signs. Approved signs shall be provided on the manual gates. The signs shall have a reflective background and shall be bolted back-to-back onto each side of the gate (see Appendix D).

512.5.3 Marking. Minimum 6-inch (152 mm) wide red, crosshatched striping shall be painted on the ground surface on both sides of the manual access gate, including recessed areas as determined by the fire department. A minimum of two applications of paint is required.
BUILDING NUMBERS AND UNIT SPREAD NUMBERS

18" BLDG. NUMBER
3" STROKE

7" X 1"
7" LETTERS
1" STROKE

3001-3028
2001-2028
1001-1028

42"
27.5"

ALL NUMBERING IS GILL SANS FONT

NOTE:
1. THE FONT USED IS GILL SANS. FONTS USED FOR ADDRESSING MUST BE LEGIBLE AND EASY TO READ.

2. THE USE OF DIFFERENT FONTS MUST BE PRE-APPROVED BY A FIRE CODE OFFICIAL.
UNIT DIRECTIONAL SIGN

Notes:

1. The sign face shall be 32" x 24" and fabricated from .080 aluminum sheet with 1/4" radius corners.

2. The font used is Arial Black. Fonts used for addressing must be legible and easy to read. The use of different fonts must be pre-approved by a Fire Prevention Emergency Access Officer.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG3 4090 series or equivalent) applied as a background to the aluminum plates.

4. Lettering / graphics shall be dark contrasting, 3M Scotchlite acrylic, transparent, electronic cuttable film (3M 1170 series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufactures match component system.

6. To form a graffiti barrier 3M 1180 protection overlay film maybe applied over sign.

7. Requires pre-approval by a Fire Code official. 602-262-6771
SITE DIRECTORY
INTERNALLY ILLUMINATED

Notes:

1. Should include photo cell.
2. Refer to entrance island detail for dimension specifications
ENTRANCE ISLAND TO RESIDENTIAL COMMUNITIES WITH AUTOMATIC GATES

SITE DIRECTORY REQUIRES PRE-APPROVAL

APARTMENT DIRECTORY

BLDG 1

BLDG 5

OFI

COMMUNITY CENTER

BLDG 3

BLDG 4

BLDG 3

ACCESS SIGN

F.D. KNOX KEY SWITCH REQUIRES PERMIT

TENANT KEY PAD

TENANT CARD ACCESS

GRADE / PAVEMENT

ENTRANCE ISLAND ELEV. DETAIL (FRONT VIEW)

ACCESS SIGN DETAIL

F.D. ACCESS

ACCESS SIGN REQUIRES PERMIT

F.D. KNOX KEY SWITCH FOR SINGLE GATE APPLICATION SWITCH MODEL #3602 FOR DOUBLE GATE APPLICATION SWITCH MODEL #3613

TENANT KEY PAD

SITE DIRECTORY

ENTRANCE ISLAND ELEV. DETAIL (SIDE VIEW)

ACCESS PADS

GRADE / PAVEMENT

PLAN VIEW

Effective July 19, 2019

2018 INTERNATIONAL FIRE CODE WITH PHOENIX AMENDMENTS
SECTION 601
GENERAL

601.1 Scope. The provisions of this chapter shall apply to the installation, operation and maintenance of fuel-fired appliances and heating systems, electrical systems and equipment, mechanical refrigeration systems, elevator recall, and commercial kitchen equipment.

601.2 Permits. Permits shall be obtained for refrigeration systems, as set forth in Sections 105.6 and 105.7.9

SECTION 602
DEFINITIONS

602.1 Definitions. The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY LEAD-ACID.
BATTERY TYPES.
COMMERCIAL COOKING APPLIANCES.
CRITICAL CURCUIT.
EMERGENCY POWER SYSTEM.
HOOD.
Type I.
Type II.
REFRIGERANT.
REFRIGERATION (REFREIGERANT) SYSTEM.
STANDBY POWER SYSTEM.

SECTION 603
FUEL-FIRED APPLIANCES

603.1 Installation. The installation of nonportable fuel-fired appliances and systems shall comply with the International Fuel Gas Code. The installation of nonportable liquid fuel-fired appliances and systems shall comply with this section and the International Mechanical Code. The installation of all other fuel-fired appliances, other than portable internal combustion engines, oil lamps and other portable devices such as blow torches, melting pots and weed burners, shall comply with this section and the International Mechanical Code.

603.1.1 Manufacturer’s instructions. The installation shall be made in accordance with the manufacturer’s instructions and applicable federal, state and local rules and regulations. Where it becomes necessary to change, modify or alter a manufacturer’s instructions in any way, written approval shall first be obtained from the manufacturer.

603.1.2 Approval. The design, construction and installation of fuel-fired appliances shall be in accordance with the International Fuel Gas Code and the International Mechanical Code.

603.1.3 Electrical wiring and equipment. Electrical wiring and equipment used in connection with oil-burning equipment shall be installed and maintained in accordance with Section 605 and NFPA 70.

603.1.4 Fuel oil. The grade of fuel oil used in a burner shall be that for which the burner is approved and as stipulated by the burner manufacturer. Oil containing gasoline shall not be used. Waste crankcase oil shall be an acceptable fuel in Group F, M and S occupancies, where utilized in equipment listed for use with waste oil and when such equipment is installed in accordance with the manufacturer’s instructions and the terms of its listing.

603.1.5 Access. The installation shall 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 Testing, diagrams and instructions. After installation of the oil-burning equipment, operation and combustion performance tests shall be conducted to determine that the burner is in proper operating condition and that all accessory equipment, controls, and safety devices function properly.

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 available in case of emergency.

603.1.6.2 Instructions. After completing the installation, the installer shall instruct the owner or operator in the proper operation of the equipment. The installer shall furnish the owner or operator with the name and telephone number of persons to contact for technical information or assistance and routine or emergency services.

603.1.7 Clearances. Working clearances between oil fired appliances and electrical panelboards and equipment shall be in accordance with NFPA 70. Clearances between oil-fired equipment and oil supply tanks shall be in accordance with NFPA 31.

603.2 Chimneys. Masonry chimneys shall be constructed in accordance with the International Building Code. Factory built chimneys shall be installed in accordance with the International Mechanical Code. Metal chimneys shall be constructed and installed in accordance with NFPA 211.

603.3 Fuel oil storage systems. Fuel oil storage systems shall be installed in accordance with this code. Fuel-oil piping systems shall be installed in accordance with NFPA 31.

603.3.1 Fuel oil storage in outside, above-ground tanks. Where connected to a fuel-oil piping system, the maximum amount of fuel oil storage allowed outside above ground without additional protection shall be 660 gallons (2498 L). The storage of fuel oil above ground in quantities exceeding 660 gallons (2498 L) shall comply with NFPA 31.

603.3.2 Fuel oil storage inside buildings. Fuel oil storage inside buildings shall comply with Sections 603.3.2.1 through 603.3.2.7 and Chapter 57.

603.3.2.1 Quantity limits. One or more fuel oil storage tanks containing Class II or III combustible liquid shall be permitted in a building. The aggregate capacity of all such tanks shall not exceed the following:

1. 660 gallons (2498 L) in unsprinklered buildings, where stored in a tank complying with UL 80, UL 142 or UL 2085.
2. 1,320 gallons (4996 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in a tank complying with UL 142.
3. 3,000-gallon (11 356 L) where stored in protected above ground tanks complying with UL 2085 and Section 5704.2.9.7 and the room is protected by an automatic sprinkler system in accordance with Section 903.3.1.1.

603.3.2.2 Restricted use and connection. Tanks installed in accordance with Section 603.3.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or fire pumps or generator equipment installed in accordance with Section 603.3.2.4. Connections between tanks and equipment supplied by such tanks shall be made using closed piping systems.

603.3.2.3 Applicability of maximum allowable quantity and control area requirements. The quantity of combustible liquid stored in tanks complying with Section 603.3.2 shall not be counted towards the maximum allowable quantity set forth in Table 5003.1.1(1), and such tanks shall not be required to be located in a control area.

603.3.2.4 Installation. Tanks and piping systems shall be installed in accordance with Section 915 and Chapter 13, both of the International Mechanical Code, as applicable.

Exception: Emergency vents on above-ground tanks containing fuel-oil to fuel-burning, fire pumps or generator equipment are allowed to discharge inside a fully sprinklered building. The density of the fire protection system shall be ordinary hazard Group 2.

603.3.2.5 Separation. Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by fire barriers, horizontal assemblies, or both, with a minimum 1-hour fire-resistance rating with 1-hour fire-protection-rated opening protective in accordance with the International Building Code.

Exception: Rooms containing protected aboveground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

603.3.2.6 Spill containment. Tanks exceeding 55-gallon (208 L) capacity or an aggregate capacity of 1,000 gallons (3785 L) that are not provided with integral secondary containment shall be provided with spill containment sized to contain a release from the largest tank.

603.3.2.7 Tanks in basements. Tanks in basements shall be located not more than two stories below grade plane.

603.3.3 Underground storage of fuel oil. The storage of fuel oil in underground storage tanks shall comply with NFPA 31.

603.4 Portable unvented heaters. Portable unvented fuel fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, R-3, R-4, and ambulatory care facilities.

Exceptions:

1. In one and two-family dwellings portable unvented fuel-fired heaters, where approved and listed in accordance with UL 647.
2. Portable outdoor gas-fired heating appliances shall be allowed in accordance with Section 603.4.2.

603.4.1 Prohibited locations. Unvented fuel-fired heating equipment shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms or storage closets.

603.4.2 Portable outdoor gas-fired heating appliances. Portable gas-fired heating appliances located outdoors shall be in accordance with Sections 603.4.2.1 through 603.4.2.3.

603.4.2.1 Location. Portable outdoor gas-fired heating appliances shall be located in accordance with Sections 603.4.2.1.1 through 603.4.2.1.4.

603.4.2.1.1 Prohibited locations. The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:
603.4.2.2 Installation and operation. Portable outdoor gas-fired heating appliances shall be installed and operated in accordance with Sections 603.4.2.2.1 through 603.4.2.2.4.

603.4.2.2.1 Listing and approval. Only listed and approved portable outdoor gas-fired heating appliances utilizing a fuel gas container that is integral to the appliance shall be used.

603.4.2.2.2 Installation and maintenance. Portable outdoor gas-fired heating appliances shall be installed and maintained in accordance with the manufacturer’s instructions.

603.4.2.2.3 Tip-over switch. Portable outdoor gas-fired heating appliances shall be equipped with a tilt or tip-over switch that automatically shuts off the flow of gas if the appliance is tilted more than 15 degrees (0.26 rad) from the vertical.

603.4.2.2.4 Guard against contact. The heating element or combustion chamber of portable outdoor gas-fired heating appliances shall be permanently guarded so as to prevent accidental contact by persons or material.

603.4.2.3 Gas containers. Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with Sections 603.4.2.3.1 through 603.4.2.3.4.

603.4.2.3.1 Approved containers. Only approved DOT or ASME gas containers shall be used.

603.4.2.3.2 Container replacement. Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.

603.4.2.3.3 Container capacity. The maximum individual capacity of gas containers used in connection with portable outdoor gas-fired heating appliances shall not exceed 20 pounds (9 kg).

603.4.2.3.4 Indoor storage prohibited. Gas containers shall not be stored inside of buildings except in accordance with Section 6109.9.

603.5 Heating appliances. Heating appliances shall be listed and shall comply with Sections 603.5.1 and 603.5.2.

603.5.1 Guard against contact. The heating element or combustion chamber shall be permanently guarded so as to prevent accidental contact by persons or material.

603.5.2 Heating appliance installation and maintenance. Heating appliances shall be installed and maintained in accordance with the manufacturer’s instructions, the International Building Code, the International Mechanical Code, the International Fuel Gas Code and NFPA 70.

603.6 Chimneys and appliances. Chimneys, incinerators, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, fireboxes or boilers to which such devices are connected, shall be maintained so as not to create a fire hazard.

603.6.1 Masonry chimneys. Masonry chimneys that, upon inspection, are found to be without a flue liner and that have open mortar joints which will permit smoke or gases to be discharged into the building, or which are cracked as to be dangerous, shall be repaired or relined with a listed chimney liner system installed in accordance with the manufacturer’s instructions or a flue lining system installed in accordance with the requirements of the International Building Code and appropriate for the intended class of chimney service.

603.6.2 Metal chimneys. Metal chimneys which are corroded or improperly supported shall be repaired or replaced.

603.6.3 Decorative shrouds. Decorative shrouds installed at the termination of factory-built chimneys shall be removed except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with the chimney manufacturer’s instructions.

603.6.4 Factory-built chimneys. Existing factory-built chimneys that are damaged, corroded or improperly supported shall be repaired or replaced.

603.6.5 Connectors. Existing chimney and vent connectors that are damaged, corroded or improperly supported shall be repaired or replaced.

603.7 Discontinuing operation of unsafe heating appliances. The fire code official is authorized to order that measures be taken to prevent the operation of any existing stove, oven, furnace, incinerator, boiler or any other heat-producing device or appliance found to be defective or in violation of code requirements for existing appliances after giving notice to this effect to any person, owner, firm or agent or operator in charge of the same. The fire code official is authorized to take measures to prevent the operation of any device or appliance without notice when inspection shows the existence of an immediate fire hazard or when imperiling human life. The defective device shall remain withdrawn from service until all necessary repairs or alterations have been made.

603.7.1 Unauthorized operation. It shall be a violation of
this code for any person, user, firm or agent to continue the utilization of any device or appliance (the operation of which has been discontinued or ordered discontinued in accordance with Section 603.7) unless written authority to resume operation is given by the fire code official. Removing or breaking the means by which operation of the device is prevented shall be a violation of this code.

603.8 Incinerators. Commercial, industrial and residential type incinerators and chimneys shall be constructed in accordance with the International Building Code, the International Fuel Gas Code and the International Mechanical Code.

603.8.1 Residential incinerators. Residential incinerators shall be of an approved type.

603.8.2 Spark arrestor. Incinerators shall be equipped with an effective means for arresting sparks.

603.8.3 Restrictions. Where the fire code official determines that burning in incinerators located within 500 feet (152 m) of mountainous, brush or grass-covered areas will create an undue fire hazard because of atmospheric conditions, such burning shall be prohibited.

603.8.4 Time of burning. Burning shall take place only during approved hours.

603.8.5 Discontinuance. The fire code official is authorized to require incinerator use to be discontinued immediately if the fire code official determines that smoke emissions are offensive to occupants of surrounding property or if the use of incinerators is determined by the fire code official to constitute a hazardous condition.

603.8.6 Flue-fed incinerators in Group I-2. In Group I-2 occupancies, the continued use of existing flue-fed incinerators is prohibited.

603.8.7 Incinerator inspections in Group I-2. Incinerators in Group I-2 occupancies shall be inspected not less than annually in accordance with the manufacturer's instructions. Inspection records shall be maintained on the premises and made available to the fire code official upon request.

603.9 Gas meters. Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with Section 312 or otherwise protected in an approved manner.

SECTION 604
EMERGENCY AND STANDBY POWER SYSTEMS

604.1 Abatement of electrical hazards. Identified electrical hazards shall be abated. Identified hazardous electrical conditions in permanent wiring shall be brought to the attention of the responsible code official. Electrical wiring, devices, appliances and other equipment that is modified or damaged and constitutes an electrical shock or fire hazard shall not be used.

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

604.3 Working space and clearance. A working space of not less than 30 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided in front of electrical service equipment. Where the electrical service equipment is wider than 30 inches (762 mm), the working space shall be not less than the width of the equipment. Storage of materials shall not be located within the designated working space.

Exceptions:

1. Where other dimensions are required or allowed by NFPA 70.
2. Access openings into attics or under-floor areas that provide a minimum clear opening of 22 inches (559 mm) by 30 inches (762 mm).

604.3.1 Labeling. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating ELECTRICAL ROOM or similar approved wording. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident. Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with NFPA 70.

604.4 Multiplug adapters. Multiplug adapters, such as cube adapters, unfused plug strips or any other device not complying with NFPA 70 shall be prohibited.

604.4.1 Power tap design. Relocatable power taps shall be of the polarized or grounded type, equipped with overcurrent protection, and shall be listed in accordance with UL 1363.

604.4.2 Power supply. Relocatable power taps shall be directly connected to a permanently installed receptacle.

604.4.3 Installation. Relocatable power tap cords shall not extend through walls, ceilings, floors, under doors or floor coverings, or be subject to environmental or physical damage.

604.5 Extension cords. Extension cords and flexible cords shall not be a substitute for permanent wiring and shall be listed and labeled in accordance with UL 817. Extension cords and flexible cords shall not be affixed to structures, extended through walls, ceilings or floors, or under doors or floor coverings, nor shall such cords be subject to environmental damage or physical impact. Extension cords shall be used only with portable appliances. Extension cords marked for indoor use shall not be used outdoors.

604.5.1 Power supply. Extension cords shall be plugged directly into an approved receptacle, power tap or Multiplug adapter and, except for approved multiplug extension cords, shall serve only one portable appliance.

604.5.2 Ampacity. The ampacity of the extension cords shall be not less than the rated capacity of the portable appliance supplied by the cord.

604.5.3 Maintenance. Extension cords shall be maintained in good condition without splices, deterioration or damage.
604.5.4 Grounding. Extension cords shall be grounded where serving grounded portable appliances.

604.6 Unapproved conditions. Open junction boxes and open-wiring splices shall be prohibited. Approved covers shall be provided for all switch and electrical outlet boxes.

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

604.8 Electrical motors. Electrical motors shall be maintained free from excessive accumulations of oil, dirt, waste and debris.

604.9 Temporary wiring. Temporary wiring for electrical power and lighting installations is allowed for a period not to exceed 90 days. Temporary wiring methods shall meet the applicable provisions of NFPA 70.

Exception: Temporary wiring for electrical power and lighting installations is allowed during periods of construction, remodeling, repair or demolition of buildings, structures, equipment or similar activities.

604.9.1 Attachment to structures. Temporary wiring attached to a structure shall be attached in an approved manner.

604.10 Portable, electric space heaters. Where not prohibited by other sections of this code, portable, electric space heaters shall be permitted to be used in all occupancies in accordance with Sections 604.10.1 through 604.10.5.

604.10.1 Listed and labeled. Only listed and labeled portable, electric space heaters shall be used.

604.10.2 Power supply. Portable, electric space heaters shall be plugged directly into an approved receptacle.

604.10.3 Extension cords. Portable, electric space heaters shall not be plugged into extension cords.

604.10.4 Prohibited areas. Portable, electric space heaters shall not be operated within 3 feet (914 mm) of any combustible materials. Portable, electric space heaters shall be operated only in locations for which they are listed.

604.10.5 Group I-2 occupancies and ambulatory care facilities. Where used in Group I-2 and ambulatory care facilities, portable, electric space heaters shall be limited to those having a heating element that cannot exceed a temperature of 212°F (100°C), and such heaters shall only be used in nonsleeping staff and employee areas.

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

SECTION 605
MECHANICAL REFRIGERATION

[M] 605.1 Scope. Refrigeration systems shall be installed in accordance with the International Mechanical Code.

605.1.1 Refrigerants other than ammonia. Where a refrigerant other than ammonia is used, refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15.

605.1.2 Ammonia refrigeration. Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR-2 for system design and installation and IIAR-7 for operating procedures. Decommissioning of ammonia refrigeration systems shall comply with IIAR-8.

605.1.3 Pipe labeling. Piping shall be labeled every 20’ or change of direction per Phoenix Fire Code 5003.2.2.1(2). All piping containing ammonia shall be labeled per IIAR Bulletin 14.

605.1.4 Valve tagging. All valves shall be tagged per Phoenix Fire Code 5003.2.2.1(2), and marked on the Piping and Instrumentation diagram.

[M] 605.2 Refrigerants. The use and purity of new, recovered and reclaimed refrigerants shall be in accordance with the International Mechanical Code.

[M] 605.3 Refrigerant classification. Refrigerants shall be classified in accordance with the International Mechanical Code.

[M] 605.4 Change in refrigerant type. A change in the type of refrigerant in a refrigeration system shall be in accordance with the International Mechanical Code.

605.5 Access. 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 be provided for the fire department at all times as required by the fire code official.

605.6 Testing of equipment. Refrigeration equipment and 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 subject to periodic testing in accordance with Section 605.6.1. Records of tests shall be maintained. Tests of emergency devices or systems required by this chapter shall be conducted by persons trained and qualified in refrigeration systems.

605.6.1 Periodic testing. The following emergency devices or systems shall be periodically tested in accordance with the manufacturer’s instructions and as required by the fire code official.

1. Treatment and flaring systems.
2. Valves and appurtenances necessary to the operation of emergency refrigeration control boxes.
3. Fans and associated equipment intended to operate emergency ventilation systems.
4. Detection and alarm systems.

605.6.2 Maintenance. Mechanical refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion and other debris and leaks, in accordance with the International Mechanical Code.

605.6.3 Operators. Facilities using ammonia refrigeration equipment shall, upon the request of the Fire Department,
provide evidence that the refrigeration equipment is maintained and operated by technicians who have a minimum certification from Certified Industrial Refrigeration Equipment Operator (C.I.R.O.) certification through the Refrigeration Engineer's and Technician's Association, or similar nationally recognized certification approved by the fire code official.

605.7 Emergency signs. Refrigeration units or 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 provided with approved emergency signs, charts and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the International Mechanical Code for the classification of refrigerants listed therein.

605.7.1 Emergency response documents. Emergency response documents shall be maintained at a location approved by the fire department which include the following:

1. Hazardous material permit application,
2. Site Map,
3. Hazardous materials inventory statement,
4. EPCRA emergency response plan questionnaire,
5. Facility emergency response plan,
6. Refrigeration System Operation Guide: (compressor room layout, P&IDs, valve schedule, emergency pressure control shutdown procedures, supporting photos or CDs, etc.).

605.8 Refrigerant detection. Machinery rooms shall be provided with a refrigerant detector with an audible and visible alarm. Where ammonia is used as the refrigerant, detection shall comply with IIAR 2. For refrigerants other than ammonia, refrigerant detection shall comply with Section 605.8.1

605.8.1 Refrigerants other than ammonia. A detector, or a sampling tube that draws air to a detector, shall be provided at an approved location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an approved location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the International Mechanical Code for the refrigerant classification.
2. Twenty-five percent of the lower flammable limit (LFL). Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 605.9.1.

605.8.2 Alarms. The evacuation alarm shall be actuated at 50% of the IDLH of the refrigerant. The detector shall transmit the appropriate signals to an approved location.

Exception: Unoccupied areas with only continuous piping that does not include valves, valve assemblies, equipment or equipment connections.

605.8.2.1 Notification. Evacuation notification devices with audible and visible notification shall be provided:

1. In the area or room where the refrigerant gas is located,
2. In the common area,
3. At the entrance to the room with required detection,
4. It shall be clear to the responders upon approach to the hazard that asphyxiant gas is present,
5. Or as required by the fire code official.

605.8.3 Annunciator panel. An annunciator panel shall be placed in an approved location which clearly indicates what zones have activated on the refrigerant detection system.

605.8.4 Alarms. Alarms and notification devices shall be installed and maintained in accordance with NFPA 72.

605.8.5 Ventilation system. A clearly identified ventilation system switch of the break-glass type or an approved tamper-resistant cover shall provide on-only control of the machinery room ventilation fans in accordance with the International Mechanical Code.

605.8.6 Wind indicator. A wind sock, pennant or other wind indicator shall be provided and clearly visible near the machinery room.

605.8.7 Machinery room door sign. A permanent sign shall be mounted on/near the machinery room door with the following information:

1. Name of facility
2. Address
3. Total refrigerant system charge

605.9 Remote controls. Where flammable refrigerants are used and compliance with Section 1106 of the International Mechanical Code is required, remote control of the mechanical equipment and appliances located in the machinery room as required by Sections 605.9.1 and 605.9.2 shall be provided at an approved location immediately outside the machinery room and adjacent to its principal entrance.

605.9.1 Refrigeration system emergency shutoff. A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps and normally closed automatic refrigerant valves located in the machinery room. Additionally, this equipment shall be automatically shut off when the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper detection limit or 25 percent of the LEL, whichever is lower.

605.9.2 Ventilation system. A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide on-only control of the machinery room ventilation fans.

605.10 Emergency pressure control system. Permanently installed refrigeration systems containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with Sections 605.10.1 and 605.10.2.
605.10.1 Automatic crossover valves. Each high and intermediate-pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with Sections 605.10.1.1 through 605.10.1.3.

605.10.1.1 Overpressure limit set point. Automatic crossover valves shall be arranged to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high or intermediate-pressure zone rises to within 90 percent of the set point for emergency pressure relief devices.

605.10.1.2 Manual operation. Where required by the fire code official, automatic crossover valves shall be capable of manual operation.

605.10.1.3 System design pressure. Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones.

605.10.2 Automatic emergency stop. An automatic emergency stop feature shall be provided in accordance with Sections 605.10.2.1 and 605.10.2.2.

605.10.2.1 Operation of an automatic crossover valve. Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high-pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

605.10.2.2 Overpressure in low-pressure zone. The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 percent of the set point for emergency pressure relief devices. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

605.11 Storage, use and handling. Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by Chapters 50, 53, 55 and 57.

Exception: This provision shall not apply to spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system.

605.12 Discharge and termination of pressure relief and purge systems. Pressure relief devices, fusible plugs and purge systems discharging to the atmosphere from refrigeration systems containing flammable, toxic or highly toxic refrigerants or ammonia shall comply with Sections 605.12.2 through 605.12.4.

605.12.1 Fusible plugs and rupture members. Discharge piping and devices connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event the fusible plug or rupture member functions.

605.12.2 Flammable refrigerants. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 605.12.5 or a flaring system in accordance with Section 605.12.6. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

605.12.3 Toxic and highly toxic refrigerants. Systems containing more than 6.6 pounds (3 kg) of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 605.12.5 or a flaring system in accordance with Section 605.12.6.

605.12.4 Ammonia refrigerant. Systems containing more than 6.6 pounds (3 kg) of ammonia refrigerant shall discharge vapor to the atmosphere in accordance with one of the following methods:

1. Directly to atmosphere where the fire code official determines, on review of an engineering analysis prepared in accordance with Section 104.7.2, that a fire, health or environmental hazard would not result from atmospheric discharge of ammonia.

2. Through an approved treatment system in accordance with Section 605.12.5.

3. Through a flaring system in accordance with Section 605.12.6.

4. Through an approved ammonia diffusion system in accordance with Section 605.12.7.

5. By other approved means.

Exception: Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

605.12.5 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 60.

605.12.6 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards. Incineration
shall be automatic upon initiation of discharge, shall be designed to prevent blowback and shall not expose structures or materials to threat of fire. Standby fuel, such as LP-gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system. Standby electrical power, where required to complete the incineration process, shall be in accordance with Section 1203.

605.12.7 Ammonia diffusion systems. Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (8.3 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but not lower than 33 feet (10.058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

605.12.8 Additional ammonia diffusion tank features. An ammonia diffusion tank shall have the following additional features:

1. Automatic fill capability
2. External sight board visible from a distance of at least 150 feet (45.720 mm) for the fire apparatus access lane.
3. Ammonia leak detection in relief vent piping or at diffusion tank
4. A fire hydrant shall be located within 200 feet (60.960 mm) from the fire department connection to the ammonia diffusion tank.
5. The FDC shall be marked with a sign that says: "FDC TO AMMONIA DIFFUSION TANK ONLY" per PFD specifications. See Appendix D.
6. An ammonia diffusion tank shall be labeled: "AMMONIA DIFFUSION TANK" using contrasting background that is visible at a distance of at least 150 feet (45.720 mm).

An ammonia diffusion tank shall have a low water sensor with an audible/visual alarm located in an approved location nearby. The horn/strobe shall be labeled: "Low Water--Ammonia Diffusion Tank".

605.13 Mechanical ventilation exhaust. Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia, capable of exceeding 25 percent of the LFL or 50 percent of the IDLH shall be equipped with approved treatment systems to reduce the discharge concentrations to those values or lower.

Exception: Refrigeration systems containing Group A2L complying with Section 605.17.

605.14 Notification of refrigerant discharges. The fire code official shall be notified immediately when a discharge becomes reportable under state, federal or local regulations in accordance with Section 5003.3.1.

605.15 Records. A record of refrigerant quantities brought into and removed from the premises shall be maintained in a location approved by the fire code official.

[M] 605.16 Electrical equipment. Where refrigerant of Groups A2, A3, B2 and B3, as defined in the International Mechanical Code, are used, refrigeration machinery rooms shall conform to the Class 1, Division 2 hazard location classification requirements of NFPA 70.

Exceptions:

1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1106.3 of the International Mechanical Code.
2. Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 605.17.

[M] 605.17 Special requirements for Group A2L refrigerant machinery rooms. Machinery rooms with systems containing Group A2L refrigerants shall comply with Sections 605.17.1 through 605.17.3.

Exception: Machinery rooms conforming to the Class 1, Division 2 hazardous location classification requirements of NFPA 70.

605.17.1 Refrigerant detection system. The machinery room shall be provided with a refrigerant detection system. The refrigerant detection system shall be in accordance with Section 605.8 and all of the following:

1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.
2. Upon activation, the detection system shall activate the emergency ventilation system in Section 605.17.3.
3. The detection, signaling and control circuits shall be supervised.

[M] 605.17.2 Emergency ventilation system. An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 605.17.2. Shut down of the emergency ventilation system shall be by manual means.

<table>
<thead>
<tr>
<th>REFRIGERANT</th>
<th>Q (m³/sec)</th>
<th>Q (cfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R32</td>
<td>15.4</td>
<td>32,600</td>
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<tr>
<td>R143a</td>
<td>13.6</td>
<td>28,700</td>
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<tr>
<td>R444A</td>
<td>6.46</td>
<td>13,700</td>
</tr>
<tr>
<td>R444B</td>
<td>10.6</td>
<td>22,400</td>
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<td>R445A</td>
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<tr>
<td>R451B</td>
<td>7.05</td>
<td>15,000</td>
</tr>
<tr>
<td>R1234yf</td>
<td>7.80</td>
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<tr>
<td>R1234ze(E)</td>
<td>5.92</td>
<td>12,600</td>
</tr>
</tbody>
</table>

[M] 605.17.3 Emergency ventilation system discharge. The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm)
shall read: IN FIRE EMERGENCY, DO NOT USE stairways and not to use the elevators in case of fire. The sign connected to elevators, the machine room ventilation or air call station on all floors instructing occupants to use the exit standardized design shall be posted adjacent to each elevator

**SECTION 606**

**ELEVATOR OPERATION, MAINTENANCE AND FIRE SERVICE KEYS**

**606.1 Emergency operation.** Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements in Chapter 11. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME 17.1/CSA B44.

**606.2 Standby power.** In buildings and structures where standby power is required or furnished to operate an elevator, standby power shall be provided in accordance with Section 1203. Operation of the system shall be in accordance with Sections 606.2.1 through 606.2.4.

**606.2.1 Manual transfer.** Standby power shall be manually transferable to all elevators in each bank.

**606.2.2 One elevator.** Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.

**606.2.3 Two or more elevators.** Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, not less than one elevator shall remain operable from the standby power source.

**606.2.4 Machine room ventilation.** Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the standby power source.

**[BE] 606.3 Emergency signs.** An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS.

**Exceptions:**

1. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1009.4.
2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in

**606.4 Fire service access elevator lobbies.** Where fire service access elevators are required by Section 3007 of the *International Building Code*, fire service access elevator lobbies shall be maintained free of storage and furniture.

**606.5 Occupant evacuation elevator lobbies.** Where occupant evacuation elevators are provided in accordance with Section 3008 of the *International Building Code*, occupant evacuation elevator lobbies shall be maintained free of storage and furniture.

**606.6 Water protection of hoistway enclosures.** Methods to prevent water from infiltrating into a hoistway enclosure required by Section 3007.3 and Section 3008.3 of the *International Building Code* shall be maintained.

**606.7 Elevator key location.** Keys for the elevator car doors and fire-fighter service keys shall be kept in an approved location for immediate use by the fire department.

**606.8 Standardized fire service elevator keys.** Buildings with elevators equipped with Phase I emergency recall, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official.

**Exception:** The owner shall be permitted to place the building’s nonstandardized fire service elevator keys in a key box installed in accordance with Section 506.1.2.

**606.8.1 Requirements for standardized fire service elevator keys.** Standardized fire service elevator keys shall comply with all of the following:

1. All fire service elevator keys within the jurisdiction shall be uniform and specific for the jurisdiction. Keys shall be cut to a uniform key code.
2. Fire service elevator keys shall be of a patent-protected design to prevent unauthorized duplication.
3. Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. Uncut key blanks shall not be permitted to leave the factory.
4. Fire service elevator keys subject to these rules shall be engraved with the words “DO NOT DUPLICATE.”

**606.8.2 Access to standardized fire service keys.** Access to standardized fire service elevator keys shall be restricted to the following:

1. Elevator owners or their authorized agents.
2. Elevator contractors.
3. Elevator inspectors of the jurisdiction.
4. *Fire code officials* of the jurisdiction.
5. The fire department and other emergency response agencies designated by the fire code official.
606.8.3 Duplication or distribution of keys. A person shall not duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.

606.8.4 Responsibility to provide keys. The building owner shall provide up to three standardized fire service elevator keys where required by the fire code official, upon installation of a standardized fire service key switch or switches in the building.

SECTION 607
COMMERCIAL KITCHEN HOODS

[M] 607.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of the International Mechanical Code.

[M] 607.2 Where required. A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

Exceptions:

1. Factory-built commercial exhaust hoods that are listed and labeled in accordance with UL 710, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the International Mechanical Code.

2. Factory-built commercial cooking recirculating systems that are listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1 of the International Mechanical Code, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.4 and 507.5 of the International Mechanical Code. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the International Mechanical Code. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m²).

3. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96, a hood shall not be required at or above them.

4. A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5g/m or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m³/s) in accordance with UL 710B.

607.3 Operations and maintenance. Commercial cooking systems shall be operated and maintained in accordance with Sections 607.3.1 through 607.3.4.

607.3.1 Ventilation system. The ventilation system in connection with hoods shall be operated at the required rate of air movement, and grease filters listed and labeled in accordance with UL 1046 shall be in place where equipment under a kitchen grease hood is used.

607.3.2 Grease extractors. Where grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

607.3.3 Cleaning. Hoods, grease-removal devices, fans, ducts and other appurtenances shall be cleaned at intervals as required by Sections 607.3.3.1 through 607.3.3.3.

607.3.3.1 Inspection. Hoods, grease-removal devices, fans, ducts and other appurtenances shall be inspected at intervals specified in Table 607.3.3.1 or as approved by the fire code official. Inspections shall be completed by qualified individuals.

607.3.3.2 Grease accumulation. If during the inspection it is found that hoods, grease-removal devices, fans, ducts or other appurtenances have an accumulation of grease, such components shall be cleaned in accordance with ANSI/IKECA C 10.

607.3.3.3 Records. Records for inspections shall state the individual and company performing the inspection, a description of the inspection and when the inspection took place. Records for services shall state the individual and company performing the cleaning and when the cleaning took place. Such records shall be completed after each inspection or cleaning and maintained.

607.3.3.3.1 Tags. When a commercial kitchen hood or duct system is inspected, a tag containing the service provider name, address, telephone number and date of service shall be provided in a conspicuous location. Prior tags shall be covered or removed.

607.3.4 Extinguishing system service. Automatic fire extinguishing systems protecting commercial cooking systems shall be serviced as required in Section 904.12.5.

607.4 Appliance connection to building piping. Gas-fired commercial cooking appliances installed on casters and appliances that are moved for cleaning and sanitation purposes shall be connected to the piping system with an appliance connector listed as complying with ANSI Z21.69. The commercial cooking appliance connector installation shall be configured in accordance with the manufacturer’s installation.

<table>
<thead>
<tr>
<th>TYPE OF COOKING OPERATIONS</th>
<th>FREQUENCY OF INSPECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-volume cooking operations such as 24hour cooking, charbroiling or wok cooking</td>
<td>3 months</td>
</tr>
<tr>
<td>Low-volume cooking operations such as places of religious worship, seasonal businesses and senior centers</td>
<td>12 months</td>
</tr>
<tr>
<td>Cooking operations utilizing solid fuel-burning cooking appliances</td>
<td>1 month</td>
</tr>
<tr>
<td>All other cooking operations</td>
<td>6 months</td>
</tr>
</tbody>
</table>

TABLE 607.3.3.1
COMMERCIAL COOKING SYSTEM INSPECTION FREQUENCY

607.3.3.1 Inspection. Hoods, grease-removal devices, fans, ducts and other appurtenances shall be inspected at intervals specified in Table 607.3.3.1 or as approved by the fire code official. Inspections shall be completed by qualified individuals.

607.3.3.2 Grease accumulation. If during the inspection it is found that hoods, grease-removal devices, fans, ducts or other appurtenances have an accumulation of grease, such components shall be cleaned in accordance with ANSI/IKECA C 10.

607.3.3.3 Records. Records for inspections shall state the individual and company performing the inspection, a description of the inspection and when the inspection took place. Records for services shall state the individual and company performing the cleaning and when the cleaning took place. Such records shall be completed after each inspection or cleaning and maintained.

607.3.3.3.1 Tags. When a commercial kitchen hood or duct system is inspected, a tag containing the service provider name, address, telephone number and date of service shall be provided in a conspicuous location. Prior tags shall be covered or removed.

607.3.4 Extinguishing system service. Automatic fire extinguishing systems protecting commercial cooking systems shall be serviced as required in Section 904.12.5.

607.4 Appliance connection to building piping. Gas-fired commercial cooking appliances installed on casters and appliances that are moved for cleaning and sanitation purposes shall be connected to the piping system with an appliance connector listed as complying with ANSI Z21.69. The commercial cooking appliance connector installation shall be configured in accordance with the manufacturer’s installation
instructions. Movement of appliances with casters shall be limited by a restraining device installed in accordance with the connector and appliance manufacturer’s instructions.

SECTION 608
COMMERCIAL KITCHEN
COOKING OIL STORAGE

608.1 General. Storage of cooking oil (grease) in commercial cooking operations utilizing above-ground tanks with a capacity greater than 60 gal (227 L) installed within a building shall comply with Sections 608.2 through 608.7 and NFPA 30. For purposes of this section, cooking oil shall be classified as a Class IIIB liquid unless otherwise determined by testing.

608.2 Metallic storage tanks. Metallic cooking oil storage tanks shall be listed in accordance with UL 142 or UL 80, and shall be installed in accordance with the tank manufacturer’s instructions.

608.3 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be listed in accordance with UL 2152 and shall be installed in accordance with the tank manufacturer’s instructions. Tank capacity shall not exceed 200 gallons (757 L) per tank.

608.4 Cooking oil storage system components. Cooking oil storage system components shall include but are not limited to piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil, and are permitted to be of either metallic or nonmetallic construction.

608.4.1 Design standards. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

608.4.2 Components in contact with heated oil. System components that come in contact with heated cooking oil shall be rated for the maximum operating temperatures expected in the system.

608.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

608.5.1 Normal vents. Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents shall be permitted to vent inside the building.

608.5.2 Emergency vents. Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents shall be permitted to vent inside the building.

608.6 Heating of cooking oil. Electrical equipment used for heating cooking oil in cooking oil storage systems shall be listed to UL 499 and shall comply with NFPA 70. Use of electrical immersion heaters shall be prohibited in nonmetallic tanks.

608.7 Electrical equipment. Electrical equipment used for the operation of cooking oil storage systems shall comply with NFPA 70.

SECTION 609
HYPERBARIC FACILITIES

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

609.2 Records. Records shall be maintained of all testing and repair conducted on the hyperbaric chamber and associated devices and equipment. Records shall be available to the fire code official.
CHAPTER 7
FIRE AND SMOKE PROTECTION FEATURES

User note:
About this chapter: Chapter 7 provides requirements to maintain the fire-resistance ratings of building elements and to limit fire spread. Section 701 addresses the maintenance of and owner’s responsibility for construction elements such as fire barriers and smoke barriers. The rest of the chapter deals with various aspects that must also be maintained to achieve overall fire resistance of the main fire and smoke-resistant features. These include penetrations, joint protection, door and window openings, and duct and air transfer opening protection.

SECTION 701
GENERAL

701.1 Scope. The provisions of this chapter shall govern the inspection and maintenance of the materials, systems and assemblies used for structural fire resistance, fire-resistancerated construction separation of adjacent spaces and construction installed to resist the passage of smoke to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. New buildings shall comply with the International Building Code.

701.2 Fire-resistance-rated construction. The fire-resistance rating of the following fire-resistance-rated construction shall be maintained:
1. Structural members.
2. Exterior walls.
3. Fire walls, fire barriers, fire partitions.
4. Horizontal assemblies.
5. Shaft enclosures.

701.2.1 Hanging displays. The hanging and displaying of salable goods and other decorative materials from acoustical ceiling systems that are part of a fire-resistance-rated horizontal assembly shall be prohibited.

701.3 Smoke barriers. The fire-resistance rating and smoke-resistant characteristics of smoke barriers shall be maintained.

701.4 Smoke partitions. The smoke-resistant characteristics of smoke partitions shall be maintained.

701.5 Maintaining protection. Materials, systems and devices used to repair or protect breaches and openings in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be maintained in accordance with Sections 703 through 707.

701.6 Owner’s responsibility. The owner shall maintain an inventory of all required fire-resistance-rated construction, construction installed to resist the passage of smoke and the construction included in Sections 703 through 707. Such construction shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

701.7 Unsafe conditions. Where any components in this chapter are not maintained and do not function as intended or do not have the fire resistance or the resistance to the passage of smoke required by the code under which the building was constructed, remodeled or altered, such component(s) or portion thereof shall be deemed an unsafe condition, in accordance with Section 110.1.1. Components or portions thereof determined to be unsafe shall be repaired or replaced to conform to that code under which the building was constructed, remodeled, altered or this chapter, as deemed appropriate by the fire code official.

Where the condition of components is such that any building, structure or portion thereof presents an imminent danger to the occupants of the building, structure or portion thereof, the fire code official shall act in accordance with Section 110.2.

SECTION 702
DEFINITIONS

702.1 Definitions. The following terms are defined in Chapter 2:
DRAFTSTOP.
FIREBLOCKING.
FIRE-RESISTANT JOINT SYSTEM.
MEMBRANE-PENETRATION FIRESTOP SYSTEM. OPENING PROTECTIVE.
SMOKE.
BARRIER.
SMOKE.
PARTITION.
THROUGH-PENETRATION FIRESTOP SYSTEM.

SECTION 703
PENETRATIONS

703.1 Maintaining protection. Materials and firestop systems used to protect membrane and through penetrations in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be maintained. The
materials and firestop systems shall be securely attached to or bonded to the construction being penetrated with no openings visible through or into the cavity of the construction. Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer’s installation instructions.

SECTION 704
JOINTS AND VOIDS

704.1 Maintaining protection. Where required when the building was originally constructed, materials and systems used to protect joints and voids in the following locations shall be maintained. The materials and systems shall be securely attached to or bonded to the adjacent construction, without openings visible through the construction.

1. Joints in or between fire-resistance-rated walls, floors or floor/ceiling assemblies and roof or roof/ceiling assemblies.
2. Joints in smoke barriers.
3. Voids at the intersection of a horizontal floor assembly and an exterior curtain wall.
4. Voids at the intersection of a horizontal smoke barrier and an exterior curtain wall.
5. Voids at the intersection of a nonfire-resistance-rated floor assembly and an exterior curtain wall.
6. Voids at the intersection of a vertical fire barrier and an exterior curtain wall.
7. Voids at the intersection of a vertical fire barrier and a nonfire-resistance-rated roof assembly.

Unprotected joints and voids do not need to be protected where such joints and voids were not required to be protected when the building was originally constructed.

704.2 Opening protectives. Where openings are required to be protected, opening protectives shall be maintained self closing or automatic-closing by smoke detection. Existing fusible-link-type automatic door closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

SECTION 705
DOOR AND WINDOW OPENINGS

705.1 General. Where required when the building was originally constructed, opening protectives installed in fire-resistance-rated assemblies, smoke barriers and smoke partitions shall be inspected and maintained in accordance with this section.

705.2 Inspection and maintenance. Opening protectives in fire-resistance-rated assemblies shall be inspected and maintained in accordance with NFPA 80. Opening protectives in smoke barriers shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. Openings in smoke partitions shall be inspected and maintained in accordance with NFPA 105. Fire doors and smoke and draft control doors shall not be blocked, obstructed, or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Opening protectives and smoke and draft control doors shall not be modified.

705.2.1 Labeling requirements. Where approved by the fire code official, the application of field-applied labels associated with the maintenance of opening protectives shall follow the requirements of the approved third-party certification organization accredited for listing the opening protective.

705.2.2 Signs. Where required by the fire code official, a sign shall be permanently displayed on or near each fire door in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: FIRE DOOR—DO NOT BLOCK.
2. For doors designed to be kept normally closed: FIRE DOOR—KEEP CLOSED.

705.2.3 Hold-open devices and closers. Hold-open devices and automatic door closers, where provided, shall be maintained. During the period that such device is out of service for repairs, the door it operates shall remain in the closed position.

705.2.4 Door operation. Swinging fire doors shall close from the full-open position and latch automatically.

705.2.5 Smoke and heat-activated doors. Smoke-activated doors shall be maintained to self-close or automatically close upon detection of smoke. Existing fusible-link type automatic door closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

705.2.6 Testing. Horizontal and vertical sliding and rolling fire doors shall be inspected and tested annually to confirm proper operation and full closure. Records of inspections and testing shall be maintained.

SECTION 706
DUCT AND AIR TRANSFER OPENINGS

706.1 Maintaining protection. Dampers protecting ducts and air transfer openings shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. Other products or materials used to protect the openings for ducts and air transfer openings shall be securely attached to or bonded to the construction containing the duct or air transfer opening, without visible openings through or into the cavity of the construction. Any damaged products or materials protecting duct and air transfer openings shall be repaired, restored or replaced.

706.2 Unprotected openings. Unprotected duct and air transfer openings in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be protected so as to comply with requirements that were in effect when the building was constructed.

SECTION 707
CONCEALED SPACES

707.1 Fireblocking and draftstopping. Required fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.
CHAPTER 8
INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

User note:
About this chapter: Chapter 8 provides requirements for interior finishes, decorative materials and furnishings in new and existing buildings so that they do not significantly add to or create fire hazards within buildings. The provisions tend to focus on occupancies with specific risk characteristics, such as vulnerability of occupants, density of occupants, lack of familiarity with the building and societal expectations of importance. This chapter is consistent with Chapter 8 of the International Building Code®, which regulates the interior finishes and decorative materials of new buildings.

SECTION 801
GENERAL

801.1 Scope. The provisions of this chapter shall govern interior finish, interior trim, furniture, furnishings, decorative materials and decorative vegetation in buildings. Existing buildings shall comply with Sections 803 through 808. New buildings shall comply with Sections 804 through 808, and Section 803 of the International Building Code.

SECTION 802
DEFINITIONS

802.1 Definitions. The following terms are defined in Chapter 2:
FLAME SPREAD.
FLAME SPREAD INDEX.
INTERIOR FLOORWALL BASE.
SITEFABRICATED STRETCH SYSTEM.
SMOKEDEVELOPEDINDEX.

SECTION 803
INTERIOR WALL AND CEILING FINISH AND TRIM IN EXISTING BUILDINGS

803.1 General. The provisions of this section shall limit the allowable fire performance and smoke development of interior wall and ceiling finishes and interior wall and ceiling trim in existing buildings based on location and occupancy classification. Interior wall and ceiling finishes shall be classified in accordance with Section 803 of the International Building Code. Such materials shall be classified in accordance with NFPA 286, as indicated in Section 803.1.1, or in accordance with ASTM E84 or UL 723, as indicated in Section 803.1.2.

Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and tested in accordance with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to comply with the requirements of Class A specified in Section 803.1.2.

803.1.1.1 Acceptance criteria for NFPA 286. The interior finish shall comply with the following:
1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m².

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

Class A: Flame spread index 0–25; smoke-developed index 0–450.
Class B: Flame spread index 26–75; smoke-developed index 0–450.
Class C: Flame spread index 76–200; smoke-developed index 0–450.

Exception: Materials tested in accordance with Section 803.1.1.1 and as indicated in Sections 803.1.3 through 803.15.

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

803.2 Stability. Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

803.3 Interior finish requirements based on occupancy. Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.3 for the group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286, and meeting the acceptance criteria of Section 803.1.1.1, shall be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.
803.4 Fire-retardant coatings. The required flame spread or smoke developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire retardant properties shall be maintained or renewed in accordance with the manufacturer’s instructions. The fire-retardant paint, coating or solution shall have been assessed by testing over the same substrate to be used in the application.

803.5 Textile wall coverings. Where used as interior wall finish materials, textile wall coverings, including materials having a woven, nonwoven, napped, tufted, looped or similar surface, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1, 803.5.1 or 803.5.2.

803.5.1 Room corner test for textile wall coverings and expanded vinyl wall coverings. Textile wall coverings and expanded vinyl wall coverings shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the product mounting system, including adhesive. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.5.1.1 Acceptance criteria for NFPA 265 Method B test protocol. Where testing to NFPA 265, the interior finish shall comply with the following:

1. During the 40-kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. For newly introduced wall coverings, the total smoke released throughout the test shall not exceed 1,000 m².

### TABLE 803.3

<table>
<thead>
<tr>
<th>GROUP</th>
<th>SPRINKLERED</th>
<th>NONSPRINKLERED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interior exit stairways, ramps and exit passageways</td>
<td>Corridors and enclosure for exit access stairways and exit access ramps</td>
</tr>
<tr>
<td></td>
<td>A-1 &amp; A-2</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>A-3&lt;sup&gt;x&lt;/sup&gt;, A-4, A-5</td>
<td>B</td>
</tr>
<tr>
<td>B, E, M, R-1, R-4</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>F</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>H</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>I-1</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>I-2</td>
<td>B</td>
<td>B&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
<tr>
<td>I-3</td>
<td>A</td>
<td>A&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
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<tr>
<td>S</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>U</td>
<td>No Restrictions</td>
<td>No Restrictions</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m².

- a. Class C interior finish materials shall be allowed for wainscoting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.11 of the International Building Code.
- b. In exit enclosures of buildings less than three stories in height of other than Group I<sub>3</sub>, Class B interior finish for nonsprinklered buildings and Class C for sprinklered buildings shall be permitted.
- c. Requirements for rooms and enclosed spaces shall be based upon spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered as enclosing spaces and the rooms or spaces on both sides shall be considered as one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.
- d. Lobby areas in Group A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> occupancies shall not be less than Class B materials.
- e. Class C interior finish materials shall be allowed in Group A occupancies with an occupant load of 300 persons or less.
- f. In places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be allowed.
- g. Class B material is required where the building exceeds two stories.
- h. Class C interior finish materials shall be allowed in administrative spaces.
- i. Class C interior finish materials shall be allowed in rooms with a capacity of four persons or less.
- j. Class B materials shall be allowed as wainscoting extending not more than 48 inches above the finished floor in corridors.
- k. Finish materials as provided for in other sections of this code.
- l. Applies where the vertical exits, exit passageways, corridors or rooms and spaces are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
- m. Corridors in ambulatory care facilities shall have a Class B or better interior finish material.
803.5.2 Acceptance criteria for wall and ceiling coverings. Textile wall and ceiling coverings shall have a Class A flame spread index in accordance with ASTM E84 or UL 723, and be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.6 Textile ceiling coverings. Where used as interior ceiling finish materials, textile ceiling coverings, including materials having a woven, nonwoven, napped, tufted, looped or similar surface and carpet or similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

803.7 Expanded vinyl wall coverings. Where used as interior wall finish materials, expanded vinyl wall coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1, 803.5.1 or 803.5.2.

803.8 Expanded vinyl ceiling coverings. Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

803.9 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish, it shall comply with Section 803.1.1.

803.10 Site-fabricated stretch systems. Where used as newly installed interior wall or interior ceiling finish materials, site-fabricated stretch systems containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2579.

803.11 Foam plastic materials. Foam plastic materials shall not be used as interior wall and ceiling finish unless specifically allowed by Section 803.11.1 or 803.11.2. Foam plastic materials shall not be used as interior trim unless specifically allowed by Section 804.2.

803.11.1 Foam plastic combustibility characteristics. Foam plastic materials shall be tested on the basis of fire tests that substantiate their combustibility characteristics for the use intended under actual fire conditions, as indicated in Section 2603.9 of the International Building Code. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

803.11.2 Thermal barrier for foam plastics. Foam plastic material shall be allowed if it is separated from the interior of the building by a thermal barrier in accordance with Section 2603.4 of the International Building Code.

803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:

1. The facing or veneer shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, described in Section 5.8.9 of NFPA 286.

2. The facing or veneer shall have a Class A, B or C flame spread index and smoke-developed index based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.13 Laminated products factory produced with an attached wood substrate. Laminated products factory produced with an attached wood substrate shall comply with one of the following:

1. The laminated product shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, of actual use.

2. The laminated product shall have a Class A, B or C flame spread index and smoke-developed index based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

803.14 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.

803.15 Heavy timber exemption. Exposed portions of building elements complying with the requirements of Type IV construction in accordance with the International Building Code shall not be subject to interior finish requirements.

SECTION 804 INTERIOR WALL AND CEILING TRIM AND INTERIOR FLOOR FINISH IN NEW AND EXISTING BUILDINGS

804.1 Interior trim. Combustible trim in new and existing buildings, excluding handrails and guards, shall not exceed 10 percent of the specific wall or ceiling areas to which it is attached. Other than foam plastic, material used as interior trim shall comply with Section 804.1.1 or 804.1.2. Foam plastic used as interior trim shall comply with Section 804.2.

804.1.1 Testing in accordance with NFPA 286. Interior trim material shall be tested in accordance with NFPA 286 and comply with the acceptance criteria in Section 803.1.1.1. Where the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index and smoke-developed index in accordance with ASTM E84 or UL 723.

804.1.2 Testing in accordance with ASTM E84 or UL 723. Material, other than foam plastic, used as interior trim shall have minimum Class C flame spread and smoke-developed indices, when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2.

804.2 Foam plastic interior trim. Foam plastic used as interior trim shall comply with Sections 804.2.1 through 804.2.4.
804.2.1 Density. The minimum density of the interior trim shall be 20 pounds per cubic foot (320 kg/m³).

804.2.2 Thickness. The maximum thickness of the interior trim shall be ½ inch (12.7 mm) and the maximum width shall be 8 inches (203 mm).

804.2.3 Area limitation. The interior trim shall not constitute more than 10 percent of the specific wall or ceiling area to which it is attached.

804.2.4 Flame spread. The flame spread index shall not exceed 75 where tested in accordance with ASTM E 84 or UL 723. The smoke developed index shall not be limited.

Exception: Where the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index in accordance with ASTM E 84 or UL 723.

804.3 New interior floor finish. New interior floor finish and floor covering materials in new and existing buildings shall comply with Sections 804.3.1 through 804.3.2.

Exception: Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not composed of fibers.

804.3.1 Classification. Interior floor finish and floor covering materials required by Section 804.3.3 to be of Class I or II materials shall be classified in accordance with ASTM 648 or NFPA 253. The classification referred to herein corresponds to the classifications determined by ASTM 648 or NFPA 253 as follows: Class I, 0.45 watts/cm² or greater; Class II, 0.22 watts/cm² or greater.

804.3.2 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with ASTM 648 or NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification in accordance with Section 804.3.1. Carpet type floor coverings shall be tested as proposed for use, including underlayments. Test reports confirming the information provided in the manufacturer’s product identification shall be furnished to the fire code official upon request.

804.3.3 Interior floor finish requirements. New interior floor coverings materials shall comply with Sections 804.3.3.1 and 804.3.3.2, and interior floor finish materials shall comply with Section 804.3.1.

804.3.3.1 Pill test. In all occupancies, new floor covering materials shall comply with the requirements of the DOC FF1 “pill test” (CPSC 16 CFR Part 1630) or of ASTM D 2859.

804.3.3.2 Minimum critical radiant flux. In all occupancies, new interior floor finish and floor covering materials in enclosures for stairways and ramps, exit passageways, corridors and rooms or spaces not separated from corridors by full height partitions extending from the floor to the underside of the ceiling shall stand a minimum critical radiant flux. The minimum critical radiant flux shall not be less than Class I in Groups I1, I2 and I3 and not less than Class II in Groups A, B, E, H, 14, M, R1, R2 and S.

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials shall be permitted in any area where Class I materials are required and materials complying with DOC FF1 “pill test” (CPSC 16 CFR Part 1630) or with ASTM D 2859 shall be permitted in any area where Class II materials are required.

804.4 Interior floorwall base. Interior floorwall base that is 6 inches (152 mm) or less in height shall be tested in accordance with ASTM 648 or NFPA 253 and shall be not less than Class II. Where a Class I floor finish is required, the floorwall base shall be Class I. The classification referred to herein corresponds to the classifications determined by ASTM 648 or NFPA 253 as follows: Class I, 0.45 watts/cm² or greater; Class II, 0.22 watts/cm² or greater.

Exception: Interior trim materials that comply with Section 804.1.

SECTION 805
UPHOLSTERED FURNITURE AND MATTRESSES IN NEW AND EXISTING BUILDINGS

805.1 Group I-1. Requirements in Sections 805.1.1 through 805.1.2 shall apply to facilities in Group I-1, Condition 2.

805.1.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections805.1.1.1 through 805.1.1.3.

805.1.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.

2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.1.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 megajoules (MJ).
**Exception:** Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

### 805.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.1.1.1 and 805.1.1.2.

#### 805.1.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.1.2.1 through 805.1.2.3.

**805.1.2.1 Ignition by cigarettes.** Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

**805.1.2.2 Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.

   **Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total energy released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

   **Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

**805.1.2.3 Identification.** Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.2.2.1 and 805.2.2.2.

### 805.2 Group I-2, and Group B ambulatory care facilities. The requirements in Sections 805.2.1 through 805.2.2 shall apply to Group I-2 occupancies and Group B ambulatory care facilities.

#### 805.2.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.2.1.1 through 805.2.1.3.

**805.2.1.1 Ignition by cigarettes.** Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

(a) Mocked up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261 or (b) the components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

**Exception:** Upholstered furniture belonging to the patients in sleeping rooms of nursing homes (Group I-2), condition 1 occupancies provided that a smoke detector is installed in such rooms. Battery powered, single station smoke alarms shall be allowed.

**805.2.1.2 Heat release rate.** Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   **Exception:** Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

**Exception:** Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

**805.2.1.3 Identification.** Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.2.1.1 and 805.2.1.2.

#### 805.2.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.2.2.1 through 805.2.2.3.

**805.2.2.1 Ignition by cigarettes.** Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

**805.2.2.2 Heat release rate.** Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.

   **Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

**Exception:** Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

### 805.3 Group I-3, detention and correction facilities. The requirements in Sections 805.3.1 through 805.3.2 shall apply to detention and correction facilities classified in Group I-3.

#### 805.3.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.3.1.1 through 805.3.1.3.
805.3.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.3.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

805.3.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.3.1.1 and 805.3.1.2.

805.3.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.3.2.1 through 805.3.2.3.

805.3.2.1 Ignition by cigarettes. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

805.3.2.2 Fire performance tests. Newly introduced mattresses shall be tested in accordance with Section 805.3.2.2.1 or 805.3.2.2.2

805.3.2.2.1 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

805.3.2.2.2 Mass loss test. Newly introduced mattresses shall have a mass loss not exceeding 15 percent of the initial mass of the mattress where tested in accordance with the test in Annex A3 of ASTM F 1085.

805.3.2.3 Identification. Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.3.2.1 and 805.3.2.2.

805.4 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.4.1.1 through 805.4.1.3

805.4.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked up composites of the upholstered furniture shall have a char length not exceeding 1/4 inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.4.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E 1537 or California Technical Bulletin 133, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.4.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.4.1.1 and 805.4.1.2.

805.4.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.4.2.1 through 805.4.2.3.

805.4.2.1 Ignition by cigarettes. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

805.4.2.2 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E 1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.

Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

805.4 Group R-2 college and university dormitories. The requirements of Sections 805.4.1 through 805.4.2.3 shall apply to college and university dormitories classified in Group R2, including decks, porches and balconies.
Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.4.2.3 Identification. Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.4.2.1 and 805.4.2.2.

SECTION 806
NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

806.1 Natural cut trees. Natural cut trees, where allowed by this section, shall have the trunk bottoms cut off not less than 0.5 inch (12.7 mm) above the original cut and shall be placed in a support device complying with Section 806.1.2.

806.1.1 Restricted occupancies. Natural cut trees shall be prohibited within ambulatory care facilities and in Group A, E, I, I2, I3, I4, M, R1, R2 and R4 occupancies.

Exceptions:
1. Trees located in areas protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 shall not be prohibited in Groups A, E, M, R1 and R2.
2. Trees shall be allowed within dwelling units in Group R2 occupancies.

806.1.2 Support devices. The support device that holds the tree in an upright position shall be of a type that is stable and that meets all of the following criteria:
1. The device shall hold the tree securely and be of adequate size to avoid tipping over of the tree.
2. The device shall be capable of containing a minimum two-day supply of water.
3. The water level, when full, shall cover the tree stem not less than 2 inches (51 mm). The water level shall be maintained above the fresh cut and checked not less than once daily.

806.1.3 Dryness. The tree shall be removed from the building whenever the needles or leaves fall off readily when a tree branch is shaken or if the needles are brittle and break when bent between the thumb and index finger. The tree shall be checked daily for dryness.

806.2 Obstruction of means of egress. The required width of any portion of a means of egress shall not be obstructed by decorative vegetation. Natural cut trees shall not be located within an exit, corridor, or a lobby or vestibule.

806.3 Open flame. Candles and open flames shall not be used on or near decorative vegetation. Natural cut trees shall be kept a distance from heat vents and any open flame or heat-producing devices not less than the height of the tree.

806.4 Electrical fixtures and wiring. The use of unlisted electrical wiring and lighting on natural vegetation, including natural cut trees, shall be prohibited.

806.5 Electrical fixtures and wiring. The use of unlisted electrical wiring and lighting on natural cut trees and artificial decorative vegetation shall be prohibited. The use of electrical wiring and lighting on artificial trees constructed entirely of metal shall be prohibited.

SECTION 807
DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

807.1 General. Combustible decorative materials, other than decorative vegetation, shall comply with Sections 807.2 through 807.5.6. Upon request by the fire code official, the business owner or designee shall provide proof of flame retardancy. The procedure for conducting field flame tests on combustible decorative materials and decorative vegetation shall be in accordance with Section 806 & 807 and the provisions of NFPA 701 and 705.

807.2 Combustible decorative materials. In Groups A, B, E, I, M and R-1 and in dormitories in Group R-2, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.3 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be interior finish, shall comply with Section 803 and shall not be considered decorative materials or furnishings.

Exceptions:
1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of the International Building Code.
2. In Group R-2 dormitories, within sleeping units and dwelling units, the permissible amount of curtains, draperies, fabric hangings and similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.3 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.

807.3 Acceptance criteria and reports. Where required to exhibit improved fire performance, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall be tested by an...
approved agency and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or exhibit a maximum rate of heat release of 100 kW when tested in accordance with NFPA 289, using the 20 kW ignition source. Reports of test results shall be prepared in accordance with the test method used and furnished to the fire code official upon request.

807.3.3 Passing field flame test. A combustible decorative material may be deemed flame resistant when all the following criteria are met:

1. The flame does not spread over the complete length of the sample or more than 4 inches (102 mm) from the bottom of the sample, and
2. When the fire is removed, there is no more than 2 seconds of after-flame, and
3. The material does not break or drip flaming particles.

807.3.4 Failing field flame test. The fire code official shall require that combustible decorative materials that do not meet field flame test be removed from the building or structure.

807.4 Artificial decorative vegetation. Artificial decorative vegetation shall comply with this section and the requirements for a Class B interior finish in accordance with Section 803 of the International Building Code.

Exception: Testing of artificial vegetation is not required in Group I-1; Group I-2, Condition 1; Group R-2; Group R-3; or Group R-4 occupancies equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.

3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

807.4.1 Flammability. Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting such criteria shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

807.4.2 Electrical fixtures and wiring on artificial vegetation. The use of unlisted electrical wiring and lighting on artificial decorative vegetation shall be prohibited. The use of electrical wiring and lighting on artificial trees constructed entirely of metal shall be prohibited.

807.5 Occupancy-based requirements. Occupancies shall comply with Sections 807.5.1 through 807.5.6.

807.5.1 Group A. In Group A occupancies, the requirements in Sections 807.5.1.1 through 807.5.1.4 shall apply.

807.5.1.1 Foam plastics. Exposed foam plastic materials and unprotected materials containing foam plastic used for decorative purposes or stage scenery or exhibit booths shall have a maximum heat release rate of 100 kW when tested in accordance with UL 1975, or when tested in accordance with NFPA 289 using the 20 kW ignition source.

Exceptions:

1. Individual foam plastic items or items containing foam plastic where the foam plastic does not exceed 1 pound (0.45 kg) in weight.
2. Cellular or foam plastic shall be allowed for trim in accordance with Section 804.2.

807.5.1.2 Motion picture screens. The screens on which motion pictures are projected in new and existing buildings of Group A shall either meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall comply with the requirements for a Class B interior finish in accordance with Section 803 of the International Building Code.

807.5.1.3 Wood use in places of religious worship. In places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall not be limited.

807.5.1.4 Pyroxylin plastic. Imitation leather or other material consisting of or coated with a pyroxylin or similarly hazardous base shall not be used.

807.5.2 Group E. Group E occupancies shall comply with Sections 807.5.2.1 through 807.5.2.3.

807.5.2.1 Storage in corridors and lobbies. Clothing and personal effects shall not be stored in corridors and lobbies.

Exceptions:

1. Corridors protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Corridors protected by an approved fire alarm system installed in accordance with Section 907.

3. Storage in metal lockers, provided the minimum required egress width is maintained.

807.5.2.2 Artwork in corridors. Artwork and teaching materials shall be limited on the walls of corridors to not more than 20 percent of the wall area.

807.5.2.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than 50 percent of the specific wall area to which they are attached.

807.5.3 Group I-1 and I-2. In Group I-1 and I-2 occupancies, combustible decorative materials shall comply with Sections 807.5.3.1 through 807.5.3.4.

807.5.3.1 Group I-1 and I-2 Condition 1 within units. In Group I-1 and I-2 occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, combustible decorative materials placed on walls shall be limited to not more than 50 percent of the wall area to which they are attached.

807.5.3.2 In Group I-1 and I-2, Condition 1 for areas other than within units. In Group I-1 and I-2 occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, combustible decorative materials placed on walls in areas other than within dwelling and sleeping units shall be limited to not more than 30 percent of the wall area to which they are attached.

807.5.3.3 In Group I-2, Condition 2. In Group I-2 occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, combustible decorative materials placed on walls shall be limited to not more than 30 percent of the wall area to which they are attached.

807.5.3.4 Other areas in Groups I-1 and I-2. In Group I-1 and I-2 occupancies, in areas not equipped throughout with an approved automatic sprinkler system, combustible decorative materials shall be of such limited quantities that a hazard of fire development or spread is not present.

807.5.4 Group I-3. In Group I-3, combustible decorative materials are prohibited.

807.5.5 Group I-4. Group I-4 occupancies shall comply with the requirements in Sections 807.5.5.1 through 807.5.5.3.

807.5.5.1 Storage in corridors and lobbies. Clothing and personal effects shall not be stored in corridors and lobbies.

Exceptions:
1. Corridors protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. Corridors protected by an approved fire alarm system installed in accordance with Section 907.

3. Storage in metal lockers, provided the minimum required egress width is maintained.

807.5.5.2 Artwork in corridors. Artwork and teaching materials shall be limited on walls of corridors to not more than 20 percent of the wall area.

807.5.5.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than 50 percent of the specific wall area to which they are attached.

807.5.6 Dormitories in Group R-2. In Group R-2 dormitories, within sleeping units and dwelling units, the combustible decorative materials shall be of limited quantities such that a hazard of fire development or spread is not present.

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

808.1 Wastebaskets and linen containers in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities. Wastebaskets, linen containers and other waste containers, including their lids, located in Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation. Metal wastebaskets and other metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509 of the International Building Code.

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

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

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

808.2 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories. Waste containers, including their lids, located in Group R2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m² when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m² in the horizontal orientation. Metal wastebaskets and other metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable containers exceeding 32 gallons (121 L) shall be stored in an area classified
as a waste and linen collection room constructed in accordance with Table 509 of the International Building Code.

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

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

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

**Exception:** Lockers constructed entirely of wood and noncombustible materials shall be permitted to be used wherever interior finish materials are required to meet a Class C classification in accordance with Section 803.1.2.
Chapter 9
FIRE PROTECTION SYSTEMS

User note:

About this chapter: Chapter 9 prescribes the minimum requirements for active fire protection equipment systems to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, mass notification, gas detection, controlling smoke and controlling or extinguishing the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the International Building Code®; however, this chapter also contains periodic testing criteria that are not contained in the International Building Code. In addition, the special fire protection system requirements based on use and occupancy found in Chapter 4 of the International Building Code are duplicated in this chapter as a user convenience.

SECTION 901
GENERAL

901.1 Scope. The provisions of this chapter shall specify where fire protection and life safety systems are required and shall apply to the design, installation, inspection, operation, testing and maintenance of all fire protection systems.

901.2 Construction documents. The fire code official shall have the authority to require construction documents and calculations for all fire protection systems and to require permits be issued for the installation, rehabilitation or modification of any fire protection system. All work done on new and existing systems shall meet the requirements of the current adopted codes and standards. Construction documents for fire protection systems shall be submitted for review and approval prior to system installation.

901.2.1 Statement of compliance. Before requesting final approval of the installation, where required by the fire code official, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection system has been installed in accordance with approved plans and has been tested in accordance with the manufacturer’s specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement.

901.3 Permits. Permits shall be required as set forth in Sections 105.6, 105.7, and 105.8.

901.4 Installation. Fire protection systems shall be maintained in accordance with the original installation standards for that system. Required systems shall be extended, altered or augmented as necessary to maintain and continue protection where the building is altered, remodeled or added to. Alterations to fire protection systems shall be done in accordance with current applicable standards.

901.4.1 Required fire protection systems. Fire protection systems required by this code or the International Building Code® shall be installed, repaired, operated, tested and maintained in accordance with this code. A fire protection system for which a design option, exception or reduction to the provisions of this code or the International Building Code® has been granted shall be considered to be a required system.

901.4.2 Nonrequired fire protection systems. A fire protection system or portion thereof not required by this code or the International Building Code® shall be allowed to be furnished for partial or complete protection provided that such installed system meets the applicable requirements of this code and the International Building Code.

901.4.3 Fire areas. Where buildings, or portions thereof, are divided into fire areas so as not to exceed the limits established for requiring a fire protection system in accordance with this chapter, such fire areas shall be separated by 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, having a fire resistance rating of not less than that determined in accordance with Section 707.3.10 of the International Building Code.

901.4.4 Additional fire protection systems. In occupancies of a hazardous nature, where special hazards exist in addition to the normal hazards of the occupancy or where the fire code official determines that access for fire apparatus is unduly difficult, the fire code official shall have the authority to require additional safeguards. Such safeguards include, but shall not be limited to, the following: automatic fire detection systems, fire alarm systems, automatic fire-extinguishing systems, standpipe systems, or portable or fixed extinguishers. Fire protection equipment required under this section shall be installed in accordance with this code and the applicable referenced standards.

901.4.5 Appearance of equipment. Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function shall be prohibited.

901.4.6 Pump and riser room size. Where provided, fire pump rooms and automatic sprinkler system riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function.
FIRE PROTECTION SYSTEMS

of a required fire resistance-rated assembly. Fire pump and automatic sprinkler system riser rooms shall be provided with doors and an unobstructed passageway large enough to allow removal of the largest piece of equipment.

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

901.4.6.2 Marking on access doors. Access doors for automatic sprinkler system riser rooms and fire pump rooms shall be labeled with an approved sign. The lettering shall be in contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of ¼ inch (10 mm). See Appendix D

901.4.6.3 Environment. Automatic sprinkler system riser rooms and fire pump rooms shall be maintained at a temperature of not less than 40°F (4°C) and not more than 100 °F (37°C). Heating and cooling units shall be permanently installed.

901.4.6.4 Lighting. Permanently installed artificial illumination shall be provided in the automatic sprinkler system riser rooms and fire pump rooms.

901.5 Installation acceptance testing. Fire detection and alarm systems, emergency alarm systems, gas detection systems, fire-extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official. The fire code official shall be notified before any required acceptance testing.

901.5.1 Occupancy. It shall be unlawful to occupy any portion of a building or structure until the required fire detection, alarm and suppression systems have been tested and approved.

901.5.2 Stocking and loading. No portion of a building or structure shall be stocked or loaded with combustible fixtures or furnishings or regular stock until the required automatic fire sprinkler system has been tested and approved and a temporary certificate of occupancy issued. When a fire alarm system is required, it shall be approved and monitored, or fire watch shall be provided, prior to stocking and loading. No hazardous materials or processes, shall be introduced until all required fire protection systems, or process piping systems are installed and approved.

901.6 Inspection, testing and maintenance. Fire detection and alarm systems, emergency alarm systems, gas detection systems, fire-extinguishing systems, smoke control systems, mechanical smoke exhaust systems, and smoke and heat vents shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection systems and equipment shall be inspected, tested and maintained or removed.

All fire protection systems shall be inspected and tested by a contractor licensed by the State of Arizona who is a current qualified contractor by the Phoenix Fire Department to work on the particular fire protection system being inspected or tested in accordance with NFPA standards, see Section 108.1. It shall be the responsibility of the owner to ensure that these requirements are met.

901.6.1 Standards. Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards listed in Table 901.6.1.

Where no minimum maintenance standards exist, inspections shall be not less than annually.

TABLE 901.6.1

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>STANDARD</th>
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<tr>
<td>Portable fire extinguishers</td>
<td>NFPA 10</td>
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<tr>
<td>Carbon dioxide fire-extinguishing system</td>
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<tr>
<td>Halon 1301 fire-extinguishing systems</td>
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<td>Water-based fire protection systems</td>
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<td>Water-mist systems</td>
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<tr>
<td>Clean-agent extinguishing systems</td>
<td>NFPA 2001</td>
</tr>
<tr>
<td>Aerosol fire-extinguishing systems</td>
<td>NFPA 2010</td>
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</tbody>
</table>

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

901.6.2.1 High-rise buildings. For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

901.6.2.2 Smoke control systems. Where a fire alarm system is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

901.6.3 Records. Records of all system inspections, tests and maintenance required by the referenced standards shall be maintained.

901.6.3.1 Records information. Initial records shall include the name of the installation contractor, type of
components installed, manufacturer of the components, location and number of components installed per floor. Records shall also include the manufacturers’ operation and maintenance instruction manuals. Such records shall be maintained for the life of the installation.

Inspection and test reports and records shall include the name of the company performing the inspection or test, the qualified contractor contact information, and the printed name and signature of the company representative performing the inspection and tests.

**Exception:** In Group R-3 occupancies, other than R-3 Arizona licensed care facilities, the owner or a licensed contractor shall be responsible for inspecting and testing all fire protection and detection systems.

When a deficiency report is 30 days old and the noted deficiencies are not corrected, a copy shall be sent to the Division of Fire Prevention. If the system is found to be noncompliant, a brief description and corresponding code shall be listed. Copy shall be signed by the building owner or representative. For systems out of service see Section 901.7.

### 901.6.3.2 Inspection and testing tags

Upon completion of the inspection and testing of fire protection systems, a tag shall be attached to the system in a conspicuous location. The tag shall document; the date of inspection or test, the name of the qualified contractor company, the name of the individual performing the inspection or tests and shall indicate if the system does or does not have deficiencies.

### 901.6.3.3 Inspection forms

Inspection and test records shall be documented on forms that comply with the appropriate inspection standard. The forms shall clearly identify type and quantities of all components inspected or tested and identify all deficiencies found. Deficiencies shall be identified by the appropriate code or standard referenced.

### 901.7 Systems out of service

Where a required or nonrequired fire protection system is out of service, the Phoenix Fire Department Alarm Room, 602-495-5555 shall be notified immediately and, where required by the fire code official, the building shall be either evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service. Failure to comply may result in the revocation of qualified contractor status to be an accepted Inspecting Authority within the City of Phoenix.

Where utilized, fire watches shall be provided with not less than one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

### 901.7.1 Impairment coordinator

The building owner shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the owner shall be considered the impairment coordinator.

### 901.7.2 Tag required

A tag shall be used to indicate that a system, or portion thereof, has been removed from service.

### 901.7.3 Placement of tag

The tag shall be posted at each fire department connection, system control valve, fire alarm control unit, fire alarm annunciator and fire command center, indicating which system, or part thereof, has been removed from service. The fire code official shall specify where the tag is to be placed.

### 901.7.4 Preplanned impairment programs

Preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, a designated individual shall be responsible for verifying that all of the following procedures have been implemented:

1. The extent and expected duration of the impairment have been determined.
2. The areas or buildings involved have been inspected and the increased risks determined.
3. Recommendations have been submitted to management or the building owner/manager.
4. The Phoenix Fire Department at 602-495-5555 has been notified.
5. The insurance carrier, the alarm company, the building owner/manager and other authorities having jurisdiction have been notified.
6. Occupants in the areas to be affected have been notified.
7. A tag impairment system has been implemented.
8. Necessary tools and materials have been assembled on the impairment site.

### 901.7.5 Emergency impairments

Where unplanned impairments occur, appropriate emergency action shall be taken to minimize potential injury and damage. The impairment coordinator shall implement the steps outlined in Section 901.7.4.

### 901.7.6 Restoring systems to service

Where impairment equipment is restored to normal working order, the coordinator shall verify that all of the following procedures have been implemented:

1. Necessary inspections and tests have been conducted to verify that affected systems are operational.
2. Occupants in the areas affected have been advised that protection is restored.
3. The Phoenix Fire Department Alarm Room 602-495-5555 has been advised that protection is restored.
4. The building owner/manager, insurance carrier, alarm company and other involved parties have been advised that protection is restored.
5. The impairment tag has been removed.

### 901.8 Removal of or tampering with equipment

It shall be unlawful for any person to remove, tamper with or otherwise disturb any fire hydrant, fire detection and alarm system, fire suppression system or other fire appliance required by this code except for the purposes of extinguishing fire, training purposes, recharging or making necessary repairs or where approved by the fire code official.

### 901.8.1 Removal of or tampering with appurtenances

Locks, gates, key boxes, key switches, preemption devices, doors, barricades, chains, enclosures, signs, tags or seals that have been installed by or at the direction of the fire code
901.8.2 Removal of existing occupant-use hose lines. The fire code official is authorized to permit the removal of existing occupant-use hose lines where both of the following conditions exist:

1. The hose line would not be utilized by trained personnel or the fire department.
2. The remaining outlets are compatible with local fire department fittings.

901.9 Termination of monitoring service. For fire alarm systems required to be monitored by this code, notice shall be made to the fire code official whenever alarm monitoring services are terminated. Notice shall be made in writing, by the provider of the monitoring service provider being terminated.

901.10 Recall of fire protection components. Any fire protection system component regulated by this code that is the subject of a voluntary or mandatory recall under federal law shall be replaced with approved, listed components in compliance with the referenced standards of this code. The fire code official shall be notified in writing by the building owner when the recalled component parts have been replaced.

901.11 Clearance around fire-protection systems and equipment. A minimum 3-foot clear space, on a minimum of two sides, shall be maintained for access to fire protection equipment, including control valves and control panels.

901.12 Protection of exterior exposed sprinkler system components. Protection for exterior exposed sprinkler system components shall be as follows:

1. Steel sprinkler pipe and components located on the exterior of a building shall be either galvanized or painted to protect from corrosion. There is no restriction on size for freezing protection.
2. Non-steel sprinkler pipe smaller than 2-inches in diameter shall be insulated to protect from freezing.
3. Hydraulic design information signs shall be metal with the information maintained clearly and permanently stamped onto the sign.

SECTION 902 DEFINITIONS

ALARM NOTIFICATION APPLIANCE.
ALARM SIGNAL.
ALARM VERIFICATION FEATURE.
ANNUNCIATOR.
AUDIBLE ALARM NOTIFICATION APPLIANCE.
AUTOMATIC.
AUTOMATIC FIRE-EXTINGUISHING SYSTEM.
AUTOMATIC SMOKE DETECTION SYSTEM.
AUTOMATIC SPRINKLER SYSTEM.
AUTOMATIC WATER MIST SYSTEM.
AVERAGE AMBIENT SOUND LEVEL.
CARBON DIOXIDE EXTINGUISHING SYSTEM.
CLEAN AGENT.

COMMERCIAL MOTOR VEHICLE.
COMMON AREA.
CONSTANTLY ATTENDED LOCATION.
DELUGE SYSTEM.
DETECTOR, HEAT.
DRY-CHEMICAL EXTINGUISHING AGENT.
ELEVATOR GROUP.
EMERGENCY ALARM SYSTEM.
EMERGENCY VOICE/ALARM COMMUNICATIONS.
FIRE ALARM BOX, MANUAL.
FIRE ALARM CONTROL UNIT.
FIRE ALARM SIGNAL.
FIRE ALARM SYSTEM.
FIRE AREA.
FIRE DETECTOR, AUTOMATIC.
FIRE PROTECTION SYSTEM.
FIRE SAFETY FUNCTIONS.
FIXED BASE OPERATOR (FBO).
FOAM-EXTINGUISHINGSYSTEM.
GAS DETECTION SYSTEMS.
HALOGENATED EXTINGUISHING SYSTEM.
IMPAIRMENT COORDINATOR.
INITIATING DEVICE.
MAINTENANCE.
MANUAL FIRE ALARM BOX.
MODIFICATION.
MULTIPLE-STATION ALARM DEVICE.
MULTIPLE-STATION SMOKE ALARM.
NOTIFICATION ZONE.
NUISANCE ALARM.
PRIVATE GARAGE.
RECORD DRAWINGS.
SHELL BUILDINGS.
SINGLE-STATION SMOKE ALARM.
SLEEPING UNIT.
SMOKE ALARM.
SMOKE DETECTOR.
STANDPIPE SYSTEM, CLASSES OF.
    Class I system.
    Class II system.
    Class III system.
STANDPIPE, TYPES OF.
    Automatic dry.
    Automatic wet.
    Manual dry.
    Manual wet.
    Semi-automatic dry.
SUPERVISING STATION.
SUPERVISORY SERVICE.
SUPERVISORY SIGNAL.
SUPERVISING SIGNAL-INITIATING DEVICE.
TIRES, BULK STORAGE OF.
TRANSIENT AIRCRAFT.
TROUBLE SIGNAL.
VISIBLE ALARM NOTIFICATION APPLIANCE.
WET-CHEMICAL EXTINGUISHING AGENT.
WIRELESS PROTECTION SYSTEM.
ZONE.
ZONE, NOTIFICATION.

SECTION 903
AUTOMATIC SPRINKLER SYSTEMS

903.1 General. Automatic sprinkler systems shall comply
with the Bret Tarver Sprinkler Ordinance. An approved
automatic sprinkler system shall be installed throughout all
levels of all new Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S
occupancies of any size and throughout all Group R-3
occupancies including one-and two-family dwellings built
under the International Residential Code, and Group U
occupancies of more than 5,000 square feet.

The calculated area of Group R-3 occupancies shall
include all livable space and the area of any attached
garage and carports or areas located under living spaces.

Automatic sprinkler systems shall be installed in
accordance with NFPA 13R for Group A, B, E, F, H, I, M, R-1,
R-2, R-4 and S occupancies. Automatic sprinkler systems shall
be installed in accordance with NFPA 13R for residential
occupancies up to and including four stories in height, in
Groups R-1, R-2, R-4 occupancies and NFPA 13D for one and
two-family dwellings and mobile homes in Group R-3 and
R-4 occupancies with six to ten licensed beds. Exceptions to
or reductions in code requirements are not allowed for the
installation of residential sprinkler systems installed in
accordance with NFPA 13R and NFPA 13D unless specifically
allowed by the International Building Code.

Exceptions to or reductions in code requirements for NFPA
13 systems allowed in the
Groups R-1, R-2, R-4 occupancies and NFPA 13D for one and
two-family dwellings and mobile homes in Group R-3 and
R-4 occupancies of more than 5,000 square feet.

<table>
<thead>
<tr>
<th>OCCUPANCY TYPE</th>
<th>HAZARD LEVEL</th>
<th>1997 UBC OCCUPANCY TYPE</th>
<th>2018 IFC OCCUPANCY TYPE</th>
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<tr>
<td>1 (highest)</td>
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<td>4 (lowest)</td>
<td>B, M, U, R-3</td>
<td>B, M, U, R-3</td>
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1. Business, Ambulatory Care Facility

903.1.6 Change of occupancy over 2,500 square feet
(232 m²). An automatic fire sprinkler system shall be
FIRE PROTECTION SYSTEMS

installed in any building 2,500 square feet (232 m²) or greater that undergoes a change of occupancy.

903.1.7 Change of occupancy under 2,500 square feet (232 m²). An automatic fire sprinkler system shall be installed in any building 2,500 square feet (232 m²) or less that undergoes a change of occupancy to a higher hazard level as defined by Table 903.1.7.

Exceptions: An automatic fire sprinkler system is not required when:

1. The occupancy is 1,500 square feet (139 m²) or less; and
2. There are openings entirely above the adjoining ground level totaling at least 20 square feet (1.85 m²) in each 50 linear feet (15 240 mm) or fraction thereof, of exterior wall in the story on at least one side. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from the exterior and shall not be obstructed in a manner that firefighting or rescue cannot be accomplished from the exterior; and
3. The occupancy is not classified as Group H.

903.1.8 Sprinkler systems—partially sprinklered buildings. When existing nonsprinklered buildings of mixed occupancy are required to install sprinklers based on a change of occupancy classification, sprinklers shall be installed throughout the fire area that includes the new occupancy. The fire-resistance rating of fire barriers or horizontal assemblies separating sprinklered and nonsprinklered fire areas shall be a minimum of 2 hours. Fire department connection signage shall be in accordance with Section 912.4.

903.1.9 Alternative protection. Alternative automatic fire-extinguishing systems complying with Section 904 shall be permitted in lieu of automatic sprinkler protection where recognized by the applicable standard and approved by the fire code official. Alternative fire suppression systems intended for prevention of business interruption and equipment protection shall not substitute for full automatic sprinkler coverage installed for structural and life safety protection.

903.2 Where required. Approved automatic sprinkler systems in new buildings and structures shall be provided. Where there is a conflict between a general requirement and an occupancy specific requirement, the most restrictive requirement shall be applicable.

903.2.1 Group A. An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section.

903.2.1.1 Group A-1. An automatic sprinkler system shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
4. The fire area contains a multiple-theater complex.

903.2.1.2 Group A-2. An automatic sprinkler system shall be provided throughout stories containing Group A-2 occupancies and throughout all stories from the Group A-2 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (464 m²).
2. The fire area has an occupant load of 100 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.3 Group A-3. An automatic sprinkler system shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.4 Group A-4. An automatic sprinkler system shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m²).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.5 Group A-5. An automatic sprinkler system shall be provided for all enclosed Group A-5 accessory use areas in excess of 1,000 square feet (93 m²).

903.2.1.5.1 Spaces under grandstands or bleachers. Enclosed spaces under grandstands or bleachers shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 where either of the following exist:

1. The enclosed area is 1,000 square feet (93 m²) or less and is not constructed in accordance with Section 1029.1.1.1.
2. The enclosed area exceeds 1,000 square feet (93 m²).

903.2.1.6 Assembly occupancies on roofs. Where an occupied roof has an assembly occupancy with an occupant load exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the occupied roof and the level of exit discharge shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction.

903.2.1.7 Multiple fire areas. An automatic sprinkler system shall be provided where multiple fire areas of
Group A-1, A-2, A-3 or A-4 occupancies share exit or exit access components and the combined occupant load of these fire areas is 300 or more.

903.2.2 Ambulatory care facilities. An automatic sprinkler system shall be installed throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation, whether rendered incapable by staff or staff has accepted responsibility for care recipients already incapable.
2. One or more care recipients that are incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest level of exit discharge, the level of exit discharge, and all floors below the level of exit discharge.

Exception: Floors classified as an open parking garage are not required to be sprinklered.

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 square feet (1115 m²) in area.
2. The Group E fire area is located on a floor other than a level of exit discharge serving such occupancies.

Exception: In buildings where every classroom has not fewer than one exterior exit door at ground level, an automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area.

3. The Group E fire area has an occupant load of 300 or more.

903.2.4 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 fire area exceeds 12,000 square feet (1115 m²).
2. A Group F-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).
4. A Group F-1 occupancy used for the manufacture of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

903.2.4.1 Woodworking operations. An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet in area (232 m²) in area which generate finely divided combustible waste or which use finely divided combustible materials.

903.2.5 Group H. Automatic sprinkler systems shall be provided in high-hazard occupancies as required in Sections 903.2.5.1 through 903.2.5.3.

903.2.5.1 General. An automatic sprinkler system shall be installed in Group H occupancies.

903.2.5.2 Group H-5 occupancies. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall not be less than that required under the International Building Code for the occupancy hazard classifications in accordance with Table 903.2.5.2.

Where the design area of the sprinkler system consists of a corridor protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>OCCUPANCY HAZARD CLASSIFICATION</th>
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<tbody>
<tr>
<td>Fabrication areas</td>
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</tr>
<tr>
<td>Service corridors</td>
<td>Ordinary Hazard Group 2</td>
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<tr>
<td>Storage rooms without dispensing</td>
<td>Ordinary Hazard Group 2</td>
</tr>
<tr>
<td>Storage rooms with dispensing</td>
<td>Extra Hazard Group 2</td>
</tr>
<tr>
<td>Corridors</td>
<td>Ordinary Hazard Group 2</td>
</tr>
</tbody>
</table>

903.2.5.3 Pyroxylin plastics. An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).

903.2.6 Group I. An automatic sprinkler system shall be provided throughout buildings with a Group I fire area.

Exceptions:

1. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group I-1, Condition 1 facilities.
2. An automatic sprinkler system is not required where Group I-4 day care facilities are at the level of exit discharge and where every room where care is provided has not fewer than one exterior exit door.
3. In buildings where Group I-4 day care is provided on levels other than the level of exit discharge, an automatic sprinkler system in accordance with Section 903.3.1.1 shall be installed on the entire floor where care is provided, all floors between the level of care and the level of exit discharge and all floors below the level of exit discharge other than areas classified as an open parking garage.

903.2.7 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M fire area exceeds 12,000 square feet (1115 m²).
2. A Group M fire area is located more than three stories above grade plane.
3. The combined area of all Group M fire areas on all
FIRE PROTECTION SYSTEMS

Floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).

4. A Group M occupancy used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m²).

903.2.7.1 High-piled storage. An automatic sprinkler system shall be provided as required in Chapter 32 in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

903.2.8 Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

903.2.8.1 Group R-3. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.

[F] 903.2.8.2 Group R-4. Condition 1. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-4 Condition 1 occupancies.

[F] 903.2.8.3 Group R-4 Condition 2. An automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be permitted in Group R-4 Condition 2 occupancies. Attics shall be protected in accordance with Section 903.2.8.3.1 or 903.2.8.3.2.

903.2.8.4 Care facilities. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.

903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m²).

2. A Group S-1 fire area is located more than three stories above grade plane.

3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m²).

4. A Group S-1 fire area used for the storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m²).

5. A Group S-1 occupancy used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m²).

903.2.9.1 Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406.8 of the International Building Code, as shown:

1. Buildings having two or more stories above grade plane, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m²).

2. Buildings no more than one story above grade plane, with a fire area containing a repair garage exceeding 12,000 square feet (1115 m²).


4. A Group S-1 fire area used for the repair of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m²).

903.2.9.2 Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m³) shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

903.2.10 Group S-2 enclosed parking garages. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with Section 406.6 of the International Building Code as follows:

1. Where the fire area of the enclosed parking garage exceeds 12,000 square feet (1115 m²); or

2. Where the enclosed parking garage is located beneath other groups.

Exception: Enclosed parking garages located beneath Group R-3 occupancies.

903.2.10.1 Commercial parking garages. An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m²).

903.2.11 Specific building areas and hazards. In all occupancies other than Group U, an automatic sprinkler system shall be installed for building design or hazards in the locations set forth in Sections 903.2.11.1 through 903.2.11.6.

903.2.11.1 Stories without openings. An automatic sprinkler system shall be installed throughout all stories, including basements, of all buildings where the floor area exceeds 1,500 square feet (139 m²) and where the story does not comply with the following criteria for exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1011 or an outside ramp complying with Section 1012. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).

2. Openings entirely above the adjoining ground level totaling at least 20 square feet (1.86 m²) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the bottom of the clear opening shall not exceed 44 inches (1118 mm) measured from the floor.

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

903.2.11.1.2 Openings on one side only. Where
openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an approved automatic sprinkler system or openings as specified above shall be provided on at least two sides of the story.

903.2.11.1.3 Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by Section 903.2.11.1, or where walls, partitions or other obstructions are installed that restrict the application of water from hose streams, the basement shall be equipped throughout with an approved automatic sprinkler system.

903.2.11.2 Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes 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. Access to sprinklers in chutes shall be provided for servicing.

903.2.11.3 Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access.

Exceptions:
1. Open parking structures.
2. Occupancies in Group F-2.

903.2.11.4 Ducts conveying hazardous exhausts. Where required by the International Mechanical Code, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, flammable or combustible materials.

Exception: Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

903.2.11.5 Commercial cooking operations. An automatic sprinkler system shall be installed in a commercial kitchen exhaust hood and duct system where an automatic sprinkler system is used to comply with Section 904.

903.2.11.6 Other required suppression systems. In addition to the requirements of Section 903.2, the provisions indicated in Table 903.2.11.6 also require the installation of a fire suppression system for certain buildings and areas.

| TABLE 903.2.11.6 ADDITIONAL REQUIRED FIRE SUPPRESSION SYSTEMS |
|---------------------------------|------------------|
| SECTION | SUBJECT |
| 914.2.1 | Covered and open mall buildings |
| 914.3.1 | High rise buildings |
| 914.4.1 | Atriums |
| 914.5.1 | Underground structures |
| 914.6.1 | Stages |
| 914.7.1 | Special amusement buildings |
| 914.8.2 | Airport control towers |
| 914.9 | Flammable finishes |
| 914.10 | Drying rooms |
| 914.11.1 | Ambulatory care facilities |
| 1028.6.2.3 | Smoke-protected assembly seating |
| 1103.5.1 | Existing Group A occupancies |
| 1103.5.2 | Pyroxylin plastic storage in existing buildings |
| 1103.5.3 | Existing Group I-2 occupancies |
| 1103.5.4 | Existing Group I-2, Condition 2 occupancies |
| 2108.2 | Dry cleaning plants |
| 2108.3 | Dry cleaning machines |
| 2309.3.1.5.2 | Hydrogen motor fuel-dispensing area canopies |
| 2404.2 | Spray finishing in Group A, E, I, or R |
| 2404.4 | Spray booths and spray rooms |
| 2405.2 | Dip-tank rooms in Group A, I or R |
| 2405.4.1 | Dip tanks |
| 2405.9.4 | Hardening and tempering tanks |
| 2703.10 | HPM facilities |
| 2703.10.1.1 | HPM work station exhaust |
| 2703.10.2 | HPM gas cabinets and exhausted enclosures |
| 2703.10.3 | HPM exit access corridor |
| 2703.10.4 | HPM exhaust ducts |
| 2703.10.4.1 | HPM noncombustible ducts |
| 2703.10.4.2 | HPM combustible ducts |
| 2807.3 | Lumber production conveyor enclosures |
| 2808.7 | Recycling facility conveyor enclosures |
| 3006.1 | Class A and B ovens |
| 3006.2 | Class C and D ovens |
| Table 3206.2 | Storage fire protection |
| 3206.4 | Storage |
| 3704.5 | Storage of more than 1,000 cubic feet of loose combustible fibers |
| 5003.8.4.1 | Gas rooms |
| 5003.8.5.3 | Exhausted enclosures |
| 5004.5 | Indoor storage of hazardous materials |
| 5005.1.8 | Indoor dispensing of hazardous materials |
| 5104.4.1 | Aerosol warehouses |
| 5106.3.2 | Aerosol display and merchandising areas |
| 5306.2.1 | Exterior medical gas storage room |
| 5306.2.2 | Interior medical gas storage room |
| 5306.2.3 | Medical gas storage cabinet |
| 5606.5.2.1 | Storage of smokeless propellant |
| 5704.3.7.5.1 | Flammable and combustible liquid storage rooms |
| 5704.3.8.4 | Flammable and combustible liquid storage warehouses |
| 5705.3.7.3 | Flammable and combustible liquid Group H-2 or H-3 areas |
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| 6004.1.2 | Gas cabinets for highly toxic and toxic gas |
| 6004.1.3 | Exhausted enclosures for highly toxic and toxic gas |
| 6004.2.6 | Gas rooms for highly toxic and toxic gas |
| 6004.3.3 | Outdoor storage for highly toxic and toxic gas |
| 6504.1.1 | Pyroxylin plastic storage cabinets |
| 6504.1.3 | Pyroxylin plastic storage vaults |
| 6504.2 | Pyroxylin plastic storage and manufacturing |

SI: 1 cubic foot = 0.023 m³.

**903.2.12 During construction.** _Automatic sprinkler systems_ required during construction, _alteration_ and demolition operations shall be provided in accordance with Section 3313.

**903.2.13 Shell buildings.** _Automatic sprinkler systems_ shall be installed in shell buildings, other than Group M, F or S occupancies, of light and ordinary hazards per Section 903.3.1.1 and NFPA 13. All of the following requirements shall be applied to the design and installation of these systems.

1. Only nominal inch orifice, 5.6K, standard spray upright and pendent sprinkler shall be used in shell building fire sprinkler system designs and installations.
2. Reduction in remote areas of operation for hydraulically designed systems shall be prohibited when utilizing quick response sprinklers in shell building fire sprinkler system designs and installations.
3. Extended coverage sprinkler shall be prohibited in the design and installation of shell building fire sprinkler systems.

**903.3 Installation requirements.** _Automatic sprinkler systems_ shall be designed and installed in accordance with the following and Sections 903.3.1 through 903.3.7:

**Design documents.** For fire sprinkler systems, the following are considered to be professional registrant activities in accordance with the requirements of the Arizona Board of Technical Registration.

1. Consider the range of hazards of the project;
   1.1. Automatic sprinkler system design shall be based on the hazard classification of the building or area in accordance with NFPA 13.
   1.2. Automatic sprinkler system designs for high piled storage shall be in accordance with Chapter 32, High-piled Combustible Storage, and Chapter 57, Flammable and Combustible Liquids.
2. Prepare hazard analysis; identify the hazard classification of the intended occupancy, including any special hazards;
3. Determine the applicable codes and standards and appropriate engineering practices;
4. Ascertain the availability and adequacy of the water supply for the project;
5. Determine the appropriate design density and area of operation for each hazard area.

These activities shall be completed prior to development of construction documents to be submitted for permit.

**Exception:** Automatic sprinkler systems installed in accordance with NFPA 13D.

Where items 1-5 are addressed in a stamped narrative or single page the remaining fire sprinkler shop drawings may be prepared by a NICET 3 or 4.

Non-registrant may layout automatic fire sprinkler systems and their related hydraulic calculations for installation or permit.

**Owner responsibilities.** The owner of a building or structure where the fire sprinkler system is going to be installed or their authorized agent shall provide the design professional with the following information prior to preparation of design documents in accordance with NFPA 13.

1. Intended use of the building.
2. A description of the materials to be used or stored within the building.
3. A description of how the materials are to be used in the building.
4. A description of the commodity stored and proposed storage configuration including the maximum height.
5. A preliminary plan of the building or structure along with the design concepts necessary to prepare the design documents listed in Section 903.1.9.
6. Speculative buildings shall be in accordance with Chapter 32.

These activities need to be completed prior to development of construction documents to be submitted for permit.

**Exception:** Automatic sprinkler systems installed in accordance with NFPA 13D.

Shop drawings shall be prepared by a designer in accordance with the Arizona Board of Technical Registration.

**903.3.1 Standards.** Sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1, unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

**903.3.1.1 NFPA 13 sprinkler systems.** Where the provisions of this code require that a building or portion thereof be equipped throughout with an _automatic sprinkler system_ in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 except as provided in Section 903.3.1.1.1 and 903.3.1.1.2.

**903.3.1.1 Exempt locations and shade canopies.** Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an approved _automatic_ fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from any room merely because it is damp, of fire-resistance rated construction or contains electrical equipment.

1. Any room where the application of water, or flame and water, constitutes a serious life or fire hazard. When determined by a technical opinion
and report prepared in accordance with Section 104.7.2 and approved by the fire code official.

2. A room or space where sprinklers are considered undesirable because of the nature of the contents, where approved by the fire code official. When determined by a technical opinion and report prepared in accordance with Section 104.7.2 and approved by the fire code official.

3. Generator and transformer rooms separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a fire-resistance rating of not less than 2 hours.

4. Rooms or areas that are of noncombustible construction with wholly noncombustible contents.

5. Fire service access elevator machine rooms and machinery spaces.


7. Sprinklers may be omitted from electrical vaults where access to the vault is under control of the electrical utility company and the vaults are separated from the rest of the building by fire resistant construction in accordance with the NFPA 70.

8. Linen closets or pantries that have multiple level shelving and cannot be walked into shall be considered cabinetry and shall not require sprinkler protection.


903.3.1.2 Bathrooms. In Group R occupancies, other than Group R-4 occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m²) in area and are located within individual dwelling units or sleeping units, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

903.3.1.3 Industrial shade canopies. Industrial shade canopies shall be protected by an automatic sprinkler system.

Exceptions:

1. Industrial shade awnings and canopies attached to buildings that are not otherwise required to be protected by an automatic sprinkler system.

2. Detached industrial awnings and canopies that do not exceed 1,000 square feet (93 m²) in area.

3. Detached industrial shade awnings and canopies that are made of noncombustible material with a flame spread index no greater than 25 when tested in accordance with ASME E84 which does not exceed 5,000 square feet (372 m²).

4. Where a slatted, lattice or louvered awnings or canopy roof system is not less than 50 percent open to the sky.

903.3.1.4 Mercantile shade awnings and canopies. Mercantile shade awnings and canopies shall be protected by an automatic sprinkler system.

Exceptions:

1. Where a slatted, lattice or louvered awnings or canopy roof system is not less than 50 percent open to the sky.

2. Where the shade membrane fabric is used to cover garden, greenhouse, landscaping or plant nursery products or materials, which does not exceed 5,000 square feet (372 m²).

3. Mercantile shade awnings and canopies attached to buildings that are not otherwise required to be protected by an automatic sprinkler system.

4. Mercantile shade awnings and canopies that are made of noncombustible material with a flame spread index no greater than 25 when tested in accordance with ASME E84, not exceeding 1,000 square feet (93.2 m²).

5. Where sprinklers are permitted to be omitted for noncombustible shaded walkway or pedestrian entry areas.

903.3.1.5 Nonresidential shade canopies. Nonresidential awnings, canopies and patio covers shall be protected by an automatic sprinkler system.

Areas used for storage, seating and assembly shall be sprinklered. Structures over 5,000 sq. ft. which receive an occupancy classification are subject to the sprinkler requirements of the Bret Tarver Ordinance.

Exceptions:

1. Awnings, canopies and patio covers that do not exceed 400 square feet (37.2 m²) in area.

2. Awnings, canopies and patio covers attached to buildings that are not otherwise required to be protected by an automatic sprinkler system, and the combined awning and building area do not exceed 2,500 square feet in accordance with 903.1.7.

3. Where a slatted, lattice or louvered awnings, canopies and patio roof system is not less than 50 percent open to the sky.

4. Where sprinklers are permitted to be omitted for noncombustible shaded walkway or pedestrian entry areas.

5. Nonresidential awnings, canopies and patio covers that are made of noncombustible material with a flame spread index no greater than 25 when tested in accordance with ASME E 84, not exceeding 1,000 square feet (93.2 m²).

6. Nonresidential awnings, canopies and patios cover that are made of material with a flame spread index no greater than 25 when tested in accordance with ASME E84 that is used for covering play-ground equipment.

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies up to and
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including four stories in height in buildings not exceeding 60 feet (18 288 mm) in height above grade plane shall be permitted to be installed throughout in accordance with NFPA 13R.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where any of the following conditions exists:

1. The building is of Type V construction, provided that there is a roof or deck above.
2. Exterior balconies, decks and ground floor patios of dwelling units and sleeping units are constructed in accordance with Section 705.2.3.1, Exception 3 of the International Building Code.
3. Patios with living spaces directly above.

Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.2.2 Open-ended corridors. Sprinkler protection shall be provided in open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.

903.3.1.2.3 Attics. Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an automatic sprinkler system.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4 of the International Building Code, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of required fire department vehicle access:
   3.1. Provide automatic sprinkler system protection.
   3.2. Construct the attic using noncombustible materials.
   3.3. Construct the attic using fire retardant-treated wood complying with Section 2303.2 of the International Building Code.
   3.4. Fill the attic with noncombustible insulation.

The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.

4. Group R-4, Condition 2 occupancy attics not required by Item 1 to have sprinklers shall comply with one of the following:
   4.1. Provide automatic sprinkler system protection.
   4.2. Provide a heat detection system throughout the attic that is arranged to activate the building fire alarm system.
   4.3. Construct the attic using noncombustible materials.
   4.4. Construct the attic using fire retardant-treated wood complying with Section 2303.2 of the International Building Code.
   4.5. Fill the attic with noncombustible insulation.

903.3.1.2.4 Exterior storage closets. Sprinkler protection shall be extended into attached exterior storage closets in Group R-1 and R-2 occupancies protected by automatic sprinkler systems installed according to NFPA 13R.

903.3.1.2.5 Attached garages and carports. Attached garages and carports shall be provided with sprinkler protection.

903.3.1.2.6 Residential combination services. With Water Services Department approval, a single combination water supply shall be permitted provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R.

903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one-and two-family dwellings, Group R-3; Group R-4 and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D.

903.3.1.3.1 Attached garages and carports. Attached garages and carports with living space directly above shall be provided with sprinkler protection. In open patios or balconies with living spaces directly above shall be provided with sprinkler protection.

903.3.1.3.2 Domestic services. Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with this section.

903.3.1.3.3 Residential combination services. A single combination water supply shall be permitted provided that the domestic demand is added to the sprinkler demand as required by NFPA 13D.

903.3.2 Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in all of the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a smoke compartment containing care recipient sleeping units in Group I-2 in accordance with the International Building Code.
2. Throughout all spaces within a smoke compartment containing treatment rooms in ambulatory care facilities.
3. Dwelling units and sleeping units in Group I-1 and R occupancies.
4. Light-hazard occupancies as defined in NFPA 13.

**903.3 Obstructed locations.** Automatic sprinklers shall be installed with due regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with the applicable automatic sprinkler system stand and that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3 foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

**Exception:** Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

**903.3.4 Actuation.** Automatic sprinkler systems shall be automatically actuated unless specifically provided for in this code.

**903.3.5 Water supplies.** Water supplies for automatic sprinkler systems shall comply with this section and the standards referenced in Section 903.3.1. The potable water supply shall be protected against backflow in accordance with the requirements of this section the International Plumbing Code and the City of Phoenix Plumbing Code. For connections to public waterworks systems, the water supply test used for design of fire protection systems shall be adjusted to account for seasonal and daily pressure fluctuations based on information from the water supply authority and as approved by the fire code official.

**903.3.5.1 Domestic services.** Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with this section.

**903.3.5.2 Residential combination services.** A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R.

**903.3.5.3 Water supply tests.** Hydrant flow tests used to design sprinkler systems, standpipe systems, and fire supply mains shall be performed on public hydrants by the City of Phoenix Water Services Department within 1 year of fire plans submittal. A copy of the city’s hydrant flow test report shall be submitted with the construction documents and calculations. When conducting a hydrant flow test for the design of automatic fire sprinkler systems the minimum flow volume of the test shall meet or exceed the system demand.

**903.3.5.4 Water supply tests on private hydrants.** Hydrant flow tests performed on private hydrants by the property owner or his representative to be used in the design of fire protection systems shall be witnessed by the Phoenix Fire Department. When conducting a hydrant flow test for the design of automatic fire sprinkler systems the minimum flow volume of the test shall meet or exceed the system demand.

**903.3.5.5 Sprinkler design safety factor.** Sprinkler systems for NFPA 13, 13R and 13D systems shall be designed with a minimum safety factor as follows:

1. When the static pressure exceeds 90 psi (621 kPa), the maximum design static pressure shall be 80 psi (552 kPa) regardless of actual test pressure. The slope of the original water supply curve shall be used even though the design pressure is reduced to 80 psi (552 kPa).

   The actual flow test pressures shall be used to determine the need for sizing fire pumps, pressure reducing valves, and hanger requirements in accordance with NFPA 13, 13D and 13R.

2. When the static pressure is less than 90 psi (621 kPa), a minimum 10 psi (69 kPa) safety factor shall be provided between the available water supply and the system flow and pressure demand and shall include hose stream allowances required by NFPA 13, 13D and 13R.

**903.3.6 Hose threads.** Fire hose threads and fittings used in connection with automatic sprinkler systems shall be as prescribed by the fire code official.

**903.3.7 Fire department connections.** The location of fire department connections shall be shall be installed in accordance with Section 912.

**903.3.8 Limited area sprinkler systems.** Limited area sprinkler systems shall be in accordance with the standards listed in Section 903.3.1 except as provided in Sections 903.3.8.1 through 903.3.8.5.

**903.3.8.1 Number of sprinklers.** Limited area sprinkler systems shall no exceed six sprinklers in any single fire area.

**903.3.8.2 Occupancy hazard classification.** Only areas classified by NFPA 13 as Light Hazard or Ordinary Hazard Group 1 shall be permitted to be protected by limited area sprinkler systems.

**903.3.8.3 Piping arrangement.** Where a limited area sprinkler system is installed in a building with an automatic wet standpipe system, sprinklers shall be supplied by the standpipe system. Where a limited area sprinkler system is installed in a building without an automatic wet standpipe system, water shall be permitted to be supplied by the plumbing system provided that the plumbing system is capable of simultaneously supplying domestic and sprinkler demands.

**903.3.8.4 Supervision.** Control valves shall not be installed between the water supply and sprinklers unless the valves are of an approved indicating type that are supervised or secured in the open position.

**903.3.8.5 Calculations.** Hydraulic calculations in accordance with NFPA 13 shall be provided to demonstrate that the available water flow and pressure are adequate to supply all sprinklers installed in any single fire area with discharge densities corresponding to the hazard classification.

**903.4 Sprinkler system supervision and alarms.** Valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressure and airflow switches on all sprinkler systems
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shall be electrically supervised by a listed fire alarm control unit.

Exceptions:

1. Automatic sprinkler systems protecting one and two-family dwellings, other than assisted living Group R-4 occupancies.
2. Limited area sprinkler systems in accordance with Section 903.3.8.
3. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic and the automatic sprinkler system, and a separate shutoff valve for the automatic sprinkler system is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Backflow-preventer or post indicator valves shall be supervised by one of the following methods:
   a. A local signaling service that will initiate an audible signal at a constantly attended location, or
   b. Valves locked in the open position and inspected monthly in accordance with an approved procedure.

903.4.1 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervising station or, where approved by the fire code official, shall sound an audible signal at a constantly attended location.

Exceptions:

1. Underground key or hub valves in roadway boxes provided by the municipality or public utility are not required to be monitored.
2. Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position.
3. In building occupancies in Group A-2 that do not exceed 5,000 square feet (465 m²).
4. Group H and E shall be monitored at 0 square feet.
5. All other building occupancies, that do not exceed 12,000 square feet (1115 m²)

903.4.2 Alarms. An approved audible device, located on the exterior of the building in an approved location, shall be connected to each automatic sprinkler system. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a fire alarm system is installed, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

903.4.3 Floor control valves/water flow switches. Approved supervised indicating control valves/water flow shall be provided at the point of connection to the riser on each floor.

Mezzanines that cover more than ¼ of the entire interior building footprint shall be provided with sectional 9 floor control valves as outlined in this section.

Exception:

1. Residential occupancies three stories or less with a total building square footage less than 52,000 square feet (4831 m²).
2. All other occupancies two stories or less with a total building square footage less than 22,000 square feet (2044 m²).
3. At the installing contractor’s discretion, buildings up to three stories, above or below grade, that are not classified as high-rise buildings, may have the sectional floor control valves located in a manifold configuration in the dedicated fire riser room on the grade level of the building.

903.4.4 Monitoring at a constantly attended location. When monitoring of sprinkler system is required per section 903.4.1 the facilities owner may request to monitor the system(s) at the facility site using facility personnel. Where the alarm monitoring station does not strictly comply with the NFPA 72 requirements for a proprietary supervising station, the following minimum provisions shall be met and approved by the fire code official.

1. The policies and procedures for monitoring the sprinkler system shall be written and submitted to the fire code official for approval prior to occupancy or terminating central station service or remote service. A copy of the approved fire alarm policies and procedures shall be maintained at the constantly attended location.
2. The alarm monitoring station shall be constantly attended by competent trained personnel. At least one person shall monitor the fire alarm panel at all times. Provisions shall be made to relieve the alarm monitor prior to shift changes, during breaks, or performance of other assigned duties outside of the alarm monitoring room.
3. A list of trained personnel qualified to monitor the sprinkler system shall be maintained at the alarm monitoring station. Documentation of the alarm monitoring training shall be approved by the fire code official and maintained at the alarm monitoring station and made available to the fire code official on request.
4. The policies and procedures shall address the dispensation of the various fire alarm signals. The fire department shall be immediately notified upon the activation of a fire alarm signal (smoke or heat detector, sprinkler water flow, manual pull station, special extinguishing system, etc.). Any investigation by the facility staff shall occur after or concurrent to notification of the fire department. If the investigation by facility staff determines that there is no emergency condition at the facility, the fire department shall be immediately notified to allow them to modify their response.
5. The fire department shall not be summoned for emergency response upon receipt of a supervisory or trouble signal, but procedures shall address dispensation of those signals by facility personnel.

6. A log shall be maintained at the monitoring station that note all of the signals received and the dispensation of those signals. The log sheet shall be made available to the Phoenix Fire Department on request.

**903.4.4.1 Location.** In buildings greater than one story or 22,500 square feet (2090 M²), the fire alarm panel or a fire alarm annunciator panel shall be installed in a location that is visible from the lobby or area adjacent to the primary fire department response entrance. It shall be permissible to locate the fire alarm panel in a room immediately adjacent to this lobby provided the door to this room is accessible to the fire department, visible from the lobby and is provided with a permanent, visible placard noting the location of the fire alarm control panel.

**903.5 Testing and maintenance.** Sprinkler systems shall be tested and maintained in accordance with Section 901.

**903.6 Where required in existing buildings and structures.** An automatic sprinkler system shall be provided in existing buildings and structures where required in Chapter 11.

**SECTION 904 ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS**

**904.1 General.** Automatic fire-extinguishing systems, other than automatic sprinkler systems, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this section and the applicable referenced standards. Alternative fire suppression systems intended for prevention of business interruption and equipment protection shall not substitute for full automatic sprinkler coverage installed for structural and life safety protection.

**904.1.1 Certification of service personnel for fire-extinguishing equipment.** Service personnel providing or conducting maintenance on automatic fire-extinguishing systems, other than automatic sprinkler systems, shall possess a valid certificate for the type of system and work performed.

**904.2 Where permitted.** Automatic fire-extinguishing systems installed as an alternative to the required automatic sprinkler systems of Section 903 shall be approved by the fire code official.

**904.2.1 Restriction on using automatic sprinkler system exceptions or reductions.** Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed for automatic sprinkler systems or by other requirements of this code.

**904.2.2 Commercial hood and duct systems.** Each required commercial kitchen exhaust hood and duct system required by Section 609 to have a Type I hood shall be protected with an approved automatic fire-extinguishing system installed in accordance with this code.

**904.3 Installation.** Automatic fire-extinguishing systems shall be installed in accordance with this section.

**904.3.1 Electrical wiring.** Electrical wiring shall be in accordance with NFPA 70.

**904.3.2 Actuation.** Automatic fire-extinguishing systems shall be automatically actuated and provided with a manual means of actuation in accordance with Section 904.12.1. Where more than one hazard could be simultaneously involved in fire due to their proximity, all hazards shall be protected by a single system designed to protect all hazards that could become involved.

**Exception:** Multiple systems shall be permitted to be installed if they are designed to operate simultaneously.

**904.3.3 System interlocking.** Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents, and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard.

**904.3.4 Alarms and warning signs.** Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with Section 907.5.2.

**904.3.5 Monitoring.** Where a building fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.

**904.4 Inspection and testing.** Automatic fire-extinguishing systems shall be inspected and tested in accordance with the provisions of this section prior to acceptance.

**904.4.1 Inspection.** Prior to conducting final acceptance tests, all of the following items shall be inspected:

1. Hazard specification for consistency with design hazard.
2. Type, location and spacing of automatic and manual-initiating devices.
3. Size, placement and position of nozzles or discharge orifices.
4. Location and identification of audible and visible alarm devices.
5. Identification of devices with proper designations.
6. Operating instructions.

**904.4.2 Alarm testing.** Notification appliances, connections to fire alarm systems and connections to approved supervising stations shall be tested in accordance with this section and Section 907 to verify proper operation.

**904.4.2.1 Audible and visible signals.** The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.

**904.4.3 Monitor testing.** Connections to protected premises and supervising station fire alarm systems shall be tested to verify proper identification and retransmission of alarms
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from automatic fire-extinguishing systems.

904.5 Wet-chemical systems. Wet-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 17A and their listing.

904.5.1 System test. Systems shall be inspected and tested for proper operation at six-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed and the required amount of agent verified. Stored pressure type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

904.5.2 Fusible link maintenance. Fixed temperature sensing elements shall be maintained to ensure proper operation of the system.

904.6 Dry-chemical systems. Dry-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 17 and their listing.

904.6.1 System test. Systems shall be inspected and tested for proper operation at six-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed, and the required amount of agent verified. Stored pressure type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

904.6.2 Fusible link maintenance. Fixed temperature sensing elements shall be maintained to ensure proper operation of the system.

904.7 Foam systems. Foam-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 11 and NFPA 16 and their listing. Records of inspections and testing shall be maintained.

904.8 Carbon dioxide systems. Carbon dioxide extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 12A and their listing.

904.8.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.

904.8.2 High-pressure cylinders. High-pressure cylinders shall be weighed and the date of the last hydrostatic test shall be verified at six-month intervals. Where a container shows a loss in original content of more than 10 percent, the cylinder shall be refilled or replaced.

904.8.3 Low-pressure containers. The liquid-level gauges of low-pressure containers shall be observed at one-week intervals. Where a container shows a content loss of more than 10 percent, the container shall be refilled to maintain the minimum gas requirements.

904.8.4 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.8.4.1 Test procedure. Hoses shall be tested at not less than 2,500 pounds per square inch (psi) (17 238 kPa) for high-pressure systems and at not less than 900 psi (6206 kPa) for low-pressure systems.

904.8.5 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure that such components are in proper operating condition.

904.9 Halon systems. Halogenated extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 12A and their listing.

904.9.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.

904.9.2 Containers. The extinguishing agent quantity and pressure of containers shall be checked at six-month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure (adjusted for temperature) of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.9.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.9.3.1 Test procedure. For Halon 1301 systems, hoses shall be tested at not less than 1,500 psi (10 343 kPa) for 600 psi (4137 kPa) charging pressure systems and not less than 900 psi (6206 kPa) for 360 psi (2482 kPa) charging pressure systems. For Halon 1211 hand hose line systems, hoses shall be tested at 2,500 psi (17 238 kPa) for high-pressure systems and 900 psi (6206 kPa) for low-pressure systems.

904.9.4 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure such components are in proper operating condition.

904.10 Clean-agent systems. Clean-agent fire-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 2001 and their listing.

904.10.1 System test. Systems shall be inspected and tested for proper operation at 12-month intervals.

904.10.2 Containers. The extinguishing agent quantity and pressure of the containers shall be checked at six month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure, adjusted for temperature, of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.10.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. All hoses shall be tested at five-year intervals.

904.11 Automatic water mist systems. Automatic water mist systems shall be permitted in applications that are consistent with the applicable listing or approvals and shall comply with Sections 904.11.1 through 904.11.3.

904.11.1 Design and installation requirements. Automatic water mist systems shall be designed and installed in accordance with Sections 904.11.1.1 through 904.11.1.4.

904.11.1.1 General. Automatic water mist systems shall
be designed and installed in accordance with NFPA 750 and the manufacturer's instructions.

904.11.1.2 Actuation. Automatic water mist systems shall be automatically actuated.

904.11.1.3 Water supply protection. Connections to a potable water supply shall be protected against backflow in accordance with the International Plumbing Code.

904.11.1.4 Secondary water supply. Where a secondary water supply is required for an automatic sprinkler system, an automatic water mist system shall be provided with an approved secondary water supply.

904.11.2 Water mist system supervision and alarms. Supervision and alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.

904.11.2.1 Monitoring. Monitoring shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.1.

904.11.2.2 Alarms. Alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.2.

904.11.2.3 Floor control valves. Floor control valves shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.3.

904.11.3 Testing and maintenance. Automatic systems shall be tested and maintained in accordance with Section 901.6.

904.12 Commercial cooking systems. The automatic fire extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Pre-engineered automatic dry and wet-chemical extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Other types of automatic fire-extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, NFPA 96, its listing and the manufacturer's installation instructions. Automatic fire-extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide extinguishing systems, NFPA 12.
3. Automatic water mist systems, NFPA 750.
4. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
5. Dry-chemical extinguishing systems, NFPA 17.
6. Wet-chemical extinguishing systems, NFPA 17A.

Exception: Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and listed, labeled and installed in accordance with Section 304.1 of the International Mechanical Code.

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

Exception: Automatic sprinkler systems shall not be required to be equipped with manual actuation means.

904.12.2 System interconnection. The actuation of the fire extinguishing system shall automatically shut down the fuel and electrical power supply to the cooking equipment. The fuel and electrical supply reset shall be manual. If the fire extinguishing system is listed to be effective with the commercial cooking exhaust system on or off, the system shall remain on.

904.12.3 Carbon dioxide systems. Where carbon dioxide systems are used, there shall be a nozzle at the top of the ventilating duct. Additional nozzles that are symmetrically arranged to give uniform distribution shall be installed within vertical ducts exceeding 20 feet (6096 mm) and horizontal ducts exceeding 50 feet (15 240 mm). Dampers shall be installed at either the top or the bottom of the duct and shall be arranged to operate automatically upon activation of the fire-extinguishing system. Where the damper is installed at the top of the duct, the top nozzle shall be immediately below the damper. Automatic carbon dioxide fire extinguishing systems shall be sufficiently sized to protect all hazards venting through a common duct simultaneously.

904.12.3.1 Ventilation system. Commercial-type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.

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.

904.12.4.1 Listed sprinklers. Sprinklers used for the protection of fryers shall be tested in accordance with UL 199E, listed for that application and installed in accordance with their listing.

904.12.5 Operations and maintenance. Automatic fire-extinguishing systems protecting commercial cooking systems shall be maintained in accordance with Sections 904.12.5.1 through 904.12.5.3.

904.12.5.1 Existing automatic fire-extinguishing systems. Where changes in the cooking media, positioning of cooking equipment or replacement of cooking equipment occur in existing commercial cooking systems, the automatic fire-extinguishing system shall be required to comply with the applicable provisions of Sections 904.12 through 904.12.4.

904.12.5.2 Extinguishing system service. Automatic fire-extinguishing systems shall be serviced not less frequently than every six months and after activation of the system. Inspection shall be by qualified individuals, and a certificate of inspection shall be forwarded to the fire code official upon completion.

904.12.5.3 Fusible link and sprinkler head replacement. Fusible links and automatic sprinkler heads shall be replaced
FIRE PROTECTION SYSTEMS

Annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer’s instructions.

Exception: Frangible bulbs are not required to be replaced annually.

904.13 Domestic cooking systems. Cooktops and ranges installed in the following occupancies shall be protected in accordance with Section 904.13.1:

1. In Group I-1 occupancies where domestic cooking facilities are installed in accordance with Section 420.8 of the International Building Code.

2. In Group I-2, Condition 1 occupancies where domestic cooking facilities are installed in accordance with Section 407.2.6 of the International Building Code.

3. In Group R-2 college dormitories where domestic cooking facilities are installed in accordance with Section 420.10 of the International Building Code.

904.13.1 Protection from fire. Cooktops and ranges shall be protected in accordance with Section 904.13.1.1 or 904.13.1.2.

904.13.1.1 Automatic fire-extinguishing system. The domestic recirculating or exterior vented cooking hood provided over the cooktop or range shall be equipped with an approved automatic fire-extinguishing system complying with the following:

1. The automatic fire-extinguishing system shall be of a type recognized for protection of domestic cooking equipment. Preengineered automatic fire-extinguishing systems shall be listed and labeled in accordance with UL 300A and installed in accordance with the manufacturer’s instructions.

2. Manual actuation of the fire-extinguishing system shall be provided in accordance with Section 904.12.1.

3. Interconnection of the fuel and electric power supply shall be in accordance with Section 904.12.2.

904.13.1.2 Ignition prevention. Cooktops and ranges shall include burners that have been tested and listed to prevent ignition of cooking oil with burners turned on to their maximum heat settings and allowed to operate for 30 minutes.

904.14 Aerosol fire-extinguishing systems. Aerosol fire extinguishing systems shall be installed, periodically inspected, tested and maintained in accordance with Sections 901 and 904.4, NFPA 2010, and in accordance with their listing.

Such devices and appurtenances shall be listed and installed in compliance with manufacturer’s instructions.

904.14.1 Maintenance. Not less than semiannually, an inspection shall be conducted by a trained person to assess whether the system is in working order. Not less than annually, a certified fire suppression contractor having knowledge of and training in the installation, operation and maintenance of the specific fire-extinguishing system shall inspect, test, service and maintain such system in accordance with this section and the manufacturer’s specifications and servicing manuals.

SECTION 905
STANDPIPE SYSTEMS

905.1 General. Standpipe systems shall be provided in new buildings and structures in accordance with Sections 905.2 through 905.11. In buildings used for high-piled combustible storage, fire protection shall be in accordance with Chapter.

Temporary standpipes shall be installed during construction in accordance with Chapter 33 of this code.

905.2 Installation standard. Standpipe systems shall be installed in accordance with this section and NFPA 14. Fire department connections for standpipe systems shall be in accordance with Section 912.

905.2.1 Pressure reducing valves on standpipes. All pressure reducing valves on standpipes shall be required to be field adjustable on the system without special tools.

905.2.1.2 Testing. All pressure reducing valves shall be tested annually in accordance with NFPA 25 and manufacturer’s instructions.

905.2.1.3 Minimum gpm. Pressure reducing valves shall be set to provide a minimum 250 gpm at 100-170 psi when installed.

905.2.1.4 Standpipe outlets. Standpipe outlets on the roof shall be designed to provide a minimum 500 gpm at 100 psi for the first standpipe and up to a total of 1,000 gpm at 100 psi for all standpipe outlets water supplies.

905.2.1.5 Signage. Pressure reducing valves shall be provided with signage indicating static pressure, residual pressure and flow on both sides of the valve.

905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.8. Standpipe systems are allowed to be combined with automatic sprinkler systems.

Exception: Standpipe systems are not required in Group R-3 occupancies.

905.3.1 Height. Class III standpipe systems shall be installed throughout buildings where any of the following conditions exist:

1. Four or more stories are above or below grade plane.

2. The floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access.

3. The floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

2. Class I standpipes are allowed in Group B and E occupancies.

3. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

4. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing
5. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.

6. Class I standpipes are allowed in buildings where occupant-use hose lines will not be utilized by trained personnel or the fire department.

7. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
   7.1. Recessed loading docks for four vehicles or less.
   7.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

905.3.2 Group A. Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.

Exceptions:
   1. Open-air-seating spaces without enclosed spaces.
   2. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings that are not high-rise buildings.

905.3.3 Covered and open mall buildings. Covered mall and open mall buildings shall be equipped throughout with a standpipe system where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the automatic sprinkler system sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically most remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:
   1. Within the mall at the entrance to each exit passageway or corridor.
   2. At each floor-level landing within interior exit stairways opening directly on the mall.
   3. At exterior public entrances to the mall of a covered mall building
   4. At public entrances at the perimeter line of an open mall building.
   5. At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

905.3.4 Stages. Stages greater than 1,000 square feet (93 m²) in area shall be equipped with a Class I wet standpipe system with 2 1/2-inch (64 mm) hose connections on each side of the stage.

905.3.5 Underground buildings. Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.

905.3.6 Helistops and heliports. Buildings with a rooftop helistop or heliport shall be equipped with a Class I standpipe system extended to the roof level on which the helistop or heliport is located in accordance with Section 2007.5.

905.3.7 Marinas and boatyards. Standpipes in marinas and boatyards shall comply with Chapter 36.

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

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required interior exit stairway, a hose connection shall be provided for each story above and not below grade. Hose connection shall be located at the main floor landing between floors, unless otherwise approved by the fire code official.

   Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open stairs that are not greater than 75 (22 860 mm) apart.

2. On each side of the wall adjacent to the exit opening of a horizontal exit.

   Exception: Where floor areas adjacent to a horizontal exit are reachable from interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of the building.

   Exception: Where floor areas adjacent to an exit passageway are reachable from interior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall.

5. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an interior exit stairway with stair access to the roof provided in accordance with Section 1011.12.

6. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.

905.4.1 Protection. Risers and laterals of Class I standpipe systems not located within an interior exit stairway shall be protected by a degree of fire resistance equal to that required
FIRE PROTECTION SYSTEMS

for vertical enclosures in the building in which they are located.

**Exception:** In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an interior exit stairway are not required to be enclosed within fire-resistance-rated construction.

905.4.2 Interconnection. In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

905.5 Location of Class II standpipe hose connections. Class II standpipe hose connections 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.

905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, on each side of the balcony, and on each tier of dressing rooms.

905.5.2 Protection. Fire-resistance-rated protection of risers and laterals of Class II standpipe systems is not required.

905.5.3 Class II system 1-inch hose. A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and listed for this service and where approved by the fire code official.

905.6 Location of Class III standpipe hose connections. Class III standpipe systems shall have hose connections located as required for Class I standpipes in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

905.6.1 Protection. Risers and laterals of Class III standpipe systems shall be protected as required for Class I systems in accordance with Section 905.4.1.

905.6.2 Interconnection. In buildings where more than one Class III standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

905.7 Cabinets. Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.

905.7.1 Cabinet equipment identification. Cabinets shall be identified in an approved manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

**Exceptions:**
1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
2. Doors that have either an approved visual identification clear glass panel or a complete glass door panel are not required to be marked.

905.7.2 Locking cabinet doors. Cabinets shall be unlocked.

**Exceptions:**
1. Visual identification panels of glass or other approved transparent frangible material that is easily broken and allows access.

2. Approved locking arrangements.
3. Group I-3 occupancies.

905.8 Dry standpipes. Dry standpipes shall not be installed.

**Exception:** Where subject to freezing and in accordance with NFPA 14.

905.9 Valve supervision. Valves controlling water supplies shall be supervised in the open position so that a change in the normal position of the valve will generate a supervisory signal at the supervising station required by Section 903.4. Where a fire alarm system is provided, a signal shall be transmitted to the control unit.

1. Valves to underground key or hub valves in roadway boxes provided by the municipality or public utility do not require supervision.
2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a fire alarm system.

905.10 During construction. Standpipe systems required during construction and demolition operations shall be provided in accordance with Section 3313.

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

905.12 Existing buildings. Where required in Chapter 11, existing structures shall be equipped with standpipes installed in accordance with Section 905.

SECTION 906
PORTABLE FIRE EXTINGUISHERS

906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

**Exceptions:**
1. In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
2. In Group E occupancies, portable fire extinguishers shall be required in locations specified in Items 2 through 6 where each classroom is provided with a portable fire extinguisher having a minimum rating of 2-A:20-B:C.
3. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-1; I-2, Condition 1; and R-2 college dormitory occupancies.
4. In areas where flammable or combustible liquids are stored, used or dispensed.
5. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section...
TABLE 906.1
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

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<thead>
<tr>
<th>SECTION</th>
<th>SUBJECT</th>
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<td>Asphalt kettles</td>
</tr>
<tr>
<td>307.5</td>
<td>Open burning</td>
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<td>308.1.3</td>
<td>Open flames—torches</td>
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<td>309.4</td>
<td>Powered industrial trucks</td>
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<tr>
<td>2005.2</td>
<td>Aircraft towing vehicles</td>
</tr>
<tr>
<td>2005.3</td>
<td>Aircraft welding apparatus</td>
</tr>
<tr>
<td>2005.4</td>
<td>Aircraft fuel-servicing tank vehicles</td>
</tr>
<tr>
<td>2005.5</td>
<td>Aircraft hydrant fuel-servicing vehicles</td>
</tr>
<tr>
<td>2005.6</td>
<td>Aircraft fuel-dispensing stations</td>
</tr>
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<td>2007.7</td>
<td>Heliports and helistops</td>
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<td>2108.4</td>
<td>Dry cleaning plants</td>
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<tr>
<td>2305.5</td>
<td>Motor fuel-dispensing facilities</td>
</tr>
<tr>
<td>2310.6.4</td>
<td>Marine motor fuel-dispensing facilities</td>
</tr>
<tr>
<td>2311.6</td>
<td>Repair garages</td>
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<tr>
<td>2404.4.1</td>
<td>Spray-finishing operations</td>
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<tr>
<td>2405.4.2</td>
<td>Dip-tank operations</td>
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<td>2406.4.2</td>
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<td>2804.3</td>
<td>Lumberyards/woodworking facilities</td>
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<td>2808.8</td>
<td>Recycling facilities</td>
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<td>2809.5</td>
<td>Exterior lumber storage</td>
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<tr>
<td>2903.5</td>
<td>Organic-coating areas</td>
</tr>
<tr>
<td>3006.3</td>
<td>Industrial ovens</td>
</tr>
<tr>
<td>3104.12</td>
<td>Tents and membrane structures</td>
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<tr>
<td>3206.1</td>
<td>Rack storage</td>
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<td>3315.1</td>
<td>Buildings under construction or demolition</td>
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<tr>
<td>3317.3</td>
<td>Roofing operations</td>
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<tr>
<td>3408.2</td>
<td>Tire rebuilding/storage</td>
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<td>3504.2.6</td>
<td>Welding and other hot work</td>
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<tr>
<td>3604.4</td>
<td>Marinas</td>
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<tr>
<td>5203.6</td>
<td>Combustible fibers</td>
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<tr>
<td>5703.2.1</td>
<td>Flammable and combustible liquids, general</td>
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<tr>
<td>5704.3.3.1</td>
<td>Indoor storage of flammable and combustible liquids</td>
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<td>5704.3.7.5.2</td>
<td>Liquid storage rooms for flammable and combustible liquids</td>
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<tr>
<td>5705.4.9</td>
<td>Solvent distillation units</td>
</tr>
<tr>
<td>5706.2.7</td>
<td>Farms and construction sites—flammable and combustible liquids storage</td>
</tr>
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<td>5706.4.10.1</td>
<td>Bulk plants and terminals for flammable and combustible liquids</td>
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<tr>
<td>5706.5.4.5</td>
<td>Commercial, industrial, governmental or manufacturing establishments—fuel dispensing</td>
</tr>
<tr>
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<td>Tank vehicles for flammable and combustible liquids</td>
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<tr>
<td>5906.5.7</td>
<td>Flammable solids</td>
</tr>
<tr>
<td>6108.2</td>
<td>LP-gas</td>
</tr>
<tr>
<td>6303.1.4</td>
<td>Oxidizers (pool chemicals)</td>
</tr>
</tbody>
</table>

6. Where required by the sections indicated in Table 906.1.

6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.

906.1.2 Extinguishers near oxidizers. Minimum 2A water portable fire extinguishers shall be provided in areas where oxidizers that can release chlorine are stored. The placement and use of dry chemical extinguishers containing ammonium compounds (Class A:B:C) is prohibited in areas where oxidizers that can release chlorine are stored. Halon extinguishers shall not be used in areas where oxidizers are stored.

906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and NFPA 10, or other nationally recognized standards.

Exceptions:

1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.

2. Thirty-day inspections shall not be required and maintenance shall be allowed to be once every 3 years for dry-chemical or halogenated agent portable fire extinguishers that are supervised by a listed and approved electronic monitoring device, provided that all of the following conditions are met:

2.1. Electronic monitoring shall confirm that extinguishers are properly positioned, properly charged and unobstructed.

2.2. Loss of power or circuit continuity to the electronic monitoring device shall initiate a trouble signal.

2.3. The extinguishers shall be installed inside of a building or cabinet in a noncorrosive environment.

2.4. Electronic monitoring devices and supervisory circuits shall be tested every 3 years when extinguisher maintenance is performed.

2.5. A written log of required hydrostatic test dates for extinguishers shall be maintained by the owner to verify that hydrostatic tests are conducted at the frequency required by NFPA 10.

3. In Group I-3, portable fire extinguishers shall be permitted to be located at staff locations.

906.2.1 Certification of service personnel for portable fire extinguishers. Companies providing or conducting maintenance on portable fire extinguishers shall possess a valid certificate issued by an approved governmental agency, or other approved organization for the type of work performed.

906.3 Size and distribution. The size and distribution of portable fire extinguishers shall be in accordance with Sections 906.3.1 through 906.3.4.

TABLE 906.3(1)
FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS
FIRE PROTECTION SYSTEMS

For Maximum floor area per unit of A

<table>
<thead>
<tr>
<th>TYPE OF HAZARD</th>
<th>BASIC MINIMUM EXTINGUISHER RATING</th>
<th>MAXIMUM TRAVEL DISTANCE TO EXTINGUISHERS (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light (Low)</td>
<td>5-B</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>10-B</td>
<td>50</td>
</tr>
<tr>
<td>Ordinary (Moderate)</td>
<td>10-B</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>20-B</td>
<td>50</td>
</tr>
<tr>
<td>Extra (High)</td>
<td>40-B</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>80-B</td>
<td>50</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. For requirements on water-soluble flammable liquids and alternative sizing criteria, see Section 5.5 of NFPA 10.

906.3.3 Class C fire hazards. Portable fire extinguishers for Class C fire hazards shall be selected and placed on the basis of the anticipated Class A or B hazard.

906.3.4 Class D fire hazards. Portable fire extinguishers for occupancies involving combustible metals shall be selected and placed in accordance with NFPA 10.

906.4 Cooking equipment fires. Fire extinguishers provided for the protection of cooking equipment shall be of an approved type compatible with the automatic fire-extinguishing system agent. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher in accordance with Sections 906.1, Item 2, 906.4.1 and 906.4.2 as applicable.

906.4.1 Portable fire extinguishers for solid fuel cooking appliances. Solid fuel cooking appliances, whether or not under a hood, with fireboxes 5 cubic feet (0.14 m3) or less in volume shall have a minimum 2.5-gallon (9 L) or two 1.5-gallon (6 L) Class K wet-chemical portable fire extinguishers located in accordance with Section 906.1.

906.4.2 Class K portable fire extinguishers for deep fat fryers. Where hazard areas include deep fat fryers, listed Class K portable fire extinguishers shall be provided as follows:

1. For up to four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity.
2. For every additional group of four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one additional Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity shall be provided.
3. For individual fryers exceeding 6 square feet (0.55 m2) in surface area: Class K portable fire extinguishers shall be installed in accordance with the extinguisher manufacturer’s recommendations.

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.

906.6 Unobstructed and unobscured. Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of extinguishers.

906.7 Hangers and brackets. Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangers or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer’s installation instructions.

906.8 Cabinets. Cabinets used to house portable fire extinguishers shall not be locked.

Exceptions:

1. Where portable fire extinguishers subject to malicious use or damage are provided with a means of ready access.
2. In Group I-3 occupancies and in mental health areas in Group I-2 occupancies, access to portable fire extinguishers shall be permitted to be locked or to be located in staff locations provided that the staff has keys.

906.9 Extinguisher installation. The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3.

906.9.1 Extinguishers weighing 40 pounds or less. Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 5 feet (1524 mm) above the floor.
906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 3.5 feet (1067 mm) above the floor.

906.9.3 Floor clearance. The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall be not less than 4 inches (102 mm).

906.10 Wheeled units. Wheeled fire extinguishers shall be conspicuously located in a designated location.

SECTION 907
FIRE ALARM AND DETECTION SYSTEMS

907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

907.1.1 Construction documents. Construction documents for fire alarm systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code, the International Building Code, and relevant laws, ordinances, rules and regulations, as determined by the fire code official.

For fire alarm and other code regulated alarm systems, the following are considered to be professional registrant activities in accordance with the requirements of the Arizona Board of Technical Registration:

- Determine the system type;
- Determine the applicable codes and standards and appropriate engineering practices;
- Determine device types and locations;
- Prepare generalized riser diagram;
- Coordinate and interface with other systems;
- Develop system specifications

Exceptions:

- Where the modification of fire protection alarm systems does not require mathematical calculations or hazard analysis.
- Where items 1-6 are addressed in a stamped narrative or single page the remaining fire alarm shop drawings may be prepared by a NICET 3 or 4.

907.1.2 Fire alarm shop drawings. Shop drawings for fire alarm systems shall be prepared in accordance with NFPA 72 and submitted for review and approval prior to system installation and shall include, but not be limited to, all of the following:

- A floor plan that indicates the use of all rooms
- Locations of alarm-initiating devices
- Locations of alarm notification appliances, including candle ratings for visible alarm notification appliances
- Location of fire alarm control unit, transponders and notification power supplies

5. Annunciators
6. Power connection
7. Battery calculations
8. Conductor type and sizes
9. Voltage drop calculations The two predominant methods of voltage drop calculation are point to point and end of line lump sum. Center loading of the circuits is also an acceptable method.

10. Manufacturers’ data sheets indicating model numbers and listing information for equipment, devices and materials.
11. Details of ceiling height and construction
12. The interface of fire safety control functions
13. Classification of the supervising station
14. Design minimum audibility level for occupant notification
15. Emergency voice alarm communication plans shall include the following:
16. A graphic depiction of acoustically designed spaces,
17. A written description of acoustically designed spaces,
18. A graphic depiction of areas that require intelligibility testing and areas that do not require intelligibility testing,
19. A written description of areas that require intelligibility testing and areas that do not require intelligibility testing

907.1.3 Equipment. Systems and components shall be listed and approved for the purpose for which they are installed.

907.1.4 Monitoring. Fire alarm systems shall be monitored by an approved supervising station in accordance with Section 903.4.1.

Exceptions:

- Single and multiple-station smoke alarms required by Section 907.2.10.
- Smoke detectors in Group R-3 and I-3 occupancies.
- Supervisory service is not required for automatic sprinkler systems in one-and two-family dwellings other than Group R-4s.
- Proprietary service that will initiate an audible signal at a constantly attended location in accordance with 903.4.1.4.

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. For guidance on when required by Phoenix Fire Department in NFPA 72 see the NFPA 72 Authority Having Jurisdiction Policy.

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
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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 open to the public.

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the occupant load due to the assembly occupancy is 300 or more, or where the Group A occupant load is more than 100 persons above or below the lowest level of exit discharge. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the International Building Code shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.2 Group B. A manual fire alarm system shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B occupant load of all floors is 500 or more.
2. The Group B occupant load is more than 100 persons above or below the lowest level of exit discharge.
3. The fire area contains an ambulatory care facility.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.2.1 Ambulatory care facilities. Fire areas containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 provided that occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.3 Group E. A manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies. Where automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.

Exceptions:

1. A manual fire alarm system is not required in Group E occupancies with an occupant load of 50 or less.
2. Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with occupant loads of 100 or less, provided that activation of the manual fire alarm system initiates an approved occupant notification signal in accordance with Section 907.5.
3. Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:
   3.1. Interior corridors are protected by smoke detectors.
   3.2. Auditoriums, cafeterias, gymnasiums and similar areas are protected by heat detectors or other approved detection devices.
   3.3. Shops and laboratories involving dusts or vapors are protected by heat detectors or other approved detection devices.
4. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:
   4.1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
   4.2. The emergency voice/alarm communication system will activate on sprinkler water flow.
   4.3. Manual activation is provided from a
normally occupied location.

907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more stories in height.
2. The Group F occupancy has a combined occupant load of 500 or more above or below the lowest level of exit discharge.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.5 Group H. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group H-5 occupancies and in occupancies used for the manufacture of organic coatings. An automatic smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers in accordance with Chapters 60, 62 and 63, respectively.

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 that such manual fire alarm boxes are visible and provided with ready access, and 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.

907.2.6.1 Group I-1. An automatic smoke detection system shall be installed in corridors, waiting areas open to corridors and habitable spaces other than sleeping units and kitchens. The system shall be activated in accordance with Section 907.5.

Exceptions:

1. For Group I-1 occupancies, smoke detection in habitable spaces is not required where the facility is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Smoke detection is not required for exterior balconies.

907.2.6.1.1 Smoke alarms. Single and multiple station smoke alarms shall be installed in accordance with Section 907.2.11.

907.2.6.2 Group I-2. An automatic smoke detection system shall be installed in corridors in Group I-2, Condition 1 facilities and spaces permitted to be open to the corridors by Section 407.2 of the International Building Code. The system shall be activated in accordance with Section 907.4. Group I-2, Condition 2 occupancies shall be equipped with an automatic smoke detection system as required in Section 407 of the International Building Code.

Exceptions:

1. Corridor smoke detection is not required in smoke compartments that contain sleeping units where such units are provided with smoke detectors that comply with UL 268. Such detectors shall provide a visual display on the corridor side of each sleeping unit and shall provide an audible and visual alarm at the care providers’ station attending each unit.
2. Corridor smoke detection is not required in smoke compartments that contain sleeping units where sleeping unit doors are equipped with automatic door-closing devices with integral smoke detectors on the unit sides installed in accordance with their listing, provided that the integral detectors perform the required alerting function.

907.2.6.3 Group I-3 occupancies. Group I-3 occupancies shall be equipped with a manual fire alarm system and automatic smoke detection system installed for alerting staff.

907.2.6.3.1 System initiation. Actuation of an automatic fire-extinguishing system, automatic sprinkler system, a manual fire alarm box or a fire detector shall initiate an approved fire alarm signal that automatically notifies staff.

907.2.6.3.2 Manual fire alarm boxes. Manual fire alarm boxes are not required to be located in accordance with Section 907.4.2 where the fire alarm boxes are provided at staff-attended locations having direct supervision over areas where manual fire alarm boxes have been omitted.

907.2.6.3.2.1 Manual fire alarms boxes in detainee areas. Manual fire alarm boxes are allowed to be locked in areas occupied by detainees, provided that staff members are present within the subject area and have keys readily available to operate the manual fire alarm boxes.

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 open to residents.
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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 where 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.

907.2.7 Group M. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M occupant load of all floors is 500 or more persons.

2. The Group M occupant load is more than 100 persons above or below the lowest level of exit discharge.

Exceptions:

1. A manual fire alarm system is not required in covered or open mall buildings complying with Section 402 of the International Building Code.

2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

907.2.7.1 Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an alarm signal is activated at a constantly attended location from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

907.2.8 Group R-1. Fire alarm systems and smoke alarms shall be installed in Group R-1 occupancies as required in Sections 907.2.8.1 through 907.2.8.3.

907.2.8.1 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-1 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all dwelling units or sleeping units and contiguous attic and crawl spaces 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 when 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. No fewer than one manual fire alarm box is installed at an approved location.

907.2.8.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior corridors serving sleeping units.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

907.2.8.3 Smoke alarms. Single and multiple-station smoke alarms shall be installed in accordance with Section 907.2.10.

907.2.9 Group R-2. Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in Sections 907.2.9.1 and 907.2.9.3.

907.2.9.1 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-2 occupancies where any of the following conditions apply:

1. Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge.

2. Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit.

3. The building contains more than 16 dwelling units or sleeping units.

Exceptions:

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

2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will...
automatically activate throughout the notification zones upon a sprinkler water flow.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1027.6, Exception 3.

907.2.9.2 Smoke alarms. Single and multiple-station smoke alarms shall be installed in accordance with Section 907.2.10.

907.2.9.3 Group R-2 college and university buildings. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies operated by a college and university for student or staff housing in all of the following locations:

1. Common spaces outside of dwelling units and sleeping units.
2. Laundry rooms, mechanical equipment rooms, and storage rooms.
3. All interior corridors serving sleeping units or dwelling units.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units or dwelling units and where each sleeping unit or dwelling unit either has a means of egress door opening directly to an exterior exit access that leads directly to an exit or a means of egress door opening directly to an exit.

Required smoke alarms in dwelling units and sleeping units in Group R-2 occupancies operated by a college or university for student or staff housing shall be interconnected with the fire alarm system in accordance with NFPA 72.

907.2.10 Single-and multiple-station smoke alarms. Listed single and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.10.1 through 907.2.10.7 and NFPA 72.

907.2.10.1 Group R-1. Single or multiple-station smoke alarms shall be installed in all of the following locations in Group R1:

1. In sleeping areas.
2. In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.
3. In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

907.2.10.2 Groups R-2, R-3, R-4 and I-1. Single or multiple-station smoke alarms shall be installed and maintained in Groups R-2, R-3, R-4 and I-1 regardless of occupant load at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

907.2.10.3 Installation near cooking appliances. Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section 907.2.10.1 or 907.2.10.2:

1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.
2. Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.
3. Photoelectric smoke alarms shall not be installed less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance.

907.2.10.4 Installation near bathrooms. Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section 907.2.10.1 or 907.2.10.2.

907.2.10.5 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R or I-1 occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

907.2.10.6 Power source. In new construction, required smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery back-up shall be connected to an emergency electrical system in accordance with Section 604. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.
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Exception: Smoke alarms are not required to be equipped with battery backup where they are connected to an emergency electrical system that complies with Section 604.

907.2.10.7 Smoke detection system. Smoke detectors listed in accordance with UL 268 and provided as part of the building fire alarm system shall be an acceptable alternative to single and multiple-station smoke alarms and shall comply with the following:

1. The fire alarm system shall comply with all applicable requirements in Section 907.
2. Activation of a smoke detector in a dwelling unit or sleeping unit shall initiate alarm notification in the dwelling unit or sleeping unit in accordance with Section 907.5.2.
3. Activation of a smoke detector in a dwelling unit or sleeping unit shall not activate alarm notification appliances outside of the dwelling unit or sleeping unit, provided that a supervisory signal is generated and monitored in accordance with Section 907.6.6.

907.2.11 Special amusement buildings. An automatic smoke detection system shall be provided in special amusement buildings in accordance with Sections 907.2.11.1 through 907.2.11.3.

907.2.11.1 Alarm. Activation of any single smoke detector, the automatic sprinkler system or any other automatic fire detection device shall immediately activate an audible and visible alarm at the building at a constantly attended location from which emergency action can be initiated, including the capability of manual initiation of requirements in Section 907.2.11.2.

907.2.11.2 System response. The activation of two or more smoke detectors, a single smoke detector equipped with an alarm verification feature, the automatic sprinkler system or other approved fire detection device shall automatically do all of the following:

1. Cause illumination of the means of egress with light of not less than 1 footcandle (11 lux) at the walking surface level.
2. Stop any conflicting or confusing sounds and visual distractions.
3. Activate an approved directional exit marking that will become apparent in an emergency.
4. Activate a prerecorded message, audible throughout the special amusement building, instructing patrons to proceed to the nearest exit. Alarm signals used in conjunction with the prerecorded message shall produce a sound that is distinctive from other sounds used during normal operation.

907.2.11.3 Emergency voice/alarm communication system. An emergency voice/alarm communication system, which is allowed to serve as a public address system, shall be installed in accordance with Section 907.5.2.2 and be audible throughout the entire special amusement building.

907.2.12 High-rise buildings. High-rise buildings shall be provided with an automatic smoke detection system in accordance with Section 907.2.12.1, a fire department communication system in accordance with Section 907.2.12.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

Exceptions:

1. Airport traffic control towers in accordance with Section 907.2.21 of this code and Section 412 of the International Building Code.
2. Open parking garages in accordance with Section 406.5 of the International Building Code.
4. Low-hazard special occupancies in accordance with Section 503.1.1 of the International Building Code.
6. In Group I-1 and I-2 occupancies, the alarm shall sound at a constantly attended location and occupant notification shall be broadcast by the emergency voice/alarm communication system.

907.2.12.1 Automatic smoke detection. Automatic smoke detection in high-rise buildings shall be in accordance with Sections 907.2.12.1.1 and 907.2.12.1.2.

907.2.12.1.1 Area smoke detection. Area smoke detectors shall be provided in accordance with this section. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2. In addition to smoke detectors required by Sections 907.2.1 through 907.2.9, smoke detectors shall be located as follows:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room that is not provided with sprinkler protection.
2. In each elevator machine room, machinery space, control room and control space and in elevator lobbies.

907.2.12.1.2 Duct smoke detection. Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

1. In the main return air and exhaust air plenum of each air conditioning system having a capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m³/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
2. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air conditioning system. In Group R1 and R2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m³/s) and serving not more than 10 air inlet openings.

907.2.12.2 Fire department communication system. Where a wired communication system is approved in lieu of an emergency responder radio coverage system in
accordance with Section 510, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 and shall operate between a fire command center complying with Section 508, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside interior exit stairways. The fire department communication device shall be provided at each floor level within the interior exit stairway.

907.2.12.3 Multiple-channel voice evacuation. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, voice evacuation systems for high-rise buildings shall be multiple-channel systems.

907.2.13 Atriums connecting more than two stories. A fire alarm system shall be installed in occupancies with an atrium that connects more than two stories, with smoke detection in locations required by a rational analysis in Section 909.4 and in accordance with the system operation requirements in Section 909.17. The system shall be activated in accordance with Section 907.5. Such occupancies in Group A, E or M shall be provided with an emergency voice/alarms alarm communication system complying with the requirements of Section 907.5.2.2.

907.2.14 High-piled combustible storage areas. An automatic smoke detection system shall be installed throughout high-piled combustible storage areas where required by Section 3206.5.

907.2.15 Aerosol storage uses. Aerosol product rooms and general-purpose warehouses containing aerosol products shall be provided with an approved manual fire alarm system where required by this code.

907.2.16 Lumber, wood structural panel and veneer mills. Lumber, wood structural panel and veneer mills shall be provided with a manual fire alarm system.

907.2.17 Underground buildings with smoke control systems. Where a smoke control system is installed in an underground building in accordance with the International Building Code, automatic smoke detectors shall be provided in accordance with Section 907.2.17.1.

907.2.17.1 Smoke detectors. Not fewer than one smoke detector listed for the intended purpose shall be installed in all of the following areas:

1. Mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar rooms.
2. Elevator lobbies.
3. The main return and exhaust air plenum of each air conditioning system serving more than one story and located in a serviceable area downstream of the last duct inlet.
4. Each connection to a vertical duct or riser serving two or more floors from return air ducts or plenums of heating, ventilating and air conditioning systems, except that in Group R occupancies, a listed smoke detector is allowed to be used in return air risers only at not more than 5,000 cfm (2.4 m³/s) and serving no more than 10 air inlet openings.

907.2.17.2 Alarm required. Activation of the smoke control system shall activate an audible alarm at a constantly attended location.

907.2.18 Deep underground buildings. Where the lowest level of a structure is more than 60 feet (18 288 mm) below the finished floor of the lowest level of exit discharge, the structure shall be equipped throughout with a manual fire alarm system, including an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

907.2.19 Covered and open mall buildings. Where the total floor area exceeds 50,000 square feet (4645 m²) 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. Access to emergency voice/alarm communication systems serving a mall, required or otherwise, shall be provided for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

907.2.20 Residential aircraft hangars. Not fewer than one single-station smoke alarm shall be installed within a residential aircraft hangar as defined in Chapter 2 of the International Building Code and shall be interconnected into the residential smoke alarm or other sounding device to provide an alarm that will be audible in all sleeping areas of the dwelling.

907.2.21 Airport traffic control towers. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in airport control towers in accordance with Sections 907.2.21.1 and 907.2.21.2.

Exception: Audible appliances shall not be installed within the control tower cab.

907.2.21.1 Airport traffic control towers with multiple exits and automatic sprinklers. Airport traffic control towers with multiple exits and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 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. Outside each opening into interior exit stairways.
5. Along the single means of egress permitted from observation levels.
6. Outside each opening into the single means of egress permitted from observation levels.

907.2.21.2 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.
7. Utility shafts where access to smoke detectors
FIRE PROTECTION SYSTEMS can be provided.

907.2.22 Battery rooms. An automatic smoke detection system shall be installed in areas containing stationary storage battery systems as required in Section 1206.2.

907.2.23 Capacitor energy storage systems. An automatic smoke detection system shall be installed in areas containing capacitor energy storage systems as required by Section 1206.3.

907.3 Fire safety functions. Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building’s fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

907.3.1 Duct smoke detectors. Smoke detectors installed in ducts shall be listed for the air velocity, temperature and humidity present in the duct. Duct smoke detectors shall be connected to the building’s fire alarm control unit where a fire alarm system is required by Section 907.2. Activation of a duct smoke detector shall initiate a visible and audible supervisory signal at a constantly attended location and shall perform the intended fire safety function in accordance with this code and the International Mechanical Code. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal and not as a fire alarm. They shall not be used as a substitute for required open area detection.

Exceptions:
1. The supervisory signal at a constantly attended location is not required where duct smoke detectors activate the building’s alarm notification appliances.
2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and audible supervisory signal in an approved location. Smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.

907.3.2 Special locking systems. Where special locking systems are installed on means of egress doors in accordance with Section 1010.1.9.6 or 1010.1.9.7, an automatic detection system shall be installed as required by that section.

907.3.3 Elevator emergency operation. Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with the provisions of ASME A17.1/CSA B44 and NFPA 72.

907.3.4 Wiring. The wiring to the auxiliary devices and equipment used to accomplish the fire safety functions shall be monitored for integrity in accordance with NFPA 72.

907.3.5 Kitchen hood systems. When kitchen hood systems are installed in buildings equipped with a fire alarm system designed to notify the building occupants, actuation of the hood system shall initiate the fire alarm system.

907.4 Initiating devices. Where manual or automatic alarm initiation is required as part of a fire alarm system, the initiating devices shall be installed in accordance with Sections 907.4.1 through 907.4.3.1.

907.4.1 Protection of fire alarm control unit. In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

Exception: Where ambient conditions prohibit installation of smoke detector, a heat detector shall be permitted.

907.4.2 Manual fire alarm boxes. Where a manual fire alarm system is required by another section of this code, it shall be activated by fire alarm boxes installed in accordance with Sections 907.4.2.1 through 907.4.2.6.

907.4.2.1 Location. Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each exit. In buildings not protected by an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, additional manual fire alarm boxes shall be located so that the exit access distance of travel to the nearest box does not exceed 200 feet (60 960 mm).

907.4.2.2 Height. The height of the manual fire alarm boxes shall be not less than 42 inches (1067 mm) and not more than 48 inches (1372 mm) measured vertically, from the floor level to the activating handle or lever of the box.

907.4.2.3 Color. Manual fire alarm boxes shall be red in color.

907.4.2.4 Signs. Where fire alarm systems are not monitored by a supervising station, an approved permanent sign shall be installed adjacent to each manual fire alarm box that reads: WHEN ALARM SOUNDS—CALL FIRE DEPARTMENT.

Exception: Where the manufacturer has permanently provided this information on the manual fire alarm box.

907.4.2.5 Protective covers. The fire code official is authorized to require the installation of listed manual fire alarm box protective covers to prevent malicious false alarms or to provide the manual fire alarm box with protection from physical damage. The protective cover shall be transparent or red in color with a transparent face to permit visibility of the manual fire alarm box. Each cover shall include proper operating instructions. A protective cover that emits a local alarm signal shall not be installed unless approved. Protective covers shall not project more than that permitted by Section 1003.3.3.

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

907.4.3 Automatic smoke detection. Where an automatic smoke detection system is required it shall utilize smoke detectors unless ambient conditions prohibit such an installation. In spaces where smoke detectors cannot be utilized due to ambient conditions, approved automatic heat detectors shall be permitted.
907.4.3.1 Automatic sprinkler system. For conditions other than specific fire safety functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be approved as automatic heat detection.

907.5 Occupant notification systems. A fire alarm system shall annunciate at the fire alarm control unit and shall initiate occupant notification upon activation, in accordance with Sections 907.5.1 through 907.5.2.3.3. Where a fire alarm system is required by another section of this code, it shall be activated by:

1. Automatic fire detectors.
2. Automatic sprinkler system waterflow devices.
4. Automatic fire-extinguishing systems.

Exception: Where notification systems are allowed elsewhere in Section 907 to annunciate at a constantly attended location.

907.5.1 Presignal feature. A presignal feature shall not be installed unless approved by the fire code official and the fire department. Where a presignal feature is provided, a signal shall be annunciated at a constantly attended location approved by the fire code official, in order that occupant notification can be activated in the event of fire or other emergency.

907.5.2 Alarm notification appliances. Alarm notification appliances shall be provided and shall be listed for their purpose.

907.5.2.1 Audible alarms. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm. Group A, B, E, F, H, I, M, R, S and U occupancies shall meet Public Mode Audible Requirements of NFPA 72.

Exceptions:

1. Audible alarm notification appliances are not required in critical care areas of Group I-2 occupancies that are in compliance with Section 907.2.6, Exception 2.
2. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2 suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout the suite in of Group I-2 occupancies. Occupancies that are in compliance with Section 907.2.6, Exception 2.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section 3008.9.1 of the International Building Code shall be connected to a separate notification zone for manual paging only.

4. Group I occupancies shall be allowed to use Private Mode Audible Requirements of NFPA 72, when approved by appeal to the fire marshal. Registered design professionals shall specify on plans and in construction documents the specific mode for each area of the occupancy.

5. When the private mode is specified, the designer shall provide written documentation for the use of this mode when approved by appeal to the fire marshal.

907.5.2.1 Average sound pressure. The audible alarm notification appliances shall provide and maintain a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building.

907.5.2.2 Maximum sound pressure. The maximum sound pressure level for audible alarm notification appliances shall be 110 dBA at the minimum hearing distance from the audible appliance. Where the average ambient noise is greater than 95 dBA, visible alarm notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

907.5.2.2 Emergency voice/alarm communication systems. Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. The operation of any automatic fire detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving approved information and directions for a general or staged evacuation in accordance with the building’s fire safety and evacuation plans required by Section 404. In high-rise buildings, the system shall operate on at least the alarming floor, the floor above and the two floors below. Speakers shall be provided throughout the building by paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. Interior Exit stairways.
3. Each floor.
4. Areas of refuge as defined in Chapter 2.

Exception: In Group I-1 and I-2 occupancies, the alarm shall sound in a constantly attended area and a general occupant notification shall be broadcast over the overhead page.

907.5.2.2.1 Manual override. A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.

907.5.2.2.2 Live voice messages. The emergency voice/alarm communication system shall also have the capability to broadcast live voice messages by paging zones on a selective and all-call basis.

907.5.2.2.3 Alternative uses. The emergency voice/alarm communication system shall be allowed to be
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used for other announcements, provided that manual fire alarm use takes precedence over any other use.

907.5.2.2.4 Emergency voice / alarm communication captions. Where stadiums, arenas and grandstands have 15,000 fixed seats or more and provide audible public announcements, the emergency/voice alarm communication system shall provide prerecorded or real-time captions. Prerecorded or live emergency captions shall be from an approved location constantly attended by personnel trained to respond to an emergency.

907.5.2.2.5 Emergency power. Emergency voice/ alarm communications systems shall be provided with an approved emergency power in accordance with Section 604. The system shall be capable of powering the required load for a duration of not less than 24 hours, as required in NFPR 72.

907.5.2.3 Visible alarms. Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through 907.5.2.3.3.

Exceptions:

1. Visible alarm notification appliances are not required in alterations, that do not involve changing the floor plan by the addition, removal, or relocation of walls or result in a change in occupancy classification. Except where an existing fire alarm system is modified, upgraded or replaced, or a new fire alarm system is installed.

2. Visible alarm notification appliances shall not be required in exits as defined in Chapter 2.

3. Visible alarm notification appliances are not in critical care areas of Group I-2 occupancies that are in compliance with Section 907.2.6, Exception 2.

4. Visual alarms are not required in operating rooms or treatment rooms of Group I occupancies where patients are under direct supervision by trained facility personnel.

907.5.2.3.1 Public and common areas. Visible alarm notification appliances shall be provided in public areas and common areas.

907.5.2.3.2 Groups I-1 and R-1. Habitable spaces in dwelling units and sleeping units in Group I-1 and R-1 occupancies in accordance with Table 907.5.2.3.2 shall be provided with visible alarm notification. Visible alarms shall be activated by the in-room smoke alarm and the building fire alarm system.

<table>
<thead>
<tr>
<th>NUMBER OF SLEEPING UNITS</th>
<th>SLEEPING ACCOMMODATIONS WITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 to 25</td>
<td>2</td>
</tr>
<tr>
<td>26 to 50</td>
<td>4</td>
</tr>
<tr>
<td>51 to 75</td>
<td>7</td>
</tr>
<tr>
<td>76 to 100</td>
<td>9</td>
</tr>
<tr>
<td>101 to 150</td>
<td>12</td>
</tr>
</tbody>
</table>

907.5.2.3.3 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, each story that contains dwelling units and sleeping units shall be provided with the future capability to support visible alarm notification appliances in accordance with Chapter 10 of ICC A117.1. Such capability shall accommodate wired or wireless equipment. The future capability shall include one of the following:

1. The interconnection of the building fire alarm system with the unit smoke alarms.

2. The replacement of audible appliances with combination audible/visible appliances.

3. The future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.

907.6 Installation and monitoring. A fire alarm system shall be installed and monitored in accordance with Sections 907.6.1 through 907.6.6.3 and NFPA 72.

907.6.1 Wiring. Wiring shall comply with the requirements of NFPA 70 and NFPA 72. Wireless protection systems utilizing radio-frequency transmitting devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72.

907.6.2 Power supply. The primary and secondary power supply for the fire alarm system shall be provided in accordance with NFPA 72.

Exception: Backup power for single-station and multiple-station smoke alarms as required in Section 907.2.10.6.

907.6.3 Initiating device identification. The fire alarm system shall identify the specific initiating device address, location, device type, floor level where applicable and status including indication of normal, alarm, trouble and supervisory status, as appropriate.

Exceptions:

1. 907.6.3 Fire alarm systems in single-story buildings less than 22,500 square feet (2090 m²) in area.

2. Fire alarm systems that only include manual fire alarm boxes, water flow initiating devices and not more than 10 additional alarm-initiating devices.

3. Special initiating devices that do not support individual device identification.

4. Fire alarm systems or devices that are replacing existing equipment.

907.6.3.1 Annunciation. The initiating device status shall be annunciated at an approved on-site location.

907.6.4 Zones. Each floor shall be zoned separately and a zone shall not exceed 22,500 square feet (2090 m²). The length of any zone shall not exceed 300 feet (91 440 mm) in
any direction.

Exception: Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13.

907.6.4.1 Zoning indicator panel. A zoning indicator panel and the associated controls shall be provided in an approved location. The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm-silencing switch.

907.6.4.2 High-rise buildings. In high-rise buildings, a separate zone by floor shall be provided for each of the following types of alarm-initiating devices where provided:

1. Smoke detectors.
2. Sprinkler water-flow devices.
4. Other approved types of automatic fire detection devices or suppression systems.

907.6.5 Access. Access shall be provided to each fire alarm device and notification appliance for periodic inspection, maintenance and testing.

907.6.6 Monitoring. Fire alarm systems required by this chapter or by the International Building Code shall be monitored by an approved supervising station in accordance with NFPA 72.

Exception: Monitoring by a supervising station is not required for:

1. Single and multiple-station smoke alarms required by Section 907.2.10.
2. Smoke detectors in Group I-3 occupancies.
3. Automatic sprinkler systems in one and two family dwellings.

907.6.6.1 Automatic telephone-dialing devices. Automatic telephone-dialing devices used to transmit an emergency alarm shall not be connected to any fire department telephone number unless approved by the fire chief.

907.6.6.2 Termination of monitoring service. Termination of fire alarm monitoring services shall be in accordance with Section 901.9.

907.6.6.3 Multi-tenant buildings with different addresses. The alarm monitoring station shall identify all addresses of buildings, floors or suites protected by a fire protection system and provide this information to the Phoenix Fire Department alarm room center.

907.7 Acceptance tests and completion. Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72.

907.7.1 Single and multiple-station alarm devices. When the installation of the alarm devices is complete, each device and interconnecting wiring for multiple-station alarm devices shall be tested in accordance with the smoke alarm provisions of NFPA 72.

907.7.2 Record of completion. A record of completion in accordance with NFPA 72 verifying that the system has been installed and tested in accordance with the approved plans and specifications shall be provided.

907.7.3 Instructions. Operating, testing and maintenance instructions and record drawings (“as built”) and equipment specifications shall be provided at an approved location.

907.8 Inspection, testing and maintenance. The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with Sections 907.8.1 through 907.8.5 and NFPA 72. Records of inspection, testing and maintenance shall be maintained.

907.8.1 Maintenance required. Where required for compliance with the provisions of this code, devices, equipment, systems, conditions, arrangements, levels of protection or other features shall thereafter be continuously maintained in accordance with applicable NFPA requirements. Maintenance shall be provided by qualified contractors to install, maintain, inspect and test fire alarm systems as directed by the fire code official.

The audible alarm notification appliances shall be maintained to provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of at least 60 seconds, whichever is greater, in every occupied space within the building.

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 inspection, testing and maintenance shall be maintained.

Exception: Devices or equipment that are inaccessible because of safety considerations shall be tested during scheduled shut-downs where approved by the fire code official, but not less than every 18 months.

907.8.3 Smoke detector sensitivity. Smoke detector sensitivity shall be checked within one year after installation and every alternate year thereafter. After the second calibration test, where sensitivity tests indicate that the detector has remained within its listed and marked sensitivity range (or 4-percent obscuration light gray smoke, if not marked), the length of time between calibration tests shall be permitted to be extended to a not more than 5 years. Where the frequency is extended, records of detector caused nuisance alarms and subsequent trends of these alarms shall be maintained. In zones or areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

907.8.4 Sensitivity test method. To verify that each smoke detector is within its listed and marked sensitivity range, it shall be tested using one of the following methods:

1. A calibrated test method.
2. The manufacturer’s calibrated sensitivity test instrument.
3. Listed control equipment arranged for the purpose;
4. A smoke detector/control unit arrangement whereby the detector causes a signal at the control unit where the detector’s sensitivity is outside its acceptable sensitivity range.
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5. Another calibrated sensitivity test method acceptable to the fire code official.

Detectors found to have a sensitivity outside the listed and marked sensitivity range shall be cleaned and recalibrated or replaced.

Exceptions:

1. Detectors listed as field adjustable shall be permitted to be either adjusted within the listed and marked sensitivity range and cleaned and recalibrated or they shall be replaced.

2. This requirement shall not apply to single-station smoke alarms.

907.8.4.1 Sensitivity testing device. Smoke detector sensitivity shall not be tested or measured using a device that administers an unmeasured concentration of smoke or other aerosol into the detector.

907.8.5 Inspection, testing and maintenance. The building owner shall be responsible to maintain the fire and life safety systems in an operable condition at all times. Service personnel shall meet the qualification requirements of NFPA 72 for inspection, testing and maintenance and shall be a qualified contractor to install, maintain, inspect and test fire alarm systems. Records inspection, testing and maintenance shall be maintained.

907.9 Where required in existing buildings and structures. An approved fire alarm system shall be provided in existing buildings and structures where required in Chapter 11.

907.10 Smoke alarm maintenance. Smoke alarms shall be tested and maintained in accordance with the manufacturer’s instructions. Smoke alarms shall be replaced when they fail to respond to operability tests, or when they exceed 10 years from the date of manufacture, unless an earlier replacement is specified in the manufacturer’s published instructions.

SECTION 908
EMERGENCY ALARM SYSTEMS

908.1 Group H occupancies. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in Chapter 50.

908.2 Group H-5 occupancy. Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required in Section 2703.12. A continuous gas detection system shall be provided for HPM gases in accordance with Section 2703.13.

SECTION 909
SMOKE CONTROL SYSTEMS

909.1 Scope and purpose. This section applies to mechanical or passive smoke control systems where they are required for new buildings or portions thereof by provisions of the International Building Code or this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this section serve a different purpose than the smoke and heat venting provisions found in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the International Mechanical Code.

909.2 General design requirements. Buildings, structures, or parts thereof required by the International Building Code or this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.

909.3 Special inspection and test requirements. In addition to the ordinary inspection and test requirements that buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the construction documents shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as in Section 1704 of the International Building Code.

909.4 Analysis. A rational analysis supporting the types of smoke control systems to be employed, the methods of their operations, the systems supporting them, and the methods of construction to be utilized shall accompany the construction documents submission and include, but not be limited to, the items indicated in Sections 909.4.1 through 909.4.7.

909.4.1 Stack effect. The system shall be designed such that the maximum probable normal or reverse stack effect will not adversely interfere with the system’s capabilities. In determining the maximum probable stack effect, altitude, elevation, weather history and interior temperatures shall be used.

909.4.2 Temperature effect of fire. Buoyancy and expansion caused by the design fire in accordance with Section 909.9 shall be analyzed. The system shall be designed such that these effects do not adversely interfere with the system’s capabilities.

909.4.3 Wind effect. The design shall consider the adverse effects of wind. Such consideration shall be consistent with the wind-loading provisions of the International Building Code.

909.4.4 Systems. The design shall consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis shall include
all permutations of systems status. The design shall consider the effects of the fire on the heating, ventilating and air-conditioning systems.

909.4.5 Climate. The design shall consider the effects of low temperatures on systems, property and occupants. Air inlets and exhausts shall be located so as to prevent snow or ice blockage.

909.4.6 Duration of operation. All portions of active or engineered smoke control systems shall be capable of continued operation after detection of the fire event for a period of not less than either 20 minutes or 1.5 times the calculated egress time, whichever is greater.

909.4.7 Smoke control system interaction. The design shall consider the interaction effects of the operation of multiple smoke control systems for all design scenarios.

909.5 Smoke barrier construction. Smoke barriers required for passive smoke control and a smoke control system using the pressurization method shall comply with Section 709 the International Building Code. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls: \[ A/\overline{A_w} = 0.00100 \]
2. Interior exit stairways and ramps and exit passageways: \[ A/\overline{A_w} = 0.00035 \]
3. Enclosed exit access stairways and ramps and all other shafts: \[ A/\overline{A_w} = 0.00150 \]
4. Floors and roofs: \[ A/\overline{A_w} = 0.00050 \] where:
   \[ A = \text{Total leakage area, square feet (m}^2) \]
   \[ \overline{A} = \text{Unit floor or roof area of barrier, square feet (m}^2) \]
   \[ \overline{A_w} = \text{Unit wall area of barrier, square feet (m}^2) \]

The leakage area ratios shown do not include openings due to gaps around doors, and operable windows. The total leakage area of the smoke barrier shall be determined in accordance with Section 909.5.1 and tested in accordance with Section 909.5.2.

909.5.1 Total leakage area. Total leakage area of the barrier is the product of the smoke barrier gross area multiplied by the allowable leakage area ratio, plus the area of other openings such as gaps and operable windows.

909.5.2 Testing of leakage area. Compliance with the maximum total leakage area shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke control mode for mechanical smoke control systems. Passive smoke control systems tested using other approved means, such as door fan testing, shall be as approved by the fire code official.

909.5.3 Opening protection. Openings in smoke barriers shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by fire door assemblies complying with Section 716.5.3 of the International Building Code.

Exceptions:
1. Passive smoke control systems with automatic closing devices actuated by spot-type smoke detectors listed for releasing service installed in accordance with Section 907.3.
2. Fixed openings between smoke zones that are protected utilizing the airflow method.
3. In Group I-1, I-2, and ambulatory care facilities, where, a pair of opposite-swinging doors are installed across a corridor in accordance with Section 909.5.3.1 the doors shall not be required to be protected in accordance with Section 716 of the International Building Code. The doors shall be close-fitting within operational tolerances and shall not have a center mullion or undercuts in excess of \( \frac{3}{4} \) inch (19.1 mm) louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges and where permitted by manufacturer’s listing positive-latching devices are not required.
4. In Group I-2 and ambulatory care facilities, where such doors are special purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.1.4.3 and are automatic closing by smoke detection in accordance with Section 716.5.9.3 of the International Building Code.
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.

909.5.3.1 Group I-1, Group I-2 and ambulatory care facilities. In Group I-1, Group I-2 and ambulatory care facilities, where doors are installed across a corridor, the doors shall be automatic closing by smoke detection in accordance with Section 716.5.9.3 of the International Building Code and shall have a vision panel with fire protection rated glazing materials in fire protection rated frames, the area of which shall not exceed that tested.

909.5.3.2 Ducts and air transfer openings. Ducts and air transfer openings are required to be protected with a minimum Class II, 250°F (121°C) smoke damper complying with Section 717 of the International Building Code.

909.6 Pressurization method. The primary mechanical means of controlling smoke shall be by pressure differences across smoke barriers. Maintenance of a tenable environment is not required in the smoke-control zone of fire origin.

909.6.1 Minimum pressure difference. The minimum pressure difference across a smoke barrier shall be 0.05 inch water gage (0.0124 kPa) in fully sprinklered buildings.

In buildings allowed to be other than fully sprinklered, the smoke control system shall be designed to achieve pressure differences not less than two times the maximum calculated pressure difference produced by the design fire.

909.6.2 Maximum pressure difference. The maximum air pressure difference across a smoke barrier shall be
determined by required door-opening or closing forces. The actual force required to open exit doors when the system is in the smoke control mode shall be in accordance with Section 1010.1.3. Opening and closing forces for other doors shall be determined by standard engineering methods for the resolution of forces and reactions. The calculated force to set a side-hinged, swinging door in motion shall be determined by:

\[ F = F_{dc} + K(WA - P)/2(W - d) \]  
\[ \text{Equation 9-1} \]

where:
- \( A \) = Door area, square feet (m²).
- \( D \) = Distance from door handle to latch edge of door, feet (m).
- \( F \) = Total door opening force, pounds (N).
- \( F_{dc} \) = Force required to overcome closing device, pounds (N).
- \( K \) = Coefficient 5.2 (1.0).
- \( W \) = Door width, feet (m).
- \( -P \) = Design pressure difference, inches of water (Pa).

909.6.3 Pressurized stairways and elevator hoistways. Where stairways or elevator hoistways are pressurized, such pressurization systems shall comply with Section 909 as smoke control systems, in addition to the requirements of Section 909.21 of this code and Section 909.20 of the International Building Code.

909.7 Airflow design method. When approved by the fire code official, smoke migration through openings fixed in a permanently open position, which are located between smoke-control zones by the use of the airflow method, shall be permitted. The design airflow shall be in accordance with this section. Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects. Smoke control systems using the airflow method shall be designed in accordance with NFPA 92.

909.7.1 Prohibited conditions. This method shall not be employed where either the quantity of air or the velocity of the airflow will adversely affect other portions of the smoke control system, unduly intensify the fire, disrupt plume dynamics or interfere with exiting. In no case shall airflow toward the fire exceed 200 feet per minute (1.02 m/s). Where calculated airflow exceeds this limit, the airflow method shall not be used.

909.8 Exhaust method. Where approved by the fire code official, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. Smoke control systems using the exhaust method shall be designed in accordance with NFPA 92.

909.8.1 Smoke layer. The height of the lowest horizontal surface of the smoke layer interface shall be maintained not less than 6 feet (1829 mm) above a walking surface that forms a portion of a required egress system within the smoke zone.

909.9 Design fire. The design fire shall be based on a rational analysis performed by the registered design professional and approved by the fire code official. The design fire shall be based on the analysis in accordance with Section 909.4 and this section.

909.9.1 Factors considered. The engineering analysis shall include the characteristics of the fuel, fuel load, effects included by the fire, and whether the fire is likely to be steady or unsteady.

909.9.2 Design fire fuel. Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration.

909.9.3 Heat-release assumptions. The analysis shall make use of best available data from approved sources and shall not be based on excessively stringent limitations of combustible material.

909.9.4 Sprinkler effectiveness assumptions. A documented engineering analysis shall be provided for conditions that assume fire growth is halted at the time of sprinkler activation.

909.10 Equipment. Equipment including, but not limited to, fans, ducts, automatic dampers and balance dampers shall be suitable for their intended use, suitable for the probable exposure temperatures that the rational analysis indicates, and as approved by the fire code official.

909.10.1 Exhaust fans. Components of exhaust fans shall be rated and certified by the manufacturer for the probable temperature rise to which the components will be exposed. This temperature rise shall be computed by:

\[ T_s = (Q_c/mc) + (T_a) \]  
\[ \text{Equation 9-3} \]

where:
- \( c \) = Specific heat of smoke at smoke layer temperature, Btu/lb°F (kJ/kg °F).
- \( m \) = Exhaust rate, pounds per second (kg/s).
- \( Q_c \) = Convective heat output of fire, Btu/s (kW).
- \( T_a \) = Ambient temperature, °F (°K).
- \( T_s \) = Smoke temperature, °F (°K).

Exception: Reduced \( T_s \) as calculated based on the assurance of adequate dilution air.

909.10.2 Ducts. Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined in accordance with Section 909.10.1. Ducts shall be constructed and supported in accordance with the International Mechanical Code. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistance-rated structural elements of the building by substantial, noncombustible supports.

Exception: Flexible connections for the purpose of vibration isolation, complying with the International Mechanical Code and which are constructed of approved fire-resistance-rated materials.

909.10.3 Equipment, inlets and outlets. Equipment shall be located so as to not expose uninvolved portions of the
building to an additional fire hazard. Outside air inlets shall be located so as to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be so located as to minimize reintroduction of smoke into the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

**909.10.4 Automatic dampers.** Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be listed and conform to the requirements of approved recognized standards.

**909.10.5 Fans.** In addition to other requirements, belt driven fans shall have 1.5 times the number of belts required for the design duty with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated temperature. Calculations and manufacturer’s fan curves shall be part of the documentation procedures. Fans shall be supported and restrained by noncombustible devices in accordance with the structural design requirements of Chapter 16 of the International Building Code.

Motors driving fans shall not be operated beyond their nameplate horsepower (kilowatts) as determined from measurement of actual current draw and shall have a minimum service factor of 1.15.

**909.11 Standby power** Smoke control system shall be provided with standby in accordance with Section 604.

**909.11.1 Equipment room.** The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with 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.

**909.11.2 Power sources and power surges.** Elements of the smoke control system relying on volatile memories or the like shall be supplied with uninterruptable power sources of sufficient duration to span 15-minute primary power interruption. Elements of the smoke control system susceptible to power surges shall be suitably protected by conditioners, suppressors or other approved means.

**909.12 Detection and control systems.** Fire detection systems providing control input or output signals to mechanical smoke control systems or elements thereof shall comply with the requirements of Section 907. Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment.

**909.12.1 Verification.** Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override, the presence of power downstream of all disconnects. A preprogrammed weekly test sequence, shall report abnormal conditions audibly, visually and by printed report. The preprogrammed weekly test shall operate all devices, equipment, and components used for smoke control.

**Exception:** Where verification of individual components tested through the preprogrammed weekly testing sequence ill interfere with, and produce unwanted effects to, normal building operation, such individual components are permitted to be bypassed from the preprogrammed weekly testing, where approved by the fire code official and in accordance with both of the following:

1. Where the operation of components is bypassed from the preprogrammed weekly test, presence of power downstream of all disconnects shall be verified weekly by a listed control unit.

2. Testing of all components bypassed from the reprogrammed weekly test shall be in accordance with Section 909.20.6.

**909.12.2 Wiring.** In addition to meeting requirements of NFPA 70, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.

**909.12.3 Activation.** Smoke control systems shall be activated in accordance with this section.

**909.12.3.1 Pressurization, airflow or exhaust method.** Mechanical smoke control systems using the pressurization, airflow or exhaust method shall have completely automatic control.

**909.12.3.2 Passive method.** Passive smoke control systems actuated by approved spot-type detectors listed for releasing service shall be permitted.

**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 the fire department, and any smoke detectors required by the engineering analysis.

**909.13 Control air tubing.** Control air tubing shall be of sufficient size to meet the required response times. Tubing shall be flushed clean and dry prior to final connections and shall be adequately supported and protected from damage. Tubing passing through concrete or masonry shall be sleeved and protected from abrasion and electrolytic action.

**909.13.1 Materials.** Control air tubing shall be hard drawn copper, Type L, ACR in accordance with ASTM B 42, ASTM B 43, ASTM B 68, ASTM B 88, ASTM B 251 and ASTM B 280. Fittings shall be wrought copper or brass, solder type, in accordance with ASME B 16.18 or ASME B16.22. Changes in direction shall be made with appropriate tool bends. Brass compression-type fittings shall be used at final connection to devices; other joints shall be brazed using a BCuP5 brazing alloy with solids below 1,100°F (593°C) and liquidus below 1,500°F (816°C). Brazing flux shall be used on copper to brass joints only.

**Exception:** Nonmetallic tubing used within control panels and at the final connection to devices, provided all of the following conditions are met:

1. Tubing shall comply with the requirements of Section 602.2.1.3 of the International Mechanical Code.

2. Tubing and the connected device shall be
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completely enclosed within a galvanized or paint grade steel enclosure having a minimum thickness of 0.0296 inch (0.7534 mm) (No.22 gage). Entry to the enclosure shall be by copper tubing with a protective grommet of neoprene or Teflon or by suitable brass compression to male-barbed adapter.

3. Tubing shall be identified by appropriately documented coding.

4. Tubing shall be neatly tied and supported within enclosure. Tubing bridging cabinet and door or moveable device shall be of sufficient length to avoid tension and excessive stress. Tubing shall be protected against abrasion. Tubing serving devices on doors shall be fastened along hinges.

909.13.2 Isolation from other functions. Control tubing serving other than smoke control functions shall be isolated by automatic isolation valves or shall be an independent system.

909.13.3 Testing. Control air tubing shall be tested at three times the operating pressure for not less than 30 minutes without any noticeable loss in gauge pressure prior to final connection to devices.

909.14 Marking and identification. The detection and control systems shall be clearly marked at all junctions, accesses and terminations.

909.15 Control diagrams. Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the fire code official, the fire department and in the fire command center in a format and manner approved by the fire chief.

909.16 Fire-fighter’s smoke control panel. A fire-fighter’s smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. The panel shall be located in a fire command center complying with Section 508 in high-rise buildings or buildings with smoke-protected assembly seating. In all other buildings, the fire-fighter’s smoke control panel shall be installed in an approved location adjacent to the fire alarm control panel. The fire-fighter’s smoke control panel shall comply with Sections 909.16.1 through 909.16.3.

909.16.1 Smoke control systems. Fans within the building shall be shown on the fire-fighter’s control panel. A clear indication of the direction of airflow and the relationship of components shall be displayed. Status indicators shall be provided for all smoke control equipment, annunciated by fan and zone and by pilot-lamp-type indicators as follows:

1. Fans, dampers and other operating equipment in their normal status—WHITE.
2. Fans, dampers and other operating equipment in their off or closed status—RED.
3. Fans, dampers and other operating equipment in their on or open status—GREEN.
4. Fans, dampers and other operating equipment in a fault status—YELLOW/AMBER.

909.16.2 Smoke control panel. The fire-fighter’s control panel shall provide control capability over the complete smoke-control system equipment within the building as follows:

1. ON-AUTO-OFF control over each individual piece of operating smoke control equipment that can also be controlled from other sources within the building. This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke control purposes.
2. OPEN-AUTO-CLOSE control over individual dampers relating to smoke control and that are also controlled from other sources within the building.
3. ON-OFF or OPEN-CLOSE control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the fire-fighter’s control panel.

Exceptions:

1. Complex systems, where approved, where the controls and indicators are combined to control and indicate all elements of a single smoke zone as a unit.
2. Complex systems, where approved, where the control is accomplished by computer interface using approved, plain English commands.

909.16.3 Control action and priorities. The fire-fighter’s control panel actions shall be as follows:

1. ON-OFF and OPEN-CLOSE control actions shall have the highest priority of any control point within the building. Once issued from the fire-fighter’s control panel, no automatic or manual control from any other control point within the building shall contradict the control action. Where automatic means are provided to interrupt normal, nonemergency equipment operation or produce a specific result to safeguard the building or equipment (i.e., duct freezestats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices), such means shall be capable of being overridden by the fire-fighter’s control panel. The last control action as indicated by each fire-fighter’s control panel switch position shall prevail. In no case shall control actions require the smoke control system to assume more than one configuration at any one time.

Exception: Power disconnects required by NFPA 70.

2. Only the AUTO position of each three-position firefighter’s control panel switch shall allow automatic or manual control action from other control points within the building. The AUTO position shall be the NORMAL, nonemergency, building control position. Where a fire-fighter’s control panel is in the AUTO position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described in Section 909.16.1. Where directed by an automatic signal to assume an emergency condition, the NORMAL position shall become the emergency condition for that device or group of devices.
within the zone. Control actions shall not require the smoke control system to assume more than one configuration at any one time.

909.17 System response time. Smoke-control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. For purposes of smoke control, the fire-fighter’s control panel response time shall be the same for automatic or manual smoke control action initiated from any other building control point. The total response time, including that necessary for detection, shutdown of operating equipment and smoke control system startup, shall allow for full operational mode to be achieved before the conditions in the space exceed the design smoke condition. The system response time for each component and their sequential relationships shall be detailed in the required rational analysis and verification of their installed condition reported in the required final report.

909.18 Acceptance testing. Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required by other provisions of this code, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

909.18.1 Detection devices. Smoke or fire detectors that are a part of a smoke control system shall be tested in accordance with Chapter 9 in their installed condition. Where applicable, this testing shall include verification of airflow in both minimum and maximum conditions.

909.18.2 Ducts. Ducts that are part of a smoke control system shall be traversed using generally accepted practices to determine actual air quantities.

909.18.3 Dampers. Dampers shall be tested for function in their installed condition.

909.18.4 Inlets and outlets. Inlets and outlets shall be read using generally accepted practices to determine air quantities.

909.18.5 Fans. Fans shall be examined for correct rotation. Measurements of voltage, amperage, revolutions per minute and belt tension shall be made.

909.18.6 Smoke barriers. Measurements using inclined manometers or other approved calibrated measuring devices shall be made of the pressure differences across smoke barriers. Such measurements shall be conducted for each possible smoke control condition.

909.18.7 Controls. Each smoke zone equipped with an automatic-initiation device shall be put into operation by the actuation of one such device. Each additional device within the zone shall be verified to cause the same sequence without requiring the operation of fan motors in order to prevent damage. Control sequences shall be verified throughout the system, including verification of override from the fire-fighter’s control panel and simulation of standby power conditions.

909.18.8 Testing for smoke control. Smoke control systems shall be tested by a special inspector prior to the final acceptance test. The City of Phoenix Fire Department shall witness and approve the final acceptance test of the system.

909.18.8.1 Scope of testing. Testing shall be conducted in accordance with the following:

1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.

2. Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

909.18.8.2 Qualifications. Approved agencies for smoke control testing shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

909.18.8.3 Reports. A complete report of testing shall be prepared by the approved or special inspection agency. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible registered design professional and, when satisfied that the design intent has been achieved, the responsible registered design professional shall sign, seal and date the report.

909.18.8.3.1 Report filing. A copy of the final report shall be filed with the fire code official and an identical copy shall be maintained in an approved location at the building.

909.18.9 Identification and documentation. Charts, drawings and other documents identifying and locating each component of the smoke control system, and describing their proper function and maintenance requirements, shall be maintained on file at the building as an attachment to the report required by Section 909.18.8.3. Devices shall have an approved identifying tag or mark on them consistent with the other required documentation and shall be dated indicating the last time they were successfully tested and by whom.

909.19 System acceptance. Buildings, or portions thereof, required by this code to comply with this section shall not be issued a certificate of occupancy until such time that the fire code official determines that the provisions of this section have been fully complied with and that the fire department has received satisfactory instruction on the operation, both automatic and manual, of the system and a written maintenance program complying with the requirements of Section 909.20.1 has been submitted and approved by the fire code official.

Exception: In buildings of phased construction, a temporary certificate of occupancy, as approved by the fire code official, shall be allowed, provided that those portions of the building to be occupied meet the requirements of this section and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

909.20 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The
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System shall be maintained in accordance with the manufacturer’s instructions and Sections 909.20.1 through 909.20.6.

909.20.1 Schedule. A routine maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. A written schedule for routine maintenance and operational testing shall be established.

909.20.2 Records. Record of smoke control system testing and maintenance shall be maintained. The record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

909.20.3 Testing. Operational testing of the smoke control system shall include all equipment such as initiating devices, fans, dampers, controls, doors and windows.

909.20.4 Dedicated smoke control systems. Dedicated smoke control systems shall be operated for each control sequence semiannually. The system shall be tested under standby power conditions.

909.20.5 Nondedicated smoke control systems. Nondedicated smoke control systems shall be operated for each control sequence annually. The system shall be tested under standby power conditions.

909.20.6 Components bypassing weekly test. Where components of the smoke control system are bypassed by the preprogrammed weekly test required by Section 909.12.1, such components shall be tested semiannually. The system shall be tested under standby power conditions.

[BF] 909.21 Elevator hoistway pressurization alternative. Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with Sections 909.21.1 through 909.21.11.

[BF] 909.21.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differential shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a dwelling unit or sleeping unit.

2. Where an elevator opens into a lobby enclosed in accordance with Section 3007.6 or 3008.6 of the International Building Code, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.

3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:

   3.1. The fire floor.

   3.2. The two floors immediately below the fire floor.

   3.3. The floor immediately above the fire floor.

4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors is not required at the floor of recall with the doors open.

[BF] 909.21.1.1 Use of ventilation systems. Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces on the fire floor, two floors immediately below and one floor immediately above the fire floor to the building's exterior where necessary to maintain positive pressure relationships as required in Section 909.21.1 during operation of the elevator shaft pressurization system.

[BF] 909.21.2 Rational analysis. A rational analysis complying with Section 909.4 shall be submitted with the construction documents.

[BF] 909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same fire-resistance rating as required for the elevator shaft enclosure.

[BF] 909.21.4 Fan system. The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through 909.21.4.4.

[BF] 909.21.4.1 Fire resistance. Where located within the building, the fan system that provides the pressurization shall be protected with the same fire-resistance rating required for the elevator shaft enclosure.

[BF] 909.21.4.2 Smoke detection. The fan system shall be equipped with a smoke detector that will automatically shut down the fan system when smoke is detected within the system.

[BF] 909.21.4.3 Separate systems. A separate fan system shall be used for each elevator hoistway.

[BF] 909.21.4.4 Fan capacity. The supply fan shall be either adjustable with a capacity of not less than 1,000 cfm (0.4719 m³/s) per door, or that specified by a registered design professional to meet the requirements of a designed pressurization system.

[BF] 909.21.5 Standby power. The pressurization system shall be provided with standby power in accordance with Section 604.

[BF] 909.21.6 Activation of pressurization system. The elevator pressurization system shall be activated upon
activation of either the building fire alarm system or the elevator lobby smoke detectors. Where both a building fire alarm system and elevator lobby smoke detectors are present, each shall be independently capable of activating the pressurization system.

[BF] 909.21.7 Testing. Testing for performance shall be required in accordance with Section 909.18.8. System acceptance shall be in accordance with Section 909.19.

[BF] 909.21.8 Marking and identification. Detection and control systems shall be marked in accordance with Section 909.14.

[BF] 909.21.9 Control diagrams. Control diagrams shall be provided in accordance with Section 909.15.

[BF] 909.21.10 Control panel. A control panel complying with Section 909.16 shall be provided.

[BF] 909.21.11 System response time. Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.

SECTION 910
SMOKE AND HEAT REMOVAL

910.1 General. Where required by this code, smoke and heat vents or mechanical smoke removal systems shall conform to the requirements of this section.

910.2 Where required. Smoke and heat vents or a mechanical smoke removal system shall be installed as required by Sections 910.2.1 and 910.2.2

Exceptions:

1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.

2. Smoke and heat removal shall not be required areas of buildings equipped with early suppression fast-response (ESFR) sprinklers.

3. Smoke and heat removal shall not be required in areas buildings equipped with control mode special application sprinklers with a response time index of 50 (m · S)1/2 or less that are listed to control a fire in stored commodities with 12 or fewer sprinklers.

910.2.1 Group F-1 or S-1. Smoke and heat vents installed in accordance with Section 910.3 or a mechanical smoke removal system installed in accordance with Section 910.4 shall be installed in buildings and portions thereof used as a Group F-1 or S-1 occupancy having more than 50,000 square feet (4645 m²) of undivided area. In occupied portions of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the upper surface of the story is not a roof assembly, a mechanical smoke removal system in accordance with Section 910.4 shall be installed.

910.3 Smoke and heat vents. The design and installation of smoke and heat vents shall be in accordance with Sections 910.3.1 through 910.3.3. Smoke and heat vents shall operate automatically by actuation of a heat responsive device. The device shall be rated a minimum of 50°F (10°C) above the rating of the automatic sprinklers but not more than 386°F (197°C).

910.3.1 Listing and labeling. Smoke and heat vents shall be listed and labeled to indicate compliance with UL 793 or FM4430.

910.3.2 Smoke and heat vent locations. Smoke and heat vents shall be located 20 feet (6096 mm) or more from adjacent lot lines and fire walls and 10 feet (3048 mm) or more from fire barriers. Vents shall be uniformly located within the roof in the areas of the building where the vents are required to be installed by Section 910.2 with consideration given to roof pitch, sprinkler location and structural members.

910.3.3 Smoke heat vents area. The required aggregate area of smoke and heat vents shall be calculated as follows:

For buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1:

\[ A_{VR} = A_{VR} \times \frac{V}{9000} \]

(Equation 9-4)

where:

\[ A_{VR} = \text{The required aggregate vent area (ft}^2)\]

\[ V = \text{Volume (ft}^3) \text{ of the area that requires smoke removal.} \]

For unsprinklered buildings:

\[ A_{VR} = A_{VR} \times 50 \]

(Equation 9-5)

where:

\[ A_{VR} = \text{The required aggregate vent area (2 ft).} \]

\[ A_{VR} = \text{The area of the floor in the area that requires smoke removal} \]

910.4 Mechanical smoke removal systems. Mechanical smoke removal systems shall be designed and installed in accordance with Sections 910.4.1 through 910.4.7 in approved locations and shall be listed for the environmental conditions to which they will be subjected.

910.4.1 Automatic sprinklers required. The building shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

910.4.2 Exhaust fan construction. Exhaust fans that are part of a mechanical smoke removal system shall be rated for
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operation at 221°F (105°C). Exhaust fan motors shall be located outside of the exhaust fan air stream.

910.4.3 System design criteria. The mechanical smoke removal system shall be sized to exhaust the building at a minimum rate of two air changes per hour based upon the volume of the building or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute (14.2 m³/sec).

910.4.3.1 Makeup air. Makeup air openings shall be provided within 6 feet (1829 mm) of the floor level. Operation of makeup air openings shall be manual or automatic. The minimum gross area of makeup air inlets shall be 8 square feet per 1,000 cubic feet per minute (0.74 m² per 0.4719 m³/sec) of smoke exhaust.

910.4.4 Activation. The mechanical smoke removal system shall be activated by manual controls only.

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

910.4.6 Control wiring. Wiring for operation and control of mechanical smoke removal systems shall be connected ahead of the main disconnect in accordance with Section 701.12E of NFPA 70 and be protected against interior fire exposure to temperatures in excess of 1,000°F (538°C) for a period of not less than 15 minutes.

910.4.7 Controls. Where building air-handling and mechanical smoke removal systems are combined or where independent building air-handling systems are provided, fans shall automatically shut down in accordance with the International Mechanical Code. The manual controls provided for the smoke removal system shall have the capability to override the automatic shutdown of fans that are part of the smoke removal system.

910.5 Maintenance and testing. Maintenance and testing of smoke and heat vents and mechanical smoke removal systems shall be maintained in an operative condition in accordance with Section 910.5.1 or 910.5.2, respectively. A written record of inspection, testing and maintenance that includes the date, identification of personnel involved, any unsatisfactory result, corrective action taken and replaced parts shall be maintained of the premises.

910.5.1 Smoke and heat. Smoke and heat vents shall be maintained in an operative condition. Inspection, testing and maintenance shall be in accordance with NFPA 204 except as follows:

1. Mechanically operated smoke and heat vents shall be inspected annually and operationally tested not less than every 5 years.

2. Gravity dropout smoke and heat vents shall be inspected annually.

3. Fused, damaged or painted fusible links shall be replaced.

910.5.2 Mechanical smoke removal systems. Mechanical smoke removal systems shall be maintained in accordance with NFPA 204 and the equipment manufacturer’s instructions except as follows:

1. Systems shall be inspected and operationally tested annually.

2. Testing shall include the operation of all system components, controls and ancillary equipment, such as makeup air openings.

3. A written schedule for routine maintenance and operational testing shall be established and testing shall be conducted in accordance with the schedule.

910.5.2.1 Frequency. Systems shall be operationally tested not less than once per year. Testing shall include the operation of all system components, including control elements.

910.5.2.2 Testing. Operational testing of the mechanical smoke removal system shall include all equipment such as fans, controls and make-up air openings.

910.5.2.3 Schedule. A routine maintenance and operational testing program shall be initiated and a written schedule for routine maintenance and operational testing shall be established.

910.5.2.4 Records. Record of mechanical smoke exhaust system testing and maintenance shall be maintained on the premises. The record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

SECTION 911
EXPLOSION CONTROL

911.1 General. Explosion control shall be provided in the following locations:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1.

2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

Such areas shall be provided with explosion (deflagration) venting, explosion (deflagration) prevention systems, or barricades in accordance with this section and NFPA 69, or NFPA 495 as applicable. Deflagration venting shall not be utilized as a means to protect buildings from detonation hazards.

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<td>Barricade construction</td>
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<td>Combustible dusts a</td>
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<tr>
<td>Cryogenic fluids</td>
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<td>Explosives</td>
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<td>Flammable gas</td>
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<td>Organic peroxides</td>
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<tr>
<td>Oxidizer liquids and solids</td>
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<td>Pyrophoric</td>
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<tr>
<td>Unstable (reactive)</td>
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<tr>
<td>Water-reactive liquids and solids</td>
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<tr>
<td>Special Uses</td>
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<tr>
<td>Acetylene generator rooms</td>
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<tr>
<td>Grain processing</td>
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<tr>
<td>Liquefied petroleum gas distribution facilities</td>
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<tr>
<td>Where explosion hazards exist b</td>
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<tr>
<td>911.2 Required deflagration venting. Areas that are required to be provided with deflagration venting shall comply with the following:</td>
</tr>
<tr>
<td>1. Walls, ceilings and roofs exposing surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall not be less than five times the maximum internal relief pressure specified in Item 5 of this section.</td>
</tr>
<tr>
<td>2. Deflagration venting shall be provided only in exterior walls and roofs. Exception: Where sufficient exterior wall and roof venting cannot be provided because of inadequate exterior wall or roof area, deflagration venting shall be allowed by specially designed shafts vented to the exterior of the building.</td>
</tr>
<tr>
<td>3. Deflagration venting shall be designed to prevent unacceptable structural damage. Where relieving a deflagration, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent public ways.</td>
</tr>
<tr>
<td>4. The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in Item 1 of this section and the maximum internal pressure allowed by Item 5 of this section.</td>
</tr>
<tr>
<td>5. Vents shall be designed to withstand loads in accordance with the International Building Code. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (958 Pa), but not less than the loads required by the International Building Code:</td>
</tr>
<tr>
<td>5.1. Exterior walls designed to release outward.</td>
</tr>
<tr>
<td>5.2. Hatch covers.</td>
</tr>
<tr>
<td>5.3. Outward swinging doors.</td>
</tr>
<tr>
<td>5.4. Roofs designed to uplift.</td>
</tr>
<tr>
<td>5.5. Venting devices listed for the purpose.</td>
</tr>
<tr>
<td>6. Vents designed to release from the exterior walls or roofs of the building when venting a deflagration shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the exterior walls of the building and the lot line. Exception: Vents complying with Item 7 of this section.</td>
</tr>
<tr>
<td>7. Vents designed to remain attached to the building when...</td>
</tr>
</tbody>
</table>
venting a deflagration shall be so located that the discharge opening shall be not less than 10 feet (3048 mm) vertically from window openings and exits in the building and 20 feet (6096 mm) horizontally from exits in the building, from window openings and exits in adjacent buildings on the same lot, and from the lot line.

8. Discharge from vents shall not be into the interior of the building.

911.3 Explosion prevention systems. Explosion prevention systems shall be of an approved type and installed in accordance with the provisions of this code and NFPA 69.

911.4 Barricades. Barricades shall be designed and installed in accordance with NFPA 495.

SECTION 912

FIRE DEPARTMENT CONNECTIONS

912.1 Installation. Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with Sections 912.2 through 912.7. All fire department connections underground piping shall be installed as a minimum Class 200.

912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections be approved by the fire code official and within 200 feet of a usable hydrant. A site plan detail shall be submitted to the fire code official for approval as part of the construction documents. See Section 105.

912.2.1 Visible location. Fire department connection shall be located on the street address side of buildings, or facing approved fire apparatus access roads, fully visible and recognizable from the street, fire apparatus access roads, or nearest point of fire department vehicle access or as otherwise approved by the fire code official. The location of fire department connections shall be approved and installed:

1. Within 50 feet (15 240 mm) of an approved roadway or driveway, and arranged so that hose lines can be readily attached to the inlets without interference from any nearby objects including buildings, fences, posts, plantings, or other fire department connections.

2. Within 200 feet (60 960 mm), as the firefighter and apparatus can travel, of an approved hydrant arranged so that hose lines can be readily attached to the inlets without interference from any nearby objects including buildings, fences, posts and can be used (i.e. Not across a median, a designated maintenance black cap hydrants or hydrant on the same supply loop that the FDC supplies).

3. So that the inlet height shall not be less than 18 inches (457 mm) nor more than 48 inches (1219 mm) above grade.

A site plan detail shall be submitted to the fire code official for approval as part of the construction documents. See Section 105.

A 3 feet (914 mm) minimum clearance shall be maintained, at all times, and without obstruction in the approach path.

912.2.2 Existing buildings. On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front of the building. Such sign shall have the letters “FDC” not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) or an arrow to indicate the location. Such signs shall be subject to the approval of the fire code official. Signs shall be in accordance with Section 912.5. See Appendix D.

912.3 Fire hose threads. Fire hose threads used in connection with standpipe systems shall be approved and shall be compatible with Phoenix hose threads.

912.3.1 Inlet connections. The minimum size of a fire department inlet connection shall be 2½ inches (63.5 mm) with Phoenix threads.

912.4 Access. Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls mechanical equipment, retention ponds or any other fixed or moveable object. Access to fire department connections shall be approved by the fire code official.

Exception: Fences, where provided with an access gate equipped with a sign complying with the legend requirements of Section 912.5 and a means of emergency operation. The gate and the means of emergency operation shall be approved by the fire code official and maintained operational at all times.

912.4.1 Locking fire department connection caps. The fire code official requires locking caps on fire department connections for new and tampered-with water-based fire protection systems where the responding fire department carries appropriate key wrenches for removal.

912.4.2 Clear space around connections. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or approved by the fire code official.

912.4.3 Physical protection. Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

912.5 Signs. A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: AUTOMATIC SPRINKLERS OR STANDPIPES OR TEST CONNECTION or a
combination thereof as applicable. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

Each fire department connection (FDC) shall be identified by a permanent weather resistant sign. The sign face shall be a minimum 12” x 12” (309 x 309 mm) and fabricated from .080 (2.032 mm) aluminum sheet or equivalent. The sign face shall have a white 3M diamond grade sheeting or equivalent applied as background. See Appendix D.

When the system supplied by the FDC does not supply the entire building or supplies multiple buildings the sign shall identify the buildings or areas of the building supplied by the FDC. The fire department connection sign shall identify the building address or area, where necessary, and type of systems the FDC supplies.

912.6 Backflow protection. The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the International Plumbing Code and the City of Phoenix Plumbing Code.

912.6.1 Backflow inspection, testing and maintenance. All backflow connections shall be periodically inspected, tested and maintained in accordance with NFPA 25. Private hydrants may be used for backflow testing.

For systems without private hydrants, the valve test connection may be made with an accessible connection. The valve and capped outlet shall be a hose thread connection so that fire hose with standard female Phoenix thread can be easily connected and shall be sufficiently sized to allow testing at the highest anticipated flow rate. For testing, a hose of sufficient diameter and length that can be run outside the building to an acceptable location that will not cause injury or damage to the site or property shall be provided.

912.7 Inspection, testing and maintenance. All fire department connections shall be periodically inspected, tested and maintained in accordance with NFPA 25. Records of inspection, testing and maintenance shall be maintained.

SECTION 913
FIRE PUMPS

913.1 General. Where provided, fire pumps shall be installed in accordance with this section and NFPA 20.

913.2 Protection against interruption of service. The fire pump, driver, and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions. Where required or optional electrical emergency or standby power system is installed and an electric fire pump sized to handle the load is installed, the fire pump shall be connected to both the normal electrical service and the standby power system. A UL-listed fire pump with an automatic transfer switch is required on the power supply to this pump.

Where the building, or a portion of the building, served by the fire pump is intended to remain occupied during a utility power outage through the use of an electrical standby power system, whether required or optional; the electric fire pump shall be connected to both the normal electrical service and emergency or standby power system.

913.2.1 Protection of fire pump rooms. Rooms where fire pumps are located shall be separated from all other areas of the building in accordance with Section 913.2.1 of the International Building Code.

913.2.2 Circuits supplying fire pumps. Cables used for survivability of circuits supplying fire pumps shall be protected using one of the following methods:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
2. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a fire-resistance rating of not less than 1 hour.

913.3 Temperature of pump room. Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).

913.3.1 Engine manufacturer’s recommendation. Temperature of the pump room, pump house or area where engines are installed shall never be less than the minimum recommended by the engine manufacturer. The engine manufacturer’s recommendations for oil heaters shall be followed.

913.4 Valve supervision. Where provided, the fire pump suction, discharge and bypass valves, and isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods.

1. Central-station, proprietary or remote-station signaling service.
2. Local signaling service that will cause the sounding of an audible signal at a constantly attended location.
3. Locking valves open.
4. Sealing of valves and approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner.

913.4.1 Test outlet valve supervision. Fire pump test outlet valves shall be supervised in the closed position.

913.5 Testing and maintenance. Fire pumps shall be inspected, tested and maintained in accordance with the requirements of this section and NFPA 25. Records of inspection, testing and maintenance shall be maintained.

913.5.1 Acceptance test. Acceptance testing shall be done in accordance with the requirements of NFPA 20. The suction pressure shall not drop below 20 psi.

913.5.2 Generator sets. Engine generator sets supplying emergency or standby power to fire pump assemblies shall be periodically tested in accordance with NFPA 110. Records of testing shall be maintained.
913.5.3 Transfer switches. Automatic transfer switches shall be periodically tested in accordance with NFPA 110. Records of testing shall be maintained.

913.5.4 Pump room environmental conditions. Tests of pump room environmental conditions, including heating, ventilation and illumination shall be made to ensure proper manual or automatic operation of the associated equipment.

SECTION 914
FIRE PROTECTION BASED ON SPECIAL DETAILED REQUIREMENTS OF USE AND OCCUPANCY

914.1 General. This section shall specify where fire protection systems are required based on the detailed requirements of use and occupancy of the International Building Code.

914.2 Covered and open mall buildings. Covered and open mall buildings shall comply with Sections 914.2.1 through 914.2.4.

914.2.1 Automatic sprinkler system. Covered and open mall buildings and buildings connected shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, which shall comply with the all of the following:

1. The automatic sprinkler system shall be complete and operative throughout occupied space in the mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with approved alternative protection.

2. Sprinkler protection for the mall of a covered mall building shall be independent from that provided for tenant spaces or anchor buildings.

3. Sprinkler protection for the tenant spaces of an open mall building shall be independent from that provided for anchor buildings.

4. Sprinkler protection shall be provided beneath exterior circulation balconies located adjacent to an open mall.

5. Where tenant spaces are supplied by the same system, they shall be independently controlled.

Exception: An automatic sprinkler system shall not be required in spaces or areas of open parking garages separated from the covered or open mall in accordance with Section 402.4.2.3 of the International Building Code and constructed in accordance with Section 406.5 of the International Building Code.

914.2.2 Standpipe system. The covered and open mall building shall be equipped throughout with a standpipe system as required by Section 905.3.3.

914.2.3 Emergency voice/alarm communication system. Where the total floor area exceeds 50,000 square feet (4645 m²) 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. Access to emergency voice/alarm communication systems serving a mall, required or otherwise, shall be provided for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

914.2.4 Fire department access to equipment. Rooms or areas containing controls for air-conditioning systems, automatic fire-extinguishing systems, automatic sprinkler systems or other detection, suppression or control elements shall be identified for use by the fire department.

914.3 High-rise buildings. High-rise buildings shall comply with Sections 914.3.1 through 914.3.7.

914.3.1 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 914.3.2.

Exception: An automatic sprinkler system shall not be required in spaces or areas of:

1. Open parking garages in accordance with Section 406.5 of the International Building Code.

914.3.1.1 Number of sprinkler risers and system design. Each sprinkler system zone in buildings that are more than 420 feet (128 m) in height shall be supplied by not fewer than two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.

914.3.1.1 Riser location. Sprinkler risers shall be placed in interior exit stairways and ramps that are remotely located in accordance with Section 1007.

914.3.1.2 Water supply to required fire pumps. In buildings that are more than 420 feet (128 m) in building height, required fire pumps shall be supplied by connections not fewer than two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through not fewer than one of the connections.

914.3.2 Secondary water supply. An automatic secondary on-site water supply having a capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings assigned to Seismic Design Category C, D, E or F as determined by the International Building Code. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes as...
determined by the occupancy hazard classification in accordance with NFPA 13.

**Exception:** Existing buildings.

**914.3 Fire alarm system.** A fire alarm system shall be provided in accordance with Section 907.2.12.

**914.3.4 Automatic smoke detection.** Smoke detection shall be provided in accordance with Section 907.2.12.1.

**914.3.5 Emergency voice/alarm communication system.** An emergency voice/alarm communication system shall be provided in accordance with Section 907.6.2.2.

**914.3.6 Emergency responder radio coverage.** Emergency responder radio coverage shall be provided in accordance with Section 510.

**914.3.7 Fire command.** A fire command center complying with Section 508 shall be provided in a location approved by the fire department.

**914.4 Atriums.** Atriums shall comply with Sections 914.4.1 and 914.4.2.

**914.4.1 Automatic sprinkler system.** An approved automatic sprinkler system shall be installed throughout the entire building.

**Exceptions:**

1. That area of a building adjacent to or above the atrium need not be sprinklered, provided that portion of the building is separated from the atrium portion by not less than a 2-hour fire barrier 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.

2. Where the ceiling of the atrium is more than 55 feet (16764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

**914.4.2 Fire alarm system.** A fire alarm system shall be provided where required by Section 907.2.13.

**914.4.5 Underground buildings.** Underground buildings shall comply with Sections 914.5.1 through 914.5.5.

**914.5.1 Automatic sprinkler system.** The highest level of exit discharge serving the underground portions of the building and all levels below shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Water-flow switches and control valves shall be supervised in accordance with Section 903.4.

**914.5.2 Smoke control system.** A smoke control system is required to control the migration of products of combustion in accordance with Section 909 and provisions of this section. Smoke control shall restrict movement of smoke to the general area of fire origin and maintain means of egress in a usable condition.

**914.5.3 Compartment smoke control system.** Where compartmentation is required by Section 405.4 of the International Building Code, each compartment shall have an independent smoke-control system. The system shall be automatically activated and capable of manual operation in accordance with Section 907.2.17.

**914.5.4 Fire alarm system.** A fire alarm system shall be provided where required by Sections 907.2.17 and 907.2.18.

**914.5.5 Standpipe system.** The underground building shall be provided throughout with a standpipe system in accordance with Section 905.

**914.6 Stages.** Stages shall comply with Sections 914.6.1 and 914.6.2.

**914.6.1 Automatic sprinkler system.** Stages shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

**Exceptions:**

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than 5/8 -inch (15.9 mm) in thickness.

2. Sprinklers are not required for stages 1,000 square feet (93 m²) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.

3. Sprinklers are not required within portable orchestra enclosures on stages.

**914.6.2 Standpipe system.** Standpipe systems shall be provided in accordance with Section 905.

**914.7 Special amusement buildings.** Special amusement buildings shall comply with Sections 914.7.1 and 914.7.2.

**914.7.1 Automatic sprinkler system.** Special amusement buildings shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.

**Exception:** Automatic sprinklers are not required where the total floor area of a temporary special amusement building is less than 1,000 square feet (93 m²) and the travel distance from any point to an exit access is less than 50 feet (15 240 mm).

**914.7.2 Automatic smoke detection.** Special amusement buildings shall be equipped with an automatic smoke detection system in accordance with Section 907.2.11.

**914.8 Aircraft-related occupancies.** Aircraft-related occupancies shall comply with Sections 914.8.1 through 914.8.6.

**914.8.1 Automatic smoke detection systems.** Airport traffic control towers shall be provided with an automatic smoke detection system installed in accordance with Section 907.2.21.

**914.8.2 Automatic sprinkler system for new airport traffic...**
control towers. Where an occupied floor is located no more than 35 feet (10 668mm) above the lowest level of fire department vehicle access, new airport traffic control towers shall be equipped with an automatic sprinkler system in accordance with NFPA 13.

914.8.3 Fire suppression for aircraft hangars. Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 914.8.3.

**Exception:** When a fixed base operator has separate repair facilities on site, Group II hangars operated by a fixed base operator used for storage of transient aircraft only shall have a fire suppression system, but the system shall be exempt from foam requirements.

### Table 914.8.2

| Maximum Single Fire Area (square feet) | IIA | IIIB | IIA | IIIA | IIIB | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 40,000                                | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II | Group II |

For SI: 1 square foot = 0.0929 m², 1 foot = 304.8 mm.

- a. Aircraft hangars with a door height greater than 28 feet shall be provided with fire suppression for a Group I hangar regardless of maximum fire area.
- b. Groups shall be classified in accordance with NFPA 409.
- c. Membrane structures complying with Section 3102 of the International Building Code shall be classified as a Group IV hangar.

914.8.3.1 Hazardous operations. Any Group III aircraft hangar in accordance with Table 914.8.3 that contains hazardous operations including, but not limited to, the following shall be provided with a Group I or II fire suppression system in accordance with NFPA 409 as applicable:

1. Doping.
2. Hot work including, but not limited to, welding, torch cutting and torch soldering.
3. Fuel transfer.
4. Fuel tank repair or maintenance not including defueled tanks in accordance with NFPA 409, inerted tanks or tanks that have never been fueled.
5. Spray finishing operations.
6. Total fuel capacity of all aircraft within the unsprinklered single fire area in excess of 1,600 gallons (6057 L).
7. Total fuel capacity of all aircraft within the maximum single fire area in excess of 7,500 gallons (28 390 L) for a hangar equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

914.8.3.2 Separation of maximum single fire areas. Maximum single fire areas established in accordance with hangar classification and construction type in Table 914.8.3 shall be separated by 2-hour fire walls constructed in accordance with Section 706 of the International Building Code. In determining the maximum single fire area as set forth in Table 914.8.3, ancillary uses which are separated from aircraft servicing areas by not less than 1-hour fire barrier constructed in accordance with Section 707 of the International Building Code shall not be included in the area.

914.8.4 Finishing. The process of “doping,” involving the use of a volatile flammable solvent, or of painting shall be carried on in a separate detached building equipped with automatic fire-extinguishing equipment in accordance with Section 903.

914.8.5 Residential aircraft hangar smoke alarms. Smoke alarms shall be provided within residential aircraft hangars in accordance with Section 907.2.20.

914.8.6 Aircraft paint hangar fire suppression. Aircraft paint hangars shall be provided with fire suppression as required by NFPA 409.

914.9 Application of flammable finishes. An automatic sprinkler system or fire extinguishing system shall be provided in all spray areas and spray booths and shall be installed in accordance with Chapter 9.

914.10 Drying rooms. Drying rooms designed for high-hazard materials and processes, including special occupancies as provided for in Chapter 4 of the International Building Code, shall be protected by an approved automatic fire-extinguishing system complying with the provisions of Chapter 9.

914.11 Ambulatory care facilities. Occupancies classified as ambulatory care facilities shall comply with Sections 914.11.1 through 914.11.3.

914.11.1 Automatic sprinkler systems. An automatic sprinkler system shall be provided for ambulatory care facilities in accordance with Section 903.2.2.

914.11.2 Manual fire alarm systems. A manual fire alarm
system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.

914.11.3 Fire alarm systems. An automatic smoke detection system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.1.

**SECTION 915**

**CARBON MONOXIDE DETECTION**

915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with Section 1103.9.

915.1.1 Where required. Carbon monoxide detection shall be provided in Group I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

915.1.2 Fuel-burning appliances and fuel-burning fireplaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

915.1.3 Fuel-burning forced-air furnaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms served by a fuel-burning, forced-air furnace.

**Exception:** Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

**Exceptions:**

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where without communicating openings between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where a carbon monoxide detector is provided in one of the following locations:

   2.1. In an approved location between the fuel burning appliance or fuel burning fireplace and the dwelling unit, sleeping unit or classroom.

   2.2. On the ceiling of the room containing the fuel burning appliance or fuel burning fireplace.

915.1.5 Private garages. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms in buildings with attached private garages.

**Exceptions:**

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms without communicating openings between the private garage and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms located more than one story above or below a private garage.

3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.

4. Where a carbon monoxide detector is provided in an approved location between openings to a private garage and dwelling units, sleeping units or classrooms.

915.1.6 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the International Building Code or an enclosed parking garage complying with Section 406.6 of the International Building Code shall not be considered a private garage.

915.2 Locations. Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in dwelling units outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in sleeping units.

**Exception:** Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace.

915.2.3 Group E occupancies. Carbon monoxide detectors shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

**Exception:** Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.
915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

915.4.2 Listings. Carbon monoxide alarms shall be listed in accordance with UL 2034.

915.4.3 Locations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.4.4 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 2034 and UL 217.

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are listed in accordance with UL 2075 and UL 268.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 720. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.6.1 Enclosed parking garages. Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with the International Mechanical Code, Section 404.1 shall be maintained in accordance with the manufacturer’s instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

SECTION 916
GAS DETECTION SYSTEMS

916.1 Gas detection systems. Gas detection systems required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. Permits shall be required as set forth in Section 105.7.11.

916.2.1 Construction documents. Documentation of the gas detection system design and equipment to be used that demonstrates compliance with the requirements of this code shall be provided with the application for permit.

916.3 Equipment. Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturer’s instructions.

916.4 Power connections. Gas detection systems shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an approved restraining means that secures the plug to the receptacle.

916.5 Emergency and standby power. Standby or emergency power shall be provided or the gas detection system shall initiate a trouble signal at an approved location if the power supply is interrupted.

916.6 Sensor locations. Sensors shall be installed in approved locations where leaking gases are expected to accumulate.

916.7 Gas sampling. Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.

2. For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes, in accordance with Section 6004.2.2.7.

3. Where a less frequent or delayed sampling interval is approved.

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).

2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

916.9 Signage. Signs shall be provided adjacent to gas detection system alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 Fire alarm system connections. Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer’s instructions.

916.11 Inspection, testing and sensor calibration. Inspection and testing of gas detection systems shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration.
shall be performed at the frequency specified by the sensor manufacturer.

SECTION 917
MASS NOTIFICATION SYSTEMS

917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple building college or university campus having a cumulative building occupant load of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

SECTION 918
FIRE-FIGHTER AIR SYSTEMS

918.1 Scope. The design, installation and maintenance of fire-fighter air systems shall be in accordance with this section.

918.2 Required installations. Effective May 2, 2004, a fire-fighter air system shall be installed in the following buildings:

1. Buildings classified as high-rise in accordance with the building code.
2. Underground structures that are two or more floors below grade with an area greater than 10,000 square feet (929 m²).

918.3 Plans and contractor qualifications.

918.3.1 Plans. Prior to the installation of a fire-fighter air system, a minimum of two sets of plans and specifications shall be submitted to the Phoenix Fire Department for review and approval. Plans shall demonstrate compliance with the requirements of this section and shall include calculations prepared by a registered professional engineer demonstrating that the design criteria for all pressure containing components is satisfied plus a minimum safety factor of 25 percent.

The plans submittal shall also include specifications for the tubing, fittings, and manufacturer data sheets for valves, pressure regulators, pressure relief devices, gauges, RIC universal air connections and cylinder filling hoses.

918.3.2 Contractor qualification. The fire-fighter air system shall be installed by Arizona state-licensed contractors.

918.4 Design criteria.

918.4.1 Fill. The system shall be designed to fill, at each interior cylinder filling panel, one 66 standard cubic foot compressed breathing air cylinder to a maximum pressure of 4,500 psig (31 028 kPa).

918.4.2 Filling operation. The filling operation shall be completed in not more than two minutes upon connection of the cylinder to the fill hose.

918.4.3 Flow of breathing air. The minimum design flow of the breathing air piping system shall be calculated using two interior cylinder filling panels operating simultaneously and located at the highest level above the most remote location from the base station exterior fire department connection panel and enclosure base.

918.5 Operating pressure. All components used in the system shall be rated to operate at a minimum pressure of 5,000 psig (34 475 kPa) at 70°F (21°C).

918.6 Marking. System piping, gauges, valves and air outlets shall be clearly marked by means of steel or plastic labels or tags indicating their function. Markings used for piping systems shall consist of the content's name and include a direction of flow arrow. Markings shall be provided at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at a minimum of every 20 feet (6096 mm) or fraction thereof throughout the piping system.

918.7 Base station exterior fire department connection panel and enclosure.

918.7.1 Location. A fire department connection panel shall be attached to the building or on a remote monument at the exterior of the building. The panel shall be secured inside of a weather-resistant enclosure. The panel shall be within 50 feet (15 240 mm) of an approved roadway or driveway, or other location approved by the Phoenix Fire Department. The enclosure shall be visible and accessible on approach to the building.

918.7.2 Construction. The fire department connection panel shall be installed in a cabinet constructed of minimum 18-gauge carbon steel. When constructed of steel, the cabinet shall be provided with coating to protect the cabinet from corrosion. When the enclosure is constructed of nonmetallic materials, the enclosure shall be resistant to ultraviolet and infrared solar radiation.

918.7.3 Vehicle protection. When the panel is located in an area subject to vehicle traffic, impact protection shall be provided in accordance with this code.

918.7.4 Base station enclosure marking. The front of the enclosure shall be marked “FIRE-FIGHTER AIR SYSTEM” on securely attached steel, plastic engraved or painted plate. The lettering shall be in a color that contrasts with the enclosure front and in letters that are a minimum of 2 inches (51 mm) high with ¼-inch (9053 mm) brush stroke. The marking of the enclosure shall be visible.

918.7.5 Base station enclosure components. The components in the base station panel shall consist of the necessary components to provide air to the air substations located on upper or lower building levels, or both. The fire department air supply source shall be designed to connect to the base station panel. The following components shall be installed in the base station enclosure.

1. One—Male Rapid Intervention Crew (RIC) Universal Air Connection (UAC) fitting. When connected to a female fitting, the assembled UAC shall meet the construction, performance and dimensional requirements of NFPA 1981, Standard on Open

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918.8.2 Cabinet requirements. Each air substation cylinder fill panel shall be installed in a cabinet constructed of minimum 18-gauge carbon steel. The depth of the cabinet shall not create an exit obstruction when installed in building stairways. All components with the exception of the shutoff valve, pressure gauges, fill hoses and ancillary components shall be contained behind a minimum 18-gauge interior panel.

918.8.3 Door. Hinges for the cabinet door shall be located inside of the cabinet. The door shall be arranged such that when the door is open, it does not reduce the required exit width or create an obstruction in the path of egress. A minimum of 80 percent of the door surface area shall be constructed of tempered glass. The thickness of the glass shall not be greater than ½ inch (3.17 mm).

918.8.4 Cabinet marking. The front of each cylinder fill panel shall be marked “FIRE-FIGHTER AIR SYSTEM.” The lettering shall be in a color that contrasts with the cabinet front and in letters that are a minimum of 2 inches (50 mm) high with 3/ -inch (5 mm) brush stroke. The marking of the cabinet shall be visible to emergency response personnel.

918.8.5 Air substation cabinet components. The cabinet shall be of sufficient size to allow for the installation of the following components:

1. One— is isolation valve located between the air discharge line to the next air substation and the downstream line to the air base station supply or the air substation immediately below to the next substation above the air base station.

2. The fill hoses and isolation valves shall be installed between the air bottle connection line and the fresh air supply.

3. Excess bleed valves shall be located between the air bottle fill hose and the next air substation.

4. Four SCBA fill hoses are required at a single air substation, the air supply lines shall be identified as 4,500 psig (31 028 kPa) pressure and shall be controlled by a single valve between the air supply and air bottle. The SCBA fill hoses shall be designed with RIC UAC fittings. A protective cap shall be provided for each hose.

5. Mechanical supports for piping, hoses, gauges and pressure components shall be designed and built to provide a solid rigid structure.

918.8.6 Cylinder filling hose. The design of the cabinet shall provide a means for storing the hose to prevent kinking. When the hose is coiled, the brackets shall be installed so that the hose bend radius is maintained at 4 inches (102 mm) or greater.

The discharge outlet of each cylinder filling hose shall have a female RIC UAC. The female fitting shall be designed to connect to a male RIC UAC. The assembled RIC UAC shall meet the construction, performance and dimensional requirements of NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services 2007 edition.
918.7 Security. To prevent unauthorized access to or tampering with the system, each panel cover shall remain locked by an approved means.

918.9 Installation of components.

918.9.1 Pressure monitoring switch. An electric low pressure monitoring switch shall be installed in the piping system to monitor the air pressure. The pressure switch shall be connected to the building’s fire alarm system. The pressure switch shall transmit a supervisory signal when the pressure of the breathing-air system is less than 3,000 psig (20,685 kPa) at 70°F (21°C), + 100 psig (690 kPa). If the building is not equipped with a fire alarm system, activation of the pressure switch shall activate an audible alarm located at the building’s main entrance. A weather resistant sign shall be provided adjacent to the audible alarm stating: “FIRE-FIGHTER AIR SYSTEM LOW AIR PRESSURE ALARM.” The lettering shall be in a contrasting color and the letters shall be a minimum of 2 inches (51 mm) high with ¾ -inch (9.53 mm) brush strokes.

918.9.2 Tubing. Piping shall be constructed of stainless steel or other approved materials that are compatible with breathing air. The use of nonmetallic materials shall be compatible with breathing air. When stainless steel tubing is used, it shall meet ASTM A269, Grade 316 or an equal standard. Stainless steel fitting shall be Grade 316 and be a minimum of 0.375 inch (9.5 mm) outside diameter by .065 inch (1.6 mm) fully annealed seamless. Stainless steel fittings shall be at least Grade 316 and meet the requirements of ASTM A479 or equal. Routing of tubing and bends shall be such as to protect the tubing from mechanical damage.

918.9.3 Support. Piping shall be supported at maximum intervals of 5 feet (1524 mm). Individual tubing clamps and mounting components shall be mechanically secured to the building support members in accordance with the manufacturer’s specifications.

918.9.4 Fittings. Fittings shall be constructed of stainless steel or other approved materials that are compatible with breathing air. The use of nonmetallic materials shall be compatible with breathing air. Stainless steel fittings shall be at least Grade 316 and meet the requirements of ASTM A479 or an equal standard.

918.9.5 Prohibition. The use of carbon steel, iron pipe, malleable iron, high-strength gray iron or alloy steel is prohibited.

918.10 System assembly requirements. The system shall be welded except where the tubing joints are readily accessible and at the individual air fill panels. When mechanical high pressure tube fittings are used, they shall be approved for the type of materials to be joined and rated for the maximum pressure of the system. Welding procedures shall meet ASME B31.1-2010, Part 4 and Chapter V (Exhibit VI). Prior to and during the welding of sections of tubing, a continuous, regulated dry nitrogen or argon purge at 3 psig (20.68 kPa) shall be maintained to eliminate contamination with products of the oxidation or welding flux. The purge shall commence a minimum of 2 minutes prior to welding operations and continue until the welded joint is at an ambient temperature between 60°F and 80°F (15.5°C to 26.6°C).

918.11 Prevention of contamination. The installing contractor shall ensure that, at all times, the system components are not exposed to contaminants, including, but not limited to, oils, solvents, dirt and construction materials. When contamination of system components has occurred, the affected component shall not be installed in the system.

918.12 Testing and inspection.

918.12.1 Testing. Following fabrication, assembly, and installation of the piping distribution system, exterior connection panel and interior cylinder fill panels, the Phoenix Fire Department shall witness the pneumatic testing of the complete system at a minimum test pressure of 5,500 psi (37 923 kPa) using oil-free dry air, nitrogen or argon. A minimum 24-hour pneumatic or hydrostatic test shall be performed. During this test all fittings, joints and system components shall be inspected for leaks. A solution compatible with the system component materials shall be used on each joint and fitting. Any defects in the system or leaks detected shall be documented on an inspection report, repaired or replaced. As an alternate, a pressure decay test in accordance with ASME B31.3 is allowed. A test of the low-pressure monitoring switch shall be performed. Each air fill panel shall be tested for compatibility with the fire department’s SCBA RIC UAC. The pipe or tubing manufacturer mill report shall be provided to the Phoenix Fire Department.

918.12.2 Air samples. A minimum of two samples shall be taken from separate air fill panels and submitted to an independent, certified gas analysis laboratory to verify the system’s cleanliness and that the air is certified as breathing air. The laboratory shall submit a written report of the analysis to the Phoenix Fire Department documenting that the breathing air complies with this section.

918.12.3 Quality analysis. During the period of air quality analysis, the air fill panel inlet shall be secured so that no air can be introduced into the system and each air fill panel shall be provided with a sign stating: “AIR QUALITY ANALYSIS IN PROGRESS, DO NOT FILL OR USE ANY AIR FROM THIS SYSTEM.” This sign shall be a minimum of 8 ½ inches by 11 inches (215 mm by 279 mm) with a minimum of 1-inch (25 mm) lettering.

918.12.4 Inspection. Annually the breathing air within the system shall be inspected and one air sample shall be taken and certified as breathing air in accordance with the section. The laboratory test results shall be available for review by the Phoenix Fire Department.

918.13 System acceptance and certification. Prior to the final acceptance of the air system, the building owner shall provide for the testing and certification of the system. As a minimum, this shall include verifying the system’s compatibility with the fire department’s SCBA apparatus; the system’s ability to maintain 5,000 psi (34 475 kPa) working pressure; the operability of the low-pressure monitoring switch and that the system’s air quality complies with the requirements of Section
918.12. Prior to final acceptance, the building owner shall provide the Phoenix Fire Department with written verification of a testing and certification contract. Upon satisfactory completion of all tests and verification of air quality, the system shall be considered complete.

SECTION 919
EXISTING-HIGH-RISE SMOKE REMOVAL SYSTEMS

919.1 Smoke removal. To facilitate smoke removal in buildings built prior to engineered smoke management requirements. There shall be capability for post-fire salvage and overhaul operations. Buildings and structures shall be equipped with natural or mechanical ventilation for removal of products of combustion in accordance with one of the following:

1. Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50-foot (15 240 mm) intervals. The area of operable windows or panels shall be not less than 40 square feet (3.7 m²) per 50 linear feet (15 240mm) of perimeter.

   Exceptions:
   1. In Group R-1 occupancies, each sleeping unit or suite having an exterior wall shall be permitted to be provided with 2 square feet (0.19 m²) of venting area in lieu of the area specified in Item 1.
   2. Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.

2. Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.

3. Any other design that will produce equivalent results approved by the fire code official, through the appeals process.
Notes:

1. The sign face shall be 12” x 12” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

2. Font style used is Handel Gothic BT Capital fonts.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG³ 4090 Series or equivalent) applied as a background to the aluminum plate.

4. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.

6. To be installed on the wall 5-7 feet above grade over FDC inlet.
Notes:

1. The sign face shall be 12” x 12” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

2. Font style used is Handel Gothic BT Capital fonts.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG3 4090 Series or equivalent) applied as a background to the aluminum plate.

4. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.
PHOENIX THREADS

![Diagram of Phoenix threads]

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PHOENIX THREADS

THREAD DATA

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UNLESS OTHERWISE SPECIFIED – DIMENSIONS ARE IN INCHES, ALL MACHINED SURFACES ARE ARITHMETIC AVERAGE, TOLERANCES - .X = ± .1, .XX = ± .03, .XXX = ± .010, ANGULAR ± 2°
Notes:

4. The sign face shall be 12” x 12” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

5. Font style used is Handel Gothic BT Capital fonts.

6. The sign face shall have a white 3M diamond grade reflective sheeting (DG3 4090 Series or equivalent) applied as a background to the aluminum plate.

7. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

8. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.

9. To form a graffiti barrier 3M 1160 Protection Overlay film may be applied.

10. To be installed on wall 5-7 fee above grade over the air system valve.
CHAPTER 10
MEANS OF EGRESS

User note: Chapter 10 provides the general criteria for designing the means of egress established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. This chapter addresses all portions of the egress system (exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics that will permit the safe use of components without special knowledge or effort are specified. The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Sections 1002 through 1030 are duplicated text from Chapter 10 of the International Building Code®; however, the International Fire Code® contains an additional Section 1031 on maintenance of the means of egress system in existing buildings. Retroactive minimum means of egress requirements for existing buildings are found in Chapter 11.

SECTION 1001
ADMINISTRATION

1001.1 General. Buildings or portions thereof shall be provided with a means of egress system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of means of egress components required to provide an approved means of egress from structures and portions thereof. Sections 1003 through 1030 shall apply to new construction. Sections 1023.9 and 1031 shall apply to existing buildings. See International Building Code Chapter 10 Means of Egress for all City of Phoenix amendments to the means of egress.

Exception: Detached one and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories above grade plane in height with a separate means of egress and their accessory structures shall comply with the International Residential Code.

1001.2 Minimum requirements. It shall be unlawful to alter a building or structure in a manner that will reduce the number of exits or the capacity of the means of egress to less than required by this code.

SECTION 1002
DEFINITIONS

[BE] 1002.1 Definitions. The following terms are defined in Chapter 2:

[B] ACCESSIBLE MEANS OF EGRESS.
[B] AISLE.
[B] AISLE ACCESSWAY.
[B] ALTERNATING TREAD DEVICE.
[B] AREA OF REFUGE.
[B] BLEACHERS.
[B] BREAKOUT.
[B] COMMON PATH OF EGRESS TRAVEL.
[B] CORRIDOR.
[B] DOOR, BALANCED.
[B] EGRESS COURT.
[B] EMERGENCY ESCAPE AND RESCUE OPENING.
[B] EXIT.
[B] EXIT ACCESS.
[B] EXIT ACCESS DOORWAY.
[B] EXIT ACCESS RAMP.
[B] EXIT ACCESS STAIRWAY.
[B] EXIT DISCHARGE.
[B] EXIT DISCHARGE, LEVEL OF.
[B] EXIT, HORIZONTAL.
[B] EXIT PASSAGEWAY.
[B] EXTERIOR EXIT RAMP.
[B] FIRE EXIT HARDWARE.
[B] FIXED SEATING.
[B] FLIGHT.
[B] FLOOR AREA, GROSS.
[B] FLOOR AREA, NET.
[B] FOLDING AND TELESCOPIC SEATING.
[B] GRANDSTAND.
[B] GUARD.
[B] HANDRAIL.
[B] HORIZONTAL EXIT.
[B] INTERIOR EXIT RAMP.
[B] INTERIOR EXIT STAIRWAY.
[B] LOW ENERGY POWER-OPERATED DOOR.
[B] MEANS OF EGRESS.
[B] MERCHANDISE PAD.
[B] NOSING.
[B] OCCUPANT LOAD.
[B] OPEN-AIR ASSEMBLY SEATING.
[B] PANIC HARDWARE.
[B] PHOTOLUMINESCENT.
POWER-ASSISTED DOOR.
[B] PUBLIC WAY.
[B] RAMP.
[B] SCISSOR STAIR.
[B] SELF-LUMINOUS.
[B] SMOKE-PROTECTED ASSEMBLY SEATING.
[B] STAIR.
[B] STAIRWAY.
[B] STAIRWAY, INTERIOR EXIT.
[B] STAIRWAY, SPIRAL.
[B] WINDER.

SECTION 1003
GENERAL MEANS OF EGRESS

[B] 1003.1 Applicability. The general requirements specified in Sections 1003 through 1015 shall apply to all three elements of the means of egress system, in addition to those specific requirements for the exit access, the exit and the exit discharge detailed elsewhere in this chapter.

[B] 1003.2 Ceiling height. The means of egress shall have a ceiling height of not less than 7 feet 6 inches (2286 mm) above the finished floor.

Exceptions:
1. Sloped ceilings in accordance with Section 1207.2 of the International Building Code.
2. Ceilings of dwelling units and sleeping units within residential occupancies in accordance with Section 1207.2 of the International Building Code.
3. Allowable projections in accordance with Section 1003.3.
4. Stair headroom in accordance with Section 1011.3.
5. Door height in accordance with Section 1010.1.1.
6. Ramp headroom in accordance with Section 1012.5.2.
7. The clear height of floor levels in vehicular and pedestrian traffic areas of public and private parking garages in accordance with Section 406.2.2 of the International Building Code.
8. Areas above and below mezzanine floors in accordance with Section 505.2 of the International Building Code.

[B] 1003.3 Protruding objects. Protruding objects on circulation paths shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

[B] 1003.3.1 Headroom. Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 provided where a minimum headroom of 80 inches (2032 mm) is provided over any circulation path, including walks, corridors, aisles and passageways. Not more than 50 percent of the ceiling area of a means of egress shall be reduced in height by protruding objects.

Exception: Door closers and stops shall not reduce headroom to less than 78 inches (1981 mm).

A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the floor.

[B] 1003.3.2 Post-mounted objects. A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the finished floor. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

Exception: These requirements shall not apply to sloping portions of handrails between the top and bottom riser of stairs and above the ramp run.

[B] 1003.3.3 Horizontal projections. Objects with leading edges more than 27 inches (685 MM) and not more than 80 inches (2030 mm) above the finished floor shall not project horizontally more than 4 inches (102 mm) into the circulation path.

Exception: Handrails are permitted to protrude 4 ½ inches (114 mm) from the wall or guard.

[B] 1003.3.4 Clear width. Protruding objects shall not reduce the minimum clear width of accessible routes.

[B] 1003.4 Slip-resistant surface. Circulation paths of the means of egress shall have a slip-resistant surface and be securely attached.

[B] 1003.5 Elevation change. Where changes in elevation of less than 12 inches (305 mm) exist in the means of egress, sloped surfaces shall be used. Where the slope is greater than one unit vertical in 20 units horizontal (5-percent slope), ramps complying with Section 1012 shall be used. Where the difference in elevation is 6 inches (152 mm) or less, the ramp shall be equipped with either handrails or floor finish materials that contrast with adjacent floor finish materials.

Exceptions:
1. A single step with a maximum riser height of 7 inches (178 mm) is permitted for buildings with occupancies in Groups F, H, R-2, R-3, S and U at exterior doors not required to be accessible by Chapter 11 of the International Building Code.
2. A stair with a single riser or with two risers and a tread is permitted at locations not required to be accessible by Chapter 11 of the International Building Code, provided that the risers and treads comply with Section 1011.5 the minimum depth of the tread is 13 inches (330 mm) and not less than one handrail complying with Section 1014 is provided within 30 inches (762 mm) of the centerline of the normal path of egress travel on the stair.
3. A step is permitted in *aisles* serving seating that has a difference in elevation less than 12 inches (305 mm) at locations not required to be *accessible* by Chapter 11 of the *International Building Code*, provided that the risers and treads comply with Section 1028.14 and the *aisle* is provided with a *handrail* complying with Section 1028.16.

Throughout a story in a Group I-2 occupancy, any change in elevation in portions of the means of egress that serve nonambulatory persons shall be by means of a ramp or sloped walkway.

**[B] 1003.6 Means of egress continuity.** The path of egress travel along a *means of egress* shall not be interrupted by any building element other than a *means of egress* component as specified in this chapter. Obstructions shall not be placed in the minimum width or required capacity of a *means of egress* component except projections permitted by this chapter. The minimum width or required capacity of a *means of egress* system shall not be diminished along the path of egress travel.

**[B] 1003.7 Elevators, escalators and moving walks.** Elevators, escalators and moving walks shall not be used as a component of a required *means of egress* from any other part of the building.

*Exception:* Elevators used as an accessible *means of egress* in accordance with Section 1009.4

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**SECTION 1004 OCCUPANT LOAD**

**[B] 1004.1 Design occupant load.** In determining means of egress requirements, the number of occupants for whom means of egress facilities are provided shall be determined in accordance with this section.

**[BE] 1004.2 Cumulative occupant loads.** Where the path of egress travel includes intervening rooms, areas or spaces, cumulative occupant loads shall be determined in accordance with this section.

**[BE] 1004.2.1 Intervening spaces or accessory areas.** Where occupants egress from one more rooms, areas or spaces through others, the design occupant load shall be the combined occupant load of interconnected accessory or intervening spaces. Design of egress path capacity shall be based on the cumulative occupant loads of all rooms, areas or spaces to that point along the path of egress.

**[BE] 1004.2.2 Adjacent levels for mezzanines.** That portion of the occupant load of a mezzanine with required egress through a room, area or space on an adjacent level shall be added to the occupant load of that room, area or space.

**[BE] 1004.2.3 Adjacent stories.** Other than for the egress components designed for convergence in accordance with Section 1005.6, the occupant load from separate stories shall not be added.

**[BE] 1004.3 Multiple-function occupant load.** Where an area under consideration contains multiple functions having different occupant load factors, the design occupant load for such area shall be based on the floor area of each function calculated independently.

**[BE] 1004.4 Multiple occupancies.** Where a building contains two or more occupancies, the means of egress requirements shall apply to each portion of the building based on the occupancy of that space. Where two or more occupancies utilize portions of the same means of egress system, those egress components shall meet the more stringent requirements of all occupancies that are served.

**[BE] 1004.5 Areas without fixed seating.** The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.1.2. For areas without fixed seating, the occupant load shall not be less than that number determined by dividing the floor area under consideration by the occupant load factor assigned to the function of the space as set forth in Table 1004.1.2. Where an intended function is not listed in Table 1004.1.2, the *fire code official* shall establish a function based on a listed function that most nearly resembles the intended function.

*Exception:* Where approved by the *fire code official*, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by calculation, shall be permitted to be used in the determination of the design occupant load.  

**[BE] 1004.5.1 Increased occupant load.** The occupant load permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.5, provided that all other requirements of the code are also met based on such modified number and the *occupant load* does not exceed one occupant per 7 square feet (0.65 m²) of occupiable floor space. Where required by the *fire code official*, an approved aisle, seating or fixed equipment diagram substantiating any increase in occupant load shall be submitted. Where required by the *fire code official*, such diagram shall be posted.

**[BE] 1004.6 Fixed seating.** For areas having fixed seats and aisles, the occupant load shall be determined by the number of fixed seats installed therein. The occupant load for areas in which fixed seating is not installed, such as waiting spaces, shall be determined in accordance with Section 1004.5 and added to the number of fixed seats.

**TABLE 1004.1.2 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT**

<table>
<thead>
<tr>
<th>FUNCTION OF SPACE</th>
<th>OCCUPANT LOAD FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessory storage areas, mechanical</td>
<td>300 gross</td>
</tr>
<tr>
<td>equipment room</td>
<td></td>
</tr>
<tr>
<td>Agricultural building</td>
<td>300 gross</td>
</tr>
<tr>
<td>Aircraft hangars</td>
<td>500 gross</td>
</tr>
<tr>
<td>Airport terminal</td>
<td>20 gross</td>
</tr>
<tr>
<td>Baggage claim</td>
<td>300 gross</td>
</tr>
<tr>
<td>Baggage handling</td>
<td>100 gross</td>
</tr>
<tr>
<td>C oncourse Waiting areas</td>
<td>15 gross</td>
</tr>
<tr>
<td>Assembly</td>
<td>11 gross</td>
</tr>
<tr>
<td>Gaming floors (keno, slots, etc.)</td>
<td>30 net</td>
</tr>
<tr>
<td>Exhibit gallery and museum</td>
<td></td>
</tr>
</tbody>
</table>
The occupant load of wheelchair spaces and the associated companion seat shall be based on one occupant for each wheelchair space and one occupant for the associated companion seat provided in accordance with Section 1108.2.3 of the International Building Code.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one means of egress.
2. Both outdoor areas associated with Group R-3 and individual dwelling units of Group R-2.

SECTION 1005
MEANS OF EGRESS SIZING

[B] 1005.1 General. All portions of the means of egress system shall be sized in accordance with this section.

[Exception]: Aisles and aisle accessways in rooms or spaces used for assembly purposes complying with Section 1029.

[B] 1005.2 Minimum width based on component. The minimum width, in inches (mm), of any means of egress components shall be not less than that specified for such component elsewhere in this code or the International Building Code.

[B] 1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of means of egress stairways shall be calculated by multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.3 inch (7.6 mm) per occupant. Where stairways serve more than one story, only the occupant

<table>
<thead>
<tr>
<th>Assembly with fixed seats</th>
<th>See Section 1004.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly without fixed seats</td>
<td>7 net</td>
</tr>
<tr>
<td>Concentrated (chairs only – not fixed) Standing space</td>
<td>5 net</td>
</tr>
<tr>
<td>Unconcentrated (tables and chairs)</td>
<td>15 net</td>
</tr>
<tr>
<td>Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas</td>
<td>7 net</td>
</tr>
<tr>
<td>Business areas Concentrated business use areas</td>
<td>150 gross</td>
</tr>
<tr>
<td>Courtrooms – other than fixed seating areas</td>
<td>40 net</td>
</tr>
<tr>
<td>Day care</td>
<td>35 net</td>
</tr>
<tr>
<td>Dormitories</td>
<td>50 gross</td>
</tr>
<tr>
<td>Educational Classroom area</td>
<td>20 net</td>
</tr>
<tr>
<td>Shops and other vocational room areas</td>
<td>50 net</td>
</tr>
<tr>
<td>Exercise rooms</td>
<td>50 gross</td>
</tr>
<tr>
<td>Group H-5 Fabrication and manufacturing areas</td>
<td>200 gross</td>
</tr>
<tr>
<td>Industrial areas</td>
<td>100 gross</td>
</tr>
<tr>
<td>Institutional areas</td>
<td>240 gross</td>
</tr>
<tr>
<td>Inpatient treatment areas</td>
<td>100 gross</td>
</tr>
<tr>
<td>Outpatient areas</td>
<td>120 gross</td>
</tr>
<tr>
<td>Sleeping areas</td>
<td></td>
</tr>
<tr>
<td>Kitchens, commercial</td>
<td>200 gross</td>
</tr>
<tr>
<td>Library</td>
<td>50 net</td>
</tr>
<tr>
<td>Reading rooms</td>
<td>100 gross</td>
</tr>
<tr>
<td>Stack area</td>
<td></td>
</tr>
<tr>
<td>Locker rooms</td>
<td>50 gross</td>
</tr>
<tr>
<td>Mall buildings – covered and open</td>
<td>See Section 402.8.2 of the International Building Code</td>
</tr>
<tr>
<td>Mercantile Areas on other floors Basement and grade floor areas Storage, stock, shipping areas</td>
<td></td>
</tr>
<tr>
<td>Parking garages</td>
<td>200 gross</td>
</tr>
<tr>
<td>Residential</td>
<td>200 gross</td>
</tr>
<tr>
<td>Skating rinks, swimming pools Rink and pool decks</td>
<td></td>
</tr>
<tr>
<td>Stages and platforms</td>
<td>15 net</td>
</tr>
<tr>
<td>Warehouses</td>
<td>500 gross</td>
</tr>
</tbody>
</table>

For SI: 1 square foot = 0.0929 m², 1 foot (304.8 mm).

a. Floor area in square feet per occupant.
load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.

Exceptions:

1. For other than Group H and I-2 occupancies, the capacity, in inches (mm), of means of egress stairways shall be calculated multiplying the occupant load served by such stairway by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

2. Facilities with open-air seating shall be permitted to use the capacity factors in Table 1029.6.2 indicated for stepped aisles for exit access or exit stairways where the entire path

[B] 1005.3.2 Other egress components. The capacity, in inches (mm), of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant.

Exceptions:

1. For other than Group H and I-2 occupancies, the capacity, in inches (mm), of means of egress components other than stairways shall be calculated multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inches (5.1 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

2. Facilities with smoke-protect assembly seating shall be permitted to use the capacity factors in Table 1029.6.2 indicated for stepped aisles for exit access or exit stairways where the entire path

3. Facilities with open-air assembly seating shall be permitted to use the capacity factors in Section 1029.6.3 indicated for stepped aisles for exit access or exit stairways where the entire path for means of egress from the seating to the exit discharge is open to the outdoors.

[B] 1005.4 Continuity. The minimum width or required capacity of the means of egress required form any story of a building shall not be reduced along the path of egress travel until arrival at the public way.

[B] 1005.5. Distribution of minimum width and required capacity. Where more than one exit, or access to more than one exit, is required, the means of egress shall be configured such that the loss of any one exit, or access to one exit, shall not reduce the available capacity to less than 50 percent of the required capacity.

[B] 1005.6 Egress convergence. Where the means of egress from stories above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall not be less than the sum of the required capacities for the stairways or ramps serving the two adjacent stories, whichever is larger.

[B] 1005.7 Encroachment. Encroachments into the required means of egress width shall be in accordance with the provisions of this section.

[B] 1005.7.1 Doors. Doors, when fully opened, shall not reduce the required width by more than 7 inches (178 mm). Doors in any position shall not reduce the required width by more than one-half.

Exceptions:

1. Surface-mounted latch release hardware shall be exempt from inclusion in the 7-inch maximum (178 mm) encroachment where both conditions exist:

   1.1. The hardware is mounted to the side of the door facing away from the adjacent wall where the door is in the open position; and

   1.2 The hardware is mounted not less than 34 inches (865 mm) nor more than 48 inches (1219 mm) above the finished floor.

2. The restrictions on door swing shall not apply to doors within individual dwelling units and sleeping units of Group R-2 occupancies and dwelling units of Group R-3 occupancies.

[B] 1005.7.2 Other projections. Handrail projections shall be in accordance with the provisions of Section 1014.8. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width not more than 1 ½ inches (38 mm) on each side.

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>MAXIMUM OCCUPANT LOAD OF SPACE</th>
<th>MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without Sprinkler System (feet)</td>
<td>With Sprinkler System (feet)</td>
</tr>
<tr>
<td></td>
<td>Occupant Load</td>
<td>OL &lt; 30</td>
</tr>
<tr>
<td>Ac, E, M</td>
<td>49</td>
<td>75</td>
</tr>
<tr>
<td>B</td>
<td>49</td>
<td>100</td>
</tr>
</tbody>
</table>

TABLE 1006.2.1
SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ac, E, M</td>
</tr>
<tr>
<td>B</td>
</tr>
</tbody>
</table>
### Exception: Projections are permitted in corridors within Group I-2 Condition 1 in accordance with Section 407.4.3 of the International Building Code

[B] 1005.7.3 Protruding objects. Protruding objects shall comply with the applicable requirements of Section 1003.3.

## SECTION 1006

### NUMBERS OF EXITS AND EXIT ACCESS DOORWAYS

**[BE] 1006.1 General.** The number of exits or exit access doorways required within the means of egress system shall comply with the provisions of Section 1006.2 for spaces, including mezzanines, and Section 1006.3 for stories or occupied roofs.

**[BE] 1006.2 Egress from spaces.** Rooms, areas or spaces, including mezzanines, within a story or basement shall be provided with the number of exits or access to exits in accordance with this section.

**[BE] 1006.2.1 Egress based on occupant load and common path of egress travel distance.** Two exits or exit access doorways from any space shall be provided where the design occupant load or the common path of egress travel distance exceeds the values listed in Table 1006.2.1. The cumulative occupant load from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

**Exceptions:**

1. The number of exits from foyers, lobbies, vestibules or similar spaces need not be based on cumulative occupant loads for areas discharging through such spaces, but the capacity of the exits from such spaces shall be based on applicable cumulative occupant loads.

2. Care suites in Group I-2 occupancies complying with Section 407.4 of the International Building Code.

**[BE] 1006.2.2 Egress based on use.** The numbers of exits or access to exits shall be provided in the uses described in Sections 1006.2.2.1 through 1006.2.2.5.

**[BE] 1006.2.2.1 Boiler, incinerator and furnace rooms.** Two exit access doorways are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m²) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422,000 KJ) input capacity. Where two exit access doorways are required, one is permitted to be a fixed ladder or an alternating tread device. Exit access doorways shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

**[BE] 1006.2.2.2 Refrigeration machinery rooms.** Machinery rooms larger than 1,000 square feet (93 m²) shall have not less than two exits or exit access doorways. Where two exit access doorways are required, one such doorway is permitted to be served by a fixed ladder or an alternating tread device. Exit access doorways shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.

All portions of machinery rooms shall be within 150 feet (45,720 mm) of an exit or exit access doorway. An increase in exit access travel distance is permitted in accordance with Section 1017.1.

Exit and exit access doorways swing in the direction of egress travel, regardless of the occupant load served. Exit
and exit access doorways shall be tight fitting and self-closing.

**[BE] 1006.2.2.3 Refrigerated rooms or spaces.** Rooms or spaces having a floor area larger than 1,000 square feet (93 m²), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access doorways.

Exit access travel distance shall be determined as specified in Section 1017.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access doorway where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigerated rooms or spaces.

**Exception:** Where using refrigerants in quantities limited to the amounts based on the volume set forth in the International Mechanical Code.

**[BE] 1006.2.2.4 Group I-4 means of egress.** Group I-4 facilities, rooms or spaces where care is provided for more than 10 children that are 2 ½ years of age or less, shall have access to not less than two exits or exit access doorways.

**[BE] 1006.2.2.5 Vehicular ramps.** Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

**[BE] 1006.2.2.6 Groups R-3 and R-4.** Where Group R-3 occupancies are permitted by Section 903.2.8 to be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.3, the exit access travel distance for Group R-3 shall be not more than 125 feet (38 100 mm). Where Group R-4 occupancies are permitted by Section 903.2.8 to be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.3, the exit access travel distance for Group R-4 shall be not more than 75 feet (22 860 mm).

**[BE] 1006.3 Egress from stories or occupied roofs.** The means of egress system serving any story or occupied roof shall be provided with the number of separate and distinct exits or access to exits based on the aggregate occupant load served in accordance with this section. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required number of exits or access to exits serving that story.

**Exception:** The path of egress travel to an exit shall be permitted to pass through more than one adjacent story in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or fewer serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
2. Exit access stairways serving and contained within a Group R-3 congregate residence or a Group R-4 facility.

3. Exit access stairways and ramps in open parking garages that serve only the parking garage.

4. Exit access stairways and ramps serving open-air assembly seating complying with the exit access travel distance requirements of Section 1029.7.

5. Exit access stairways and ramps between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

#### 1006.3.2 Egress based on occupant load. Each story and occupied roof shall have the minimum number of separate and distinct exits, or access to exits, as specified in Table 1006.3.2. A single exit or access to a single exit shall be permitted in accordance with Section 1006.3.3. The required number of exits or exit access stairways or ramps providing access to exits, from any story or occupied roof shall be maintained until arrival at the exit discharge or public way.

<table>
<thead>
<tr>
<th>OCCUPANT LOAD PER STORY</th>
<th>MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-500</td>
<td>2</td>
</tr>
<tr>
<td>501-1,000</td>
<td>3</td>
</tr>
<tr>
<td>More than 1,000</td>
<td>4</td>
</tr>
</tbody>
</table>

**[BE] 1006.3.2 Single exits.** A single exit or access to a single exit shall be permitted from any story or occupied roof, where one of the following conditions exists:

1. The occupant load, number of dwelling units and common path of egress travel distance do not exceed the values in Table 1006.3.3(1) or 1006.3.3(2).

2. Rooms, areas and spaces complying with Section 1006.2.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit or access to a single exit.

3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit or access to a single exit.

4. Group R-3 and R-4 occupancies shall be permitted to have one exit or access to a single exit.

5. Individual single-story or multistory dwelling units shall be permitted to have a single exit or access to a single exit from the dwelling unit provided that both of the following criteria are met:

   5.1. The dwelling unit complies with Section 1006.2.1 as a space with one means of egress.

   5.2. Either the exit from the dwelling unit discharges directly to the exterior at the level of exit discharge, or the exit access outside the dwelling unit’s entrance door provides access to not less than two approved independent exits.

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**[BE] TABLE 1006.3.3(1) STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 OCCUPANCIES**
### TABLE [BE] 1006.3.2(2)
STORIES WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

<table>
<thead>
<tr>
<th>STORY</th>
<th>OCCUPANCY</th>
<th>MAXIMUM OCCUPANT LOAD PER STORY</th>
<th>MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First story above or below grade plane</td>
<td>A, B&lt;sup&gt;a&lt;/sup&gt;, E F&lt;sup&gt;b&lt;/sup&gt;, M, U</td>
<td>49</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>H-2, H-3</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>H-4, H-5, I, R-1, R-2&lt;sup&gt;a,c&lt;/sup&gt;, R-4</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>S&lt;sup&gt;b,d&lt;/sup&gt;</td>
<td>29</td>
<td>75</td>
</tr>
<tr>
<td>Second story above grade plane</td>
<td>B, F, M, S&lt;sup&gt;d&lt;/sup&gt;</td>
<td>29</td>
<td>75</td>
</tr>
<tr>
<td>Third story above grade plane and higher</td>
<td>NP</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm. NP = Not Permitted. NA = Not Applicable.

- a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1030.
- b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall have a maximum exit access travel distance of 100 feet.
- c. This table is used for R-2 occupancies consisting of sleeping units. For R-2 occupancies consisting of dwelling units, use Table 1006.3.3(1).
- d. The length of exit access travel distance in a Group S-2 open parking garage shall not be more than 100 feet.

### SECTION 1007
EXIT AND EXIT ACCESS DOORWAY CONFIGURATION

**[BE] 1007.1 General.** Exits, exit access doorways, and exit access stairways and ramps serving spaces, including individual building stories, shall be separated in accordance with the provisions of this section.

**[BE] 1007.1.1 Two exits or exit access doorways.** Where two exits, exit access doorways, exit access stairways or ramps, or any combination thereof, are required from any portion of the exit access, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between them. Interlocking or scissor stairways shall be counted as one exit stairway.

**Exceptions:**

1. Where interior exit stairways or ramps are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1020, the required exit separation shall be measured...
along the shortest direct line of travel within the corridor.

2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

**BE** 1007.1.1.1 Measurement point. The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to exit or exit access doorways shall be measured to any point along the width of the doorway.

2. The separation distance to exit access stairways shall be measured to the closest riser.

3. The separation distance to exit access ramps shall be measured to the start of the ramp run.

**BE** 1007.1.2 Three or more exits or exit access doorways. Where access to three or more exits is required, not less than two exit or exit access doorways shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required exit or exit access doorways shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

**BE** 1007.1.3 Remoteness of exit access stairways or ramps. Where two exit access stairways or ramps provide the required means of egress to exits at another story, the required separation distance shall be maintained for all portions of such exit access stairways or ramps.

**BE** 1007.1.3.1 Three or more exit access stairways or ramps. Where more than two exit access stairways or ramps provide the required means of egress, not less than two shall be arranged in accordance with Section 1007.1.3.

**SECTION 1008 MEANS OF EGRESS ILLUMINATION**

**BE** 1008.1 Means of egress illumination. Illumination shall be provided in the means of egress in accordance with Section 1008.2. Under emergency power, means of egress illumination shall comply with Section 1008.3.

**BE** 1008.2 Illumination required. The means of egress serving a room or space shall be illuminated at all times that the room or space is occupied.

**Exceptions:**

1. Occupancies in Group U.
2. Aisle accessways in Group A.
3. Dwelling units and sleeping units in Groups R-1, R-2 and R-3.
4. Sleeping units of Group I occupancies.

**BE** 1008.2.1 Illumination level under normal power. The means of egress illumination level shall be not less than 1 footcandle (11 lux) at the walking surface.

**Exception:** For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises’ fire alarm system:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux),
2. Steps, landings and the sides of ramps shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems listed in accordance with UL 1994.

**BE** 1008.2.2 Group I-2. In Group I-2 occupancies where two or more exits are required, on the exterior landings required by Section 1010.6.1, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

**BE** 1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the exit discharge from each exit to the public way.

**Exception:** Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

**BE** 1008.3 Emergency power for illumination. The power supply for means of egress illumination shall normally be provided by the premises’ electrical supply.

**BE** 1008.3.1 General. In the event of power supply failure in rooms and spaces that require two or more means of egress an emergency electrical system shall automatically illuminate all of the following areas:

1. Aisles.
2. Corridors.
3. Exit access stairways and ramps.

**BE** 1008.3.2 Buildings. In the event of power supply failure, in buildings that require two or more means of egress, an emergency electrical system shall automatically illuminate all of the following areas:

1. Interior exit access stairways and ramps.
2. Interior and exterior exit stairways and ramps.
3. Exit passageways.
4. Vestibules and areas on the level of discharge used for exit discharge in accordance with Section 1028.1.
5. Exterior landings as required by Section 1010.1.6 for exit doorways that lead directly to the exit discharge.
[BE] 1009.3 Rooms and spaces. In the event of power supply failure, an emergency electrical system shall automatically illuminate all of the following areas:

1. Electrical equipment rooms.
2. Fire command centers.
3. Fire pump rooms.
4. Generator rooms.
5. Public restrooms with an area greater than 300 square feet (27.87 m²).

[BE] 1008.3.4 Duration. The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702 of the International Building Code.

[BE] 1008.3.5 Illumination level under emergency power. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 foot-candle (2.2 lux).

SECTION 1009
ACCESSIBLE MEANS OF EGRESS

[BE] 1009.1 Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress is required by Section 1006.2 or 1006.3 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exceptions:

1. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1009.3, 1009.4 or 1009.5.
2. In assembly areas with ramped aisles or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1029.8.

[BE] 1009.2 Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with Section 1104 of the International Building Code.
2. Interior exit stairways complying with Sections 1009.3 and 1023.
3. Exit access stairways complying with Sections 1009.3 and 1019.3 or 1019.4.
4. Exterior exit stairways complying with Sections 1009.3 and 1027 and serving levels other than the level of exit discharge.
5. Elevators complying with Section 1009.4.
6. Platform lifts complying with Section 1009.5.
7. Horizontal exits complying with Section 1026.
8. Ramps complying with Section 1012.
9. Areas of refuge complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving exits at the level of exit discharge.

[BE] 1009.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a level of exit discharge, not less than one required accessible means of egress shall be an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a horizontal exit and located at or above the level of exit discharge.
2. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required on floors provided with a ramp conforming to the provisions of Section 1012.

[BE] 1009.3 Stairways. In order to be considered part of an accessible means of egress, a stairway between stories shall comply with Sections 1009.3.1 through 1009.3.3.

Exceptions:

Exit access stairways providing means of egress from mezzanines are permitted as part of an accessible means of egress.

1009.3.2 Stairway width. Stairways shall have a clear width of 48 inches (1219 mm) between handrails.

Exceptions:

1. The clear width of 48 inches (1219 mm) between handrails is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The clear width of 48 inches (1219 mm) between handrails is not required for stairways accessed from a refuge area in conjunction with a horizontal exit.

1009.3.3 [BE] 1009.3.3 Area of refuge. Stairways shall either incorporate an area of refuge within an enlarged floorlevel landing or shall be accessed from an area of refuge complying with Section 1009.6.

Exceptions:

1. Areas of refuge are not required at exit access stairways where two-way communication is provided at the elevator landing in accordance with Section 1009.8.
2. **Areas of refuge** are not required at **stairways** in buildings equipped throughout with an **automatic sprinkler system** installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. **Areas of refuge** are not required at **stairways** serving open parking garages.

4. **Areas of refuge** are not required for **smokeprotected or open-air assembly seating areas** complying with Sections 1029.6.2 and 1029.6.3.

5. **Areas of refuge** are not required at **stairways** in Group R-2 occupancies.

6. **Areas of refuge** are not required for **stairways** accessed from a refuge area in conjunction with a **horizontal exit.**

**[BE] 1009.4 Elevators.** In order to be considered part of an **accessible means of egress**, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1/CSA B44. Standby power shall be provided in accordance with Section 604 of this code and Section 3003 of the International Building Code. The elevator shall be accessed from an **area of refuge** complying with Section 1009.6.

**Exceptions:**

1. **Areas of refuge** are not required at the elevator in open parking garages.

2. **Areas of refuge** are not required in buildings and facilities equipped throughout with a **automatic sprinkler system** installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. **Areas of refuge** are not required at elevators not required to be located in a shaft in accordance with Section 712 of the International Building Code.

4. **Areas of refuge** are not required at elevators serving **smoke protected assembly seating areas** complying with Section 1029.6.2.

5. **Areas of refuge** are not required for elevators accessed from a refuge area in conjunction with a **horizontal exit.**

**[BE] 1009.5 Platform lifts.** Platform lifts shall be permitted to serve as part of an **accessible means of egress** where allowed as part of a required **accessible route** in Section 1109.8 of the International Building Code except for Item 10. Standby power for the platform lift shall be provided in accordance with Section 604.

**[BE] 1009.6 Areas of refuge.** Every required **area of refuge** shall be accessible from the space it serves by an **accessible means of egress.**

**[BE] 1009.6.1 Travel distance.** The maximum travel distance from any accessible space to an **area of refuge** shall not exceed the **exit access** travel distance permitted for the occupancy in accordance with Section 1017.1.

**[BE] 1009.6.2 Stairway or elevator access.** Every required **area of refuge** shall have direct access to a **stairway** complying with Sections 1009.3 and 1023 or an elevator complying with Section 1009.4.

**[BE] 1009.6.3 Size.** Each **area of refuge** shall be sized to accommodate one wheelchair space of 30 inches by 48 inches (762 mm by 1219 mm) for each 200 occupants or portion thereof, based on the occupant load of the **area of refuge** and areas served by the **area of refuge**. Such wheelchair spaces shall not reduce the **means of egress** minimum width or required capacity. Access to any of the required wheelchair spaces in an **area of refuge** shall not be obstructed by more than one adjoining wheelchair space.

**[BE] 1009.6.4 Separation.** Each **area of refuge** shall be separated from the remainder of the story by a smoke barrier complying with Section 709 of the International Building Code or a **horizontal exit** complying with Section 1026. Each **area of refuge** shall be designed to minimize the intrusion of smoke.

**Exceptions:**

1. **Areas of refuge** located within an enclosure for **interior exit stairways** complying with Section 1023.

2. **Areas of refuge** in outdoor facilities where exit access is essentially open to the outside.

**[BE] 1009.6.5 Two-way communication.** **Areas of refuge** shall be provided with a two-way communication system complying with Sections 1009.8.1 and 1009.8.2.

**[BE] 1009.7 Exterior areas for assisted rescue.** Exterior areas for assisted rescue shall be accessible by an **accessible route** from the area served.

Where the exit discharge does not include an accessible route from an exit located on the **level of exit discharge** to a public way, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.

**[BE] 1009.7.1 Size.** Each exterior area for assisted rescue shall be sized to accommodate wheelchair spaces in accordance with Section 1009.6.3.

**[BE] 1009.7.2 Separation.** Exterior walls separating the exterior area of assisted rescue from the interior of the building shall have a minimum fire-resistance rating of 1 hour, rated for exposure to fire from the inside. The fire-resistance-rated exterior wall construction shall extend horizontally 10 feet (3048 mm) beyond the landing on either side of the landing or equivalent fire-resistance-rated construction is permitted to extend out perpendicular to the exterior wall 4 feet (1220 mm) minimum on the side of the landing. The fire-resistance-rated construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower. Openings within such fire-resistance-rated exterior walls shall be protected in accordance with Section 716 of the International Building Code.

**[BE] 1009.7.3 Openness.** The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be not less than 50 percent open, and the open area shall be distributed so as to minimize the accumulation of smoke or toxic gases.

**[BE] 1009.7.4 Stairways.** Stairways that are part of the **means of egress** for the exterior area for assisted rescue shall provide a clear width of 48 inches (1220 mm) between **handrails.**
Exception: The clear width of 48 inches (1220 mm) between handrails is not required at stairways serving buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[BE] 1009.8 Two-way communication. A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the level of exit discharge.

Exceptions:

1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within areas of refuge in accordance with Section 1009.6.5.

2. Two-way communication systems are not required on floors provided with ramps conforming to the provisions of Section 1012.

3. Two-way communication systems are not required at the landings serving only service elevators that are not designated as part of the accessible means of egress or serve as part of the required accessible route into a facility.

4. Two-way communication systems are not required at the landings serving only freight elevators.

5. Two-way communication systems are not required at the landing serving a private residence elevator.

[BE] 1009.8.1 System requirements. Two-way communication systems shall provide communication between each required location and the fire command center or a central control point location approved by the fire department. Where the central control point is not a constantly attended location, a two-way communication system shall have a timed automatic telephone dial-out capability to a monitoring location or 9-1-1. The two-way communication system shall include both audible and visible signals.

[BE] 1009.8.2 Directions. Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the two-way communication system. Signage shall comply with the ICC A117.1 requirement for visual characters.

[BE] 1009.9 Signage. Signage indicating special accessibility provisions shall be provided as shown:

1. Each door providing access to an area of refuge from an adjacent floor area shall be identified by a sign stating: AREA OF REFUGE.

2. Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: EXTERIOR AREA FOR ASSISTED RESCUE.

Signage shall comply with the ICC A117.1 requirement for visual characters and include the International Symbol of Accessibility. Where exit sign illumination is required by Section 1013.3, the signs shall be illuminated. Additionally, visual characters, raised character and braille signage complying with ICC A117.1 shall be located at each door to an area of refuge and exterior area for assisted rescue in accordance with Section 1013.4.

[BE] 1009.10 Directional signage. Directional signage indicating the location of all other means of egress and which of those are accessible means of egress shall be provided at the following:

1. At exits serving a required accessible space but not providing an approved accessible means of egress.

2. At elevator landings.

3. Within areas of refuge.

[BE] 1009.11 Instructions. In areas of refuge and exterior areas for assisted rescue, instructions on the use of the area under emergency conditions shall be posted. Signage shall comply with the ICC A117.1 requirement for visual characters. The instructions shall include all of the following:

1. Persons able to use the exit stairway do so as soon as possible, unless they are assisting others.

2. Information on planned availability of assistance in the use of stairs or supervised operation of elevators and how to summon such assistance.

3. Directions for use of the two-way communication system where provided.

SECTION 1010
DOORS, GATES AND TURNSTILES

[BE] 1010.1 Doors. Means of egress doors shall meet the requirements of this section. Doors serving a means of egress system shall meet the requirements of this Section and Section 1022.2. Doors provided for egress purposes in numbers greater than required by this code shall meet the requirements of this section.

Means of egress doors shall be readily distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Mirrors or similar reflecting materials shall not be used on means of egress doors. Means of egress doors shall not be concealed by curtains, drapes, decorations or similar materials.

[BE] 1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear width of 32 inches (813 mm). Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). Where this Section requires a minimum clear width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. Means of egress doors in a Group I-2 occupancy used for the movement of beds shall provide a clear width not less than 41 ½ inches (1054 mm). The height of door openings shall be not less than 80 inches (2032 mm).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in Group R-2 and R-3 occupancies.
2. Door openings to resident sleeping units in Group I-3 occupancies shall have a clear width of not less than 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m²) in area shall not be limited by the minimum width.
4. Width of door leaves in revolving doors that comply with Section 1010.1.4.1 shall not be limited.
5. Door openings within a dwelling unit or sleeping unit shall be not less than 78 inches (1981 mm) in height.
6. Exterior door openings in dwelling units and sleeping units, other than the required exit door, shall be not less than 76 inches (1930 mm) in height.
7. In other than Group R-1 occupancies, the minimum widths shall not apply to interior egress doors within a dwelling unit or sleeping unit that is not required to be an Accessible unit, Type A unit or Type B unit.
8. Door openings required to be accessible within Type B units shall have a minimum clear width of 31.75 inches (806 mm).
9. Doors to walk-in freezers and coolers less than 1,000 square feet (93 m²) in area shall have a maximum width of 60 inches (1524 mm).
10. In Group R-1 dwelling units or sleeping units not required to be Accessible units, the minimum width shall not apply to doors for showers or saunas.

[BE] 1010.1.1 Projections into clear width. There shall not be projections into the required clear width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

**Exception:** Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

[BE] 1010.1.2 Door swing. Egress doors shall be of the pivoted or side-hinged swinging type.

**Exceptions:**
1. Private garages, office areas, factory and storage areas with an occupant load of 10 or less.
2. Doors within or serving a single dwelling unit in Groups R-2 and R-3.
3. In other than Group H occupancies, revolving doors complying with Section 1010.1.4.1.
4. In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.1.4.3.
5. Power-operated doors in accordance with Section 1010.1.4.2.
6. Doors serving a bathroom within an individual sleeping unit in Group R-1.
7. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a means of egress from spaces with an occupant load of 10 or less.

[BE] 1010.1.2.1 Direction of swing. Pivot or side-hinged swinging doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons or a Group H occupancy.

[BE] 1010.1.3 Door opening force. The force for pushing or pulling open interior swinging egress doors, other than fire doors, shall not exceed 5 pounds (22 N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other swinging doors, as well as sliding and folding doors, the door latch shall release when subjected to a 15-pound (67 N) force. The door shall be set in motion when subjected to a 30-pound (133 N) force. The door shall swing to a full-open position when subjected to a 15-pound (67 N) force.

[BE] 1010.1.3.1 Location of applied forces. Forces shall be applied to the latch side of the door.

[BE] 1010.1.4 Special doors. Special doors and security grilles shall comply with the requirements of Sections 1010.1.4.1 through 1010.1.4.4.

1. Group I-3 occupancies used as a place of detention.
2. Critical or intensive care patient rooms within suites of health care facilities.

<table>
<thead>
<tr>
<th>REVOLVING DOOR MAXIMUM NOMINAL DIAMETER (FT-IN)</th>
<th>MAXIMUM ALLOWABLE REVOLVING DOOR SPEED (RPM)</th>
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<tbody>
<tr>
<td>8-0</td>
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<td>24-0</td>
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</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

[BE] 1010.1.4.1 Revolving doors. Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer’s instructions.
2. Each revolving door shall be capable of breakout in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of stairways or escalators. A dispersal area shall be provided between the stairways or escalators and the revolving doors.

4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1010.1.4.1(1). Automatic or power-operated revolving doors shall comply with Table 1010.1.4.1(2).

5. An emergency stop switch shall be provided near each entry point of a power or automatically operated revolving doors within 48 inches (1220 mm) of the door and between 24 inches (610 mm) and 48 inches (1220 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.

6. Each revolving door shall have a side-hinged swinging door that complies with Section 1010.1 in the same wall and within 10 feet (3048 mm) of the revolving door.

7. Revolving doors shall not be part of an accessible route required by Section 1009 of this code and Chapter 11 of the International Building Code.

[BE] TABLE 1010.1.4.1(1)
MAXIMUM DOOR SPEED MANUAL REVOLVING DOORS

<table>
<thead>
<tr>
<th>REVOLVING DOOR NOMINAL DIAMETER (FT-IN)</th>
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<td>10-0</td>
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For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

[BE] 1010.1.4.1 Egress component. A revolving door used as a component of a means of egress shall comply with Section 1010.1.4.1 and the following three conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the minimum width or required capacity.
2. Each revolving door shall be credited with a capacity based on not more than a 50-person occupant load.
3. Each revolving door shall provide for egress in accordance with BHMA A156.27 with a breakout force of not more than 130 pounds (578 N).

[BE] 1010.1.4.2 Other than egress component. A revolving door used as other than a component of a means of egress shall comply with Section 1010.1.4.1. The breakout force of a revolving door not used as a component of a means of egress shall not be more than 180 pounds (801 N).

**Exception:** A breakout force in excess of 180 pounds (801 N) is permitted if the collapsing force is reduced to not more than 130 pounds (578 N) when not less than one of the following conditions is satisfied:

1. There is a power failure or power is removed to the device holding the door wings in position.
2. There is an actuation of the automatic sprinkler system where such system is provided.
3. There is an actuation of a smoke detection system that is installed in accordance with Section 907 to provide coverage in areas within the building that are within 75 feet (22 860 mm) of the revolving doors.
4. There is an actuation of a manual control switch, in an approved location and clearly identified, that reduces the breakout force to not more than 130 pounds (578 N).

[BE] 1010.1.4.2 Power-operated doors. Where means of egress doors are operated or assisted by power, the design shall be such that in the event of power failure, the door is capable of being opened manually to permit means of egress travel or closed where necessary to safeguard means of egress. The forces required to open these doors manually shall not exceed those specified in Section 1010.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of swinging open from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Power-operated swinging doors, power-operated sliding doors and power-operated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and low energy power-operated swinging doors shall comply with BHMA A156.19.

**Exceptions:**

1. Occupancies in Group I-3.
2. Horizontal sliding doors complying with Section 1010.1.4.3.
3. For a biparting door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-inch (813 mm) single-leaf requirement of Section 1010.1.1, provided a minimum 32-inch (813 mm) clear opening is provided when the two biparting leaves meeting in the center are broken out.

[BE] 1010.1.4.3 Special purpose horizontal sliding, accordion or folding doors. In other than Group H occupancies, special purpose horizontal sliding, accordion, or folding door assemblies permitted to be a component of a means of egress in accordance with Exception 6 to Section 1010.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.

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2. The doors shall be openable by a simple method from both sides without special knowledge or effort.

3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.

4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.

5. The door assembly shall comply with the applicable fire protection rating and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.5.9.3 of the International Building Code, shall be installed in accordance with NFPA 80 and shall comply with Section 716 of the International Building Code.

6. The door assembly shall have an integrated standby power supply.

7. The door assembly power supply shall be electrically supervised.

8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

1010.1.4.4 Locking arrangements in educational occupancies. In Group E and Group B educational occupancies, egress doors from classrooms, offices and other occupied rooms shall be permitted to be provided with locking arrangements designed to keep intruders from entering the room, where all of the following conditions are met:

1. The door shall be capable of being unlocked from outside the room with a key or other approved means.

2. The door shall be openable from within the room in accordance with Section 1010.1.9.

3. Modifications shall not be made to listed panic hardware, fire door hardware or door closers.

[BE] 1010.1.4.4.1 Remote operation of locks. Remote operation of locks complying with Section 1010.1.4.4. shall be permitted.

[BE] 1010.1.4.5 Security grilles. In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main exit and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more means of egress are required, not more than one-half of the exits or exit access doorways shall be equipped with horizontal sliding or vertical security grilles.

[BE] 1010.1.5 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:
1. Doors serving individual dwelling units in Groups R-2 and R-3 where the following apply:

   1.1. A door is permitted to open at the top step of an interior flight of stairs, provided the door does not swing over the top step.

   1.2. Screen doors and storm doors are permitted to swing over stairs or landings.

2. Exterior doors as provided for in Section 1003.5, Exception 1, and Section 1022.2, which are not on an accessible route.

3. In Group R-3 occupancies not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an occupant load of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the International Building Code and serving an occupant load of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.6 Landings at doors. Landings shall have a width not less than the width of the stairway or the door, whichever is greater. Doors in the fully open position shall not reduce a required dimension by more than 7 inches (178 mm). Where a landing serves an occupant load of 50 or more, doors in any position shall not reduce the landing to less than one-half its required width. Landings shall have a length measured in the direction of travel of not less than 44 inches (1118 mm).

Exception: Landing length in the direction of travel in Groups R-3 and U and within individual units of Group R-2 need not exceed 36 inches (914 mm).

[BE] 1010.1.7 Thresholds. Thresholds at doorways shall not exceed ¾ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving dwelling units or ½ inch (12.7 mm) above the finished floor or landing for other doors. Raised thresholds and floor level changes greater than ½ inch (6.4 mm) at doorways shall be beveled with a slope not greater than one unit vertical in two units horizontal (50-percent slope).

Exceptions:
1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to 7 ¾ inches (197 mm) in height if all of the following apply:
1. The door is not part of the required means of egress.

2. The door is not part of an accessible route as required by Chapter 11 of the International Building Code.

3. The door is not part of an accessible unit, Type A unit or Type B unit.

2. In Type B units, where Exception 5 to Section 1010.1.5 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed 4 1/4 inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or 4 1/2 inches (114 mm) above the exterior deck, patio or balcony for other doors.

**[BE] 1010.1.8 Door arrangement.** Space between two doors in a series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in a series shall swing either in the same direction or away from the space between the doors.

**Exceptions:**
1. The minimum distance between horizontal sliding power-operated doors in a series shall be 48 inches (1219 mm).
2. Storm and screen doors serving individual dwelling units in Groups R-2 and R-3 need not be spaced 48 inches (1219 mm) from the other door.
3. Doors within individual dwelling units in Groups R-2 and R-3 other than within Type A dwelling units.

**[BE] 1010.1.9 Door operations.** Except as specifically permitted by this section, egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

**[BE] 1010.1.9.1 Hardware.** Door handles, pulls, latches, locks and other operating devices on doors required to be accessible by Chapter 11 of the International Building Code shall not require tight grasping, tight pinching or twisting of the wrist to operate.

**[BE] 1010.1.9.2 Hardware height.** Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor. Locks used only for security purposes and not used for normal operation are permitted to have operable parts of the release of latch on self-latching devices at 54 inches (1370 mm) maximum above the finished floor or ground, provided the self-latching devices are not also self-locking devices operated by means of a key, electronic opener or integral combination lock.

**1010.1.9.3 Monitored or recorded egress.** Where electrical systems that monitor or record egress activity are incorporated, the locking system shall comply with Section 1010.1.9.7, 1010.1.9.8, 1010.1.9.9, 1010.1.9.10 or 1010.1.9.11, or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

**[BE] 1010.1.9.4 Locks and latches.** Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided:
   2.1. The locking device is readily distinguishable as locked.
   2.2. A readily visible durable sign is posted on the egress side or on adjacent to the door stating: THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED. The sign shall be in letters 1 inch (25 mm) high on a contrasting background.
   2.3. The use of the key-operated locking device is revokable by the fire code official for due cause.
3. Where egress doors are used in pairs, approved automatic flush bolts shall be permitted to be used, provided that the door leaf having the automatic flush bolts does not have a doorknob or surface-mounted hardware.
4. Doors from individual dwelling or sleeping units of Group R occupancies having an occupant load of 10 or less are permitted to be equipped with a night latch, dead bolt or security chain, provided such devices are operable from the inside without the use of a key or tool.
5. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.

**[BE] 1010.1.9.5 Bolt locks.** Manually operated flush bolts or surface bolts are not permitted.

**Exceptions:**
1. On doors not required for egress in individual dwelling units or sleeping units.
2. Where a pair of doors serves a storage or equipment room, manually operated edgeor surface-mounted bolts are permitted on the inactive leaf.
3. Where a pair of doors serves an occupant load of less than 50 persons in a Group B, F or S occupancy, manually operated edgeor surface-mounted bolts are permitted on the inactive leaf. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.
4. Where a pair of doors serves a Group B, F or S occupancy, manually operated edgeor surface-mounted bolts are permitted on the inactive leaf provided such inactive leaf is not needed to meet egress capacity requirements and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. The inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.
5. Where a pair of doors serves patient care rooms in Group I-2 occupancies, self-latching edge or surface-mounted bolts are permitted on the inactive leaf provided that the inactive leaf is not needed to meet egress capacity requirements and the inactive leaf shall not contain doorknobs, panic bars or similar operating hardware.

[B] 1010.1.9.6 Unlatching. The unlatching of any door or leaf shall not require more than one operation.

Exceptions:
1. Places of detention or restraint.
2. Where manually operated bolt locks are permitted by Section 1010.1.9.4.
3. Doors with automatic flush bolts as permitted by Section 1010.1.9.3, Item 3.
4. Doors from individual dwelling units and sleeping units of Group R occupancies as permitted by Section 1010.1.9.3, Item 4.

[B] 1010.1.9.6.1 Closet doors. Closet doors that latch in the closed position shall be openable from inside the closet.

[B] 1010.1.9.7 Controlled egress doors in Groups I-1 and I-2. Electric locking systems, including electro-mechanical locking systems and electromagnetic locking systems, shall be permitted to be locked in the means of egress in Group I-1 or I-2 occupancies where the clinical needs of persons receiving care require their containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door locks shall unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The door locks shall unlock upon loss of power controlling the lock or lock mechanism.
3. The door locking system shall be installed to have the capability of being unlocked by a switch located at the fire command center, a nursing station or other approved location. The switch shall directly break power to the lock.
4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an exit.
5. The procedures for unlocking the doors shall be described and approved as part of the emergency planning and preparedness required by Chapter 4.
6. All clinical staff shall have the keys, codes or other means necessary to operate the locking systems.
7. Emergency lighting shall be provided at the door.

8. The door locking system units shall be listed in accordance with UL 294.

Exceptions:
1. Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric treatment area.
2. Items 1 through 4 shall not apply to doors to areas where a listed egress control system is utilized to reduce the risk of child abduction from nursery and obstetric areas of a Group I-2 hospital.

[B] 1010.1.9.8 Delayed egress. Delayed egress locking systems, shall be permitted to be installed on doors serving the following occupancies in buildings that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or approved automatic smoke or heat detection system installed in accordance with Section 907:

2. Group E classrooms with an occupant load of less than 50.

Exception: Delayed egress locking systems shall be permitted to be installed on exit or exit access doors, other than the main exit or exit access door, serving a courtroom in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

[B] 1010.1.9.8.1 Delayed egress locking system. The delayed egress locking system shall be installed and operated in accordance with all of the following:

1. The delay electronics of the delayed egress locking system shall activate an audible signal in the vicinity of the door as part of the function of a psychiatric treatment area.
2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate, free egress.
3. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.
Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking system.

Exception: In Group I-2 or I-3 occupancies, the egress path from any point in the building shall not pass through more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

6.1. For doors that swing in the direction of egress, the sign shall read: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.2. For doors that swing in the opposite direction of egress, the sign shall read: PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.3. The sign shall comply with the visual character requirements in ICC A117.1.

   Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.

7. Emergency lighting shall be provided on the egress side of the door.

8. The delayed egress locking system units shall be listed in accordance with UL 294.

[BE] 1010.1.9.8 Sensor release of electrically locked egress doors. The electric locks on sensor-released doors located in a means of egress in buildings with an occupancy in Groups A, B, E, I-1, I-2, I-4, M, R-1 or R-2 and entrance doors to tenant spaces in occupancies in Groups A, B, E, I-1, I-2, I-4, M, R-1 or R-2 are permitted where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors. The doors shall be arranged to unlock by a signal from or loss of power to the sensor.

2. Loss of power to the lock or locking system shall automatically unlock the doors.

3. The doors shall be arranged to unlock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads “PUSH TO EXIT.” When operated, the manual unlocking device shall result in direct interruption of power to the lock—indeed of other electronics—and the doors shall remain unlocked for not less than 30 seconds.

4. Activation of the building fire alarm system, where provided, shall automatically unlock the doors, and the doors shall remain unlocked until the fire alarm system has been reset.

5. Activation of the building automatic sprinkler system or fire detection system, where provided, shall automatically unlock the doors. The doors shall remain unlocked until the fire alarm system has been reset.

6. The door locking system units shall be listed in accordance with UL 294.

[BE] 1010.1.9.9 Electromagnetically locked egress doors. Doors in the means of egress in buildings with an occupancy in Group A, B, E, I-1, I-2, I-4, M, R-1 or R-2 and doors to tenant spaces in Groups A, B, E, I-1, I-2, I-4, M, R-1 or R-2 shall be permitted to be locked with an electromagnetic locking system where equipped with hardware that incorporates a built-in switch and where installed and operated in accordance with all of the following:

1. The hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.

2. The hardware is capable of being operated with one hand.

3. Operation of the hardware directly interrupts the power to the electromagnetic lock and unlocks the door immediately.

4. Loss of power to the locking system automatically unlocks the door.

5. Where panic or fire exit hardware is required by Section 1010.1.10, operation of the panic or fire exit hardware also releases the electromagnetic lock.

6. The locking system units shall be listed in accordance with UL 294.

[BE] 1010.1.9.10 Locking arrangements in correctional facilities. In occupancies in Groups A-2, A-3, A-4, B, E, F, I-2, I-3, M and S within correctional and detention facilities, doors in means of egress serving rooms or spaces occupied by persons whose movements are controlled for security reasons shall be permitted to be locked where equipped with egress control devices that shall unlock manually and by not less than one of the following means:

1. Activation of an automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. Activation of an approved manual fire alarm box.

3. A signal from a constantly attended location.

[BE] 1010.1.9.11 Stairway doors. Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:
2. This Section shall not apply to doors arranged in accordance with Section 403.5.3 of the International Building Code.

3. In stairways serving not more than four stories, doors are permitted to be locked from the side opposite the egress side, provided they are openable from the egress side and capable of being unlocked simultaneously without unlatching upon a signal from the fire command center, if present, or a signal by emergency personnel from a single location inside the main entrance to the building.

4. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single exit stairway where permitted in Section 1006.3.2.

5. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the dwelling unit is from a single exit stairway where permitted in Section 1006.3.2.

**[BE] 1010.12 Panic and fire exit hardware.** Doors serving a Group H occupancy and doors serving rooms or spaces with an occupant load of 50 or more in a Group A or E occupancy shall not be provided with a latch or lock other than panic hardware or fire exit hardware.

**Exceptions:**

1. A main exit of a Group A occupancy shall be permitted to be locked in accordance with Section 1010.1.9.3, Item 2.

2. Doors serving a Group A or E occupancy shall be permitted to be electromagnetically locked in accordance with Section 1010.1.9.9.

   Electrical rooms with equipment rated 1,200 amperes or more and over 6 feet (1829 mm) wide, and that contain over-current devices, switching devices or control devices with exit or exit access doors, shall be equipped with panic hardware or fire exit hardware. The doors shall swing in the direction of egress travel.

**[BE] 1010.10.1 Installation.** Where panic or fire exit hardware is installed, it shall comply with the following:

1. Panic hardware shall be listed in accordance with UL 305.

2. Fire exit hardware shall be listed in accordance with UL 10C and UL 305.

3. The actuating portion of the releasing device shall extend not less than one-half of the door leaf width.

4. The maximum unlatching force shall not exceed 15 pounds (67 N).

**[BE] 1010.10.2 Balanced doors.** If balanced doors are used and panic hardware is required, the panic hardware shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

**[BE] 1010.2 Gates.** Gates serving the means of egress system shall comply with the requirements of this section. Gates used as a component in a means of egress shall conform to the applicable requirements for doors.

**Exception:** Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.

**[BE] 1010.2.1 Stadiums.** Panic hardware is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m²) per occupant are located between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1028.5 for means of egress from safe dispersal areas.

**[BE] 1010.3 Turnstiles.** Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required means of egress.

**Exception:** Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person occupant load where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.

2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.

3. Each device is not more than 39 inches (991 mm) high.

4. Each device has not less than 16 ½ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

   Where located as part of an accessible route, turnstiles shall have not less than 36 inches (914 mm) clear at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

**[BE] 1010.3.1 High turnstile.** Turnstiles more than 39 inches (991 mm) high shall meet the requirements for revolving doors.

**[BE] 1010.3.2 Additional door.** Where serving an occupant load greater than 300, each turnstile that is not portable shall have a side-hinged swinging door that conforms to Section 1010.1 within 50 feet (15 240 mm).

**SECTION 1011 STAIRWAYS**

**[BE] 1011.1 General.** Stairways serving occupied portions of a building shall comply with the requirements of Sections 1011.2 through 1011.13. Alternating tread devices shall comply with Section 1011.14. Ships ladders shall comply with Section 1011.15. Ladders shall comply with Section 1011.16.
Exception: Within rooms or spaces used for assembly purposes, stepped aisles shall comply with Section 1029.

[BE] 1011.2 Width and capacity. The required capacity of stairways shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm). See Section 1009.3 for accessible means of egress stairways.

Exceptions:
1. Stairways serving an occupant load of less than 50 shall have a width of not less than 36 inches (914 mm).
2. Spiral stairways as provided for in Section 1011.10.
3. Where an incline platform lift or stairway chairlift is installed on stairways serving occupancies in Group R-3, or within dwelling units in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

[BE] 1011.3 Headroom. Stairways shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the edge of the nosings. Such headroom shall be continuous above the stairway to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the stairway and landing.

Exceptions:
1. Spiral stairways complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; the riser height shall be 7 3/4 inches (197 mm); the minimum tread depth at the walkline shall be 10 inches (254 mm); and the minimum winder tread depth shall be 6 inches (152 mm). A nosing projection not less than 1/8 inch (19.1 mm) but not more than 1 1/4 inches (32 mm) shall be provided on stairways with solid risers where the tread depth is less than 11 inches (279 mm).
3. In Group I-3 facilities, stairways providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m²) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

[BE] 1011.5.3 Winder treads. Winder treads are not permitted in means of egress stairways except within a dwelling unit.

Exceptions:
1. Curved stairways in accordance with Section 1011.9.
2. Spiral stairways in accordance with Section 1011.10.

[BE] 1011.5.4 Dimensional uniformity. Stair tread and riser dimensions shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed 3/8 inch (9.5 mm) in any flight of stairs. The greatest winder tread depth at the walkline within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Exceptions:
1. Stairways connecting stepped aisles to cross aisles or concourses shall be permitted to comply with the dimensional nonuniformity in Section 1029.13.2.
2. Consistently shaped winders, complying with Section 1011.5, differing from rectangular treads in the same flight of stairs.
3. Nonuniform riser dimension complying with Section 1011.5.4.1.

[BE] 1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping public way, walkway or driveway having an established grade and serving as a
landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of stair width. The nosings or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight. The distinctive marking stripe shall be visible in descent of the stair and shall have a slip-resistant surface. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

[BE] 1011.5.5 Nosing and riser profile. Nosings shall have a curvature or bevel of not less than 1/16 inch (1.6 mm) but not more than 9/16 inch (14.3 mm) from the foremost projection of the tread. Risers shall be solid and vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical.

[BE] 1011.5.5.1 Nosing projection size. The leading edge (nosings) of treads shall project not more than 1 1/4 inches (32 mm) beyond the tread below.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections of the leading edges shall be of uniform size, including the projections of the nosing’s leading edge of the floor at the top of a flight.

[BE] 1011.5.5.3 Solid risers. Risers shall be solid.

Exceptions:
1. Solid risers are not required for stairways that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1011.10.

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings shall not be less than the width of stairways served. Every landing shall have a minimum width measured perpendicular to the direction of travel equal to the width of the stairway. Where the stairway has a straight run then the depth need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exception: Where stairways connect stepped aisles to cross aisles or concourses, stairway landings are not required at the transition between stairways and stepped aisles constructed in accordance with Section 1029.

[BE] 1011.7 Stairway construction. Stairways shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood handrails shall be permitted for all types of construction.

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a stairway shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. Stairway treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:
1. Openings in stair walking surfaces shall be a size that does not permit the passage of ½-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided a sphere with a diameter of 1 1/8 inches (29 mm) cannot pass through the opening.

[BE] 1011.7.2 Outdoor conditions. Outdoor stairways and outdoor approaches to stairways shall be designed so that water will not accumulate on walking surfaces.

[BE] 1011.7.3 Enclosures under interior stairways. The walls and soffits within enclosed usable spaces under enclosed and unenclosed stairways shall be protected by 1-hour fire-resistance rated construction or the fire-resistance rating of the stairway enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the stairway enclosure.

Exception: Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with ½-inch (12.7 mm) gypsum board.

[BE] 1011.7.4 Enclosures under exterior stairways. There shall not be enclosed usable space under exterior exit stairways unless the space is completely enclosed in 1-hour fire-resistance-rated construction. The open space under exterior stairways shall not be used for any purpose.

[BE] 1011.8 Vertical rise. A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

Exception: Spiral stairways used as a means of egress from technical production areas.

[BE] 1011.9 Curved stairways. Curved stairways with winder treads shall have treads and risers in accordance with Section 1011.5 and the smallest radius shall be not less than twice the minimum width or required capacity of the stairway.

Exception: The radius restriction shall not apply to curved stairways in Group R-3 and within individual dwelling units in Group R-2.

[BE] 1011.10 Spiral stairways. Spiral stairways are permitted to be used as a component in the means of egress only within dwelling units or from a space not more than 250 square feet (23 m²) in area and serving not more than five occupants, or from
technical production areas in accordance with Section 410.6 of the International Building Code.

A spiral stairway shall have a 7 ½-inch (191 mm) minimum clear tread depth at a point 12 inches (305 mm) from the narrow edge. The risers shall be sufficient to provide a headroom of 78 inches (1981 mm) minimum, but riser height shall not be more than 9½ inches (241 mm). The minimum stairway clear width at and below the handrail shall be 26 inches (660 mm).

[BE] 1011.11 Handrails. Stairways shall have handrails on each side and shall comply with Section 1014. Where glass is used to provide the handrail, the handrail shall also comply with Section 2407 of the International Building Code.

Exceptions:
1. Stairways within dwelling units, and spiral stairways are permitted to have a handrail on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require handrails.
3. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require handrails.
4. Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Group R-2 and R-3 do not require handrails.

[BE] 1011.12 Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

Exception: Other than where required by Section 1011.12.1, in buildings without an occupied roof, access to the roof from the top story shall be permitted to be by an alternating tread device, a ships ladder or a permanent ladder.

[BE] 1011.12.1 Stairway to elevator equipment. Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway.

[BE] 1011.12.2 Roof access. Where a stairway is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1510.2 of the International Building Code.

Exception: In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m²) in area and having a minimum dimension of 2 feet (610 mm).

[BE] 1011.13 Guards. Guards shall be provided along stairways and landings where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by guards installed in accordance with Section 1015.

[BE] 1011.14 Alternating tread devices. Alternating tread devices are limited to an element of a means of egress in buildings of Groups F, H and S from a mezzanine not more than 250 square feet (23 m²) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m²) in area and for access to unoccupied roofs. Alternating tread devices used as a means of egress shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

[BE] 1011.14.1 Handrails of alternating tread devices. Handrails shall be provided on both sides of alternating tread devices and shall comply with Section 1014.

[BE] 1011.14.2 Treads of alternating tread devices. Alternating tread devices shall have a minimum tread depth of 5 inches (127 mm), a minimum projected tread depth of 8½ inches (216 mm), a minimum tread width of 7 inches (178 mm) and a maximum riser height of 9½ inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

Exception: Alternating tread devices used as an element of a means of egress in buildings from a mezzanine area not more than 250 square feet (23 m²) in area that serves not more than five occupants shall have a minimum tread depth of 3 inches (76 mm) with a minimum projected tread depth of 10½ inches (267 mm). The rise to the next alternating tread surface shall not exceed 8 inches (203 mm).

[BE] 1011.15 Ships ladders. Ships ladders are permitted to be provided in Group I-3 as a component of a means of egress to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m²) with not more than three occupants and for access to unoccupied roofs. The minimum clear width at and below the handrails shall be 20 inches (508 mm).

[BE] 1011.15.1 Handrails of ships ladders. Handrails shall be provided on both sides of ships ladders.

[BE] 1011.15.2 Treads of ships ladders. Ships ladders shall have a minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8½ inches (216 mm). The maximum riser height shall be 9½ inches (241 mm).

[BE] 1011.16 Ladders. Permanent ladders shall not serve as a part of the means of egress from occupied spaces within a building. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have stairway access in accordance with Section 1011.12.1.
6. Ladders shall be constructed in accordance with Section 306.5 of the International Mechanical Code.

SECTION 1012 RAMPS

[BE] **1012.1 Scope.** The provisions of this Section shall apply to ramps used as a component of a means of egress.

**Exceptions:**
1. Ramped aisles within assembly rooms or spaces shall comply with the provisions in Section 1029.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian exit access shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an accessible route serving accessible parking spaces, or other required accessible elements or part of an accessible means of egress.

[BE] **1012.2 Slope.** Ramps used as part of a means of egress shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian ramps shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).

[BE] **1012.3 Cross slope.** The slope measured perpendicular to the direction of travel of a ramp shall not be steeper than one unit vertical in 48 units horizontal (2-percent slope).

[BE] **1012.4 Vertical rise.** The rise for any ramp run shall be 30 inches (762 mm) maximum.

[BE] **1012.5 Minimum dimensions.** The minimum dimensions of means of egress ramps shall comply with Sections 1012.5.1 through 1012.5.3.

[BE] **1012.5.1 Width and capacity.** The minimum width and required capacity of a means of egress ramp shall be not less than that required for corridors by Section 1020.2. The clear width of a ramp between handrails, if provided, or other permissible projections shall be 36 inches (914 mm) minimum.

[BE] **1012.5.2 Headroom.** The minimum headroom in all parts of the means of egress ramp shall be not less than 80 inches (2032 mm).

[BE] **1012.5.3 Restrictions.** Means of egress ramps shall not reduce in width in the direction of egress travel. Projections into the required ramp and landing width are prohibited. Doors opening onto a landing shall not reduce the clear width to less than 42 inches (1067 mm).

[BE] **1012.6 Landings.** Ramps shall have landings at the bottom and top of each ramp, points of turning, entrance, exits and at doors. Landings shall comply with Sections 1012.6.1 through 1012.6.5.

[BE] **1012.6.1 Slope.** Landings shall have a slope not steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. Changes in level are not permitted.

[BE] **1012.6.2 Width.** The landing width shall be not less than the width of the widest ramp run adjoining the landing.

[BE] **1012.6.3 Length.** The landing length shall be 60 inches (1525 mm) minimum.

**Exceptions:**
1. In Group R-2 and R-3 individual dwelling and sleeping units that are not required to be Accessible units, Type A units or Type B units in accordance with Section 1107 of the International Building Code, landings are permitted to be 36 inches (914 mm) minimum.
2. Where the ramp is not a part of an accessible route, the length of the landing shall not be required to be more than 48 inches (1220 mm) in the direction of travel.

[BE] **1012.6.4 Change in direction.** Where changes in direction of travel occur at landings provided between ramp runs, the landing shall be 60 inches by 60 inches (1524 mm by 1524 mm) minimum.

**Exception:** In Group R-2 and R-3 individual dwelling or sleeping units that are not required to be Accessible units, Type A units or Type B units in accordance with Section 1107 of the International Building Code, landings are permitted to be 36 inches by 36 inches (914 mm by 914 mm) minimum.

[BE] **1012.6.5 Doorways.** Where doorways are located adjacent to a ramp landing, maneuvering clearances required by ICC A117.1 are permitted to overlap the required landing area.

[BE] **1012.7 Ramp construction.** Ramps shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood handrails shall be permitted for all types of construction.

[BE] **1012.7.1 Ramp surface.** The surface of ramps shall be of slip-resistant materials that are securely attached.

[BE] **1012.7.2 Outdoor conditions.** Outdoor ramps and outdoor approaches to ramps shall be designed so that water will not accumulate on walking surfaces.

[BE] **1012.8 Handrails.** Ramps with a rise greater than 6 inches (152 mm) shall have handrails on both sides. Handrails shall comply with Section 1014.

[BE] **1012.9 Guards.** Guards shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015.

[BE] **1012.10 Edge protection.** Edge protection complying with Section 1012.10.1 or 1012.10.2 shall be provided on each side of ramp runs and at each side of ramp landings.

**Exceptions:**
1. Edge protection is not required on ramps that are not required to have handrails, provided they have flared sides that comply with the ICC A117.1 curb ramp provisions.
2. Edge protection is not required on the sides of ramp landings serving an adjoining ramp run or stairway.
3. Edge protection is not required on the sides of ramp landings having a vertical dropoff of not more than $\frac{1}{2}$ inch (12.7 mm) within 10 inches (254 mm) horizontally of the required landing area.

**[BE] 1012.10.1 Curb, rail, wall or barrier.** A curb, rail, wall or barrier shall be provided to serve as edge protection. A curb shall be not less than 4 inches (102 mm) in height. Barriers shall be constructed so that the barrier prevents the passage of a 4-inch-diameter (102 mm) sphere, where any portion of the sphere is within 4 inches (102 mm) of the floor or ground surface.

**[BE] 1012.10.2 Extended floor or ground surface.** The floor or ground surface of the ramp run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with Section 1014.

### SECTION 1013

**EXIT SIGNS**

**[BE] 1013.1 Where required.** Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits and within exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within exits shall be marked by exit signs. Exit sign placement shall be such that no point in an exit access corridor or exit passageway is more than 100 feet (30 480 mm) or the listed viewing distance for the sign, whichever is less, from the nearest visible exit sign.

**Exceptions:**

1. Exit signs are not required in rooms or areas that require only one exit or exit access.
2. Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not have exit signs where approved by the fire code official.
3. Exit signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3.
4. Exit signs are not required in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

**[BE] 1013.2 Floor-level exit signs in Group R-1.** Where exit signs are required in Group R-1 occupancies by Section 1013.1, additional low-level exit signs shall be provided in all areas serving guest rooms in Group R-1 occupancies and shall comply with Section 1013.5.

The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 12 inches (305 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.

**[BE] 1013.3 Illumination.** Exit signs shall be internally or externally illuminated.

**Exception:** Tactile signs required by Section 1013.4 need not be provided with illumination.

**[BE] 1013.4 Raised character and braille exit signs.** A sign stating EXIT in visual characters, raised characters and braille and complying with ICC A117.1 shall be provided adjacent to each door to an area of refuge, an exterior area for assisted rescue, an exit stairway or ramp, an exit passageway and the exit discharge.

**[BE] 1013.5 Internally illuminated exit signs.** Electrically powered, self-luminous and photoluminescent exit signs shall be listed and labeled in accordance with UL 924 and shall be installed in accordance with the manufacturer’s instructions and Section 604. Exit signs shall be illuminated at all times.

**[BE] 1013.6 Externally illuminated exit signs.** Externally illuminated exit signs shall comply with Sections 1013.6.1 through 1013.6.3.

**[BE] 1013.6.1 Graphics.** Every exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $\frac{1}{4}$ inch (19.1 mm) wide. The word “EXIT” shall have letters having a width not less than 2 inches (51 mm) wide, except the letter “I,” and the minimum spacing between letters shall be not less than 3/8 inch (9.5 mm). Signs larger than the minimum established in this Section shall have letter widths, strokes and spacing in proportion to their height.

The word “EXIT” shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.

**[BE] 1013.6.2 Exit sign illumination.** The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

**[BE] 1013.6.3 Power source.** Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 604.

**Exceptions:**

1. Approved exit sign illumination means that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.
2. Group I-2 Condition 2 exit sign illumination shall not be provided by unit equipment battery only.
SECTION 1014

[BE] 1014.1 Where required. Handrails serving stairways, ramps, stepped aisles and ramped aisles shall be adequate in strength and attachment in accordance with Section 1607.8 of the International Building Code. Handrails required for stairways by Section 1011.11 shall comply with Sections 1014.2 through 1014.9. Handrails required for ramps by Section 1012.8 shall comply with Sections 1014.2 through 1014.8. Handrails for stepped aisles and ramped aisles required by Section 1029.15 shall comply with Sections 1014.2 through 1014.8.

[BE] 1014.2 Height. Handrail height, measured above stair tread nosings, or finish surface of ramp slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height of alternating tread devices and ships ladders, measured above tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:
1. Where handrail fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.

2. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual dwelling units in Group R-2 occupancies; where handrail fittings or bendings are used to provide continuous transition between flights, transition at winder treads, transition from handrail to guard, or where used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

3. Handrails on top of a guard where permitted along stepped aisles and ramped aisles in accordance with Section 1029.15.

[BE] 1014.3 Handrail graspability. Required handrails shall comply with Section 1014.3.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; handrails shall be Type I in accordance with Section 1014.3.1, Type II in accordance with Section 1014.3.2 or shall provide equivalent graspability.

[BE] 1014.3.1 Type I. Handrails with a circular cross Section shall have an outside diameter of not less than 1 1/2 inches (32 mm) and not greater than 2 inches (51 mm). Where the handrail is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) with a maximum cross-sectional dimension of 2 1/4 inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.3.2 Type II. Handrails with a perimeter greater than 6 1/4 inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 1/4 inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than 5/16 inch (8 mm) within 1/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3/8 inch (10 mm) to a level that is not less than 1 1/4 inches (45 mm) below the tallest portion of the profile. The minimum width of the handrail above the recess shall be not less than 1 1/4 inches (32 mm) to a maximum of 2 1/4 inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4 Continuity. Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

Exceptions:
1. Handrails within dwelling units are permitted to be interrupted by a newel post at a turn or landing.
2. Within a dwelling unit, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the handrail that do not project horizontally beyond the sides of the handrail within 1/2 inches (38 mm) of the bottom of the handrail shall not be considered obstructions. For each 1/2 inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of 1 1/2 inches (38 mm) shall be permitted to be reduced by 1/8 inch (3.2 mm).
4. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. Handrails serving stepped aisles or ramped aisles are permitted to be discontinuous in accordance with Section 1029.15.1.

[BE] 1014.5 Fittings. Handrails shall not rotate within their fittings.

[BE] 1014.6 Handrail extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent flight of stairs or ramp run. Where handrails are not continuous between flights the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At ramps where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of handrails shall be in the same direction of the flights of stairs at stairways and the ramp runs at ramps.

Exceptions:
1. Handrails within a dwelling unit that is not required to be accessible need extend only from the top riser to the bottom riser.
2. Handrails serving aisles in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1029.15.
3. Handrails for alternating tread devices and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. Handrails for alternating tread devices are not required to be continuous between flights or to extend beyond the top or bottom risers.

[BE] 1014.7 Clearance. Clear space between a handrail and a wall or other surface shall be not less than 1½ inches (38 mm). A handrail and a wall or other surface adjacent to the handrail shall be free of any sharp or abrasive elements.

[BE] 1014.8 Projections. On ramps and on ramped aisles that are part of an accessible route, the clear width between handrails shall be 36 inches (914 mm) minimum. Projections into the required width of aisles, stairways and ramps at each side shall not exceed 4½ inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3. Projections due to intermediate handrails shall not constitute a reduction in the egress width. Where a pair of intermediate handrails are provided with the stairway width without a walking surface between the pair of intermediate handrails and the distance between the pair of intermediate handrails is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of handrails that is greater than 6 inches (152 mm).

[BE] 1014.9 Intermediate handrails. Stairways shall have intermediate handrails located in such a manner that all portions of the stairway minimum width or required capacity are within 30 inches (762 mm) of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.

SECTION 1015 GUARDS

[BE] 1015.1 General. Guards shall comply with the provisions of Section 1015.2 through 1015.7. Operable windows with sills located more than 72 inches (1829 mm) above finished grade or other surface below shall comply with Section 1015.8.

[BE] 1015.2 Where required. Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, aisles, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Guards shall be adequate in strength and attachment in accordance with Section 1607.8 of the International Building Code.

Exception: Guards are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including stairs leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, ramps and side stages used for entertainment or presentations.

4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross aisles in accordance with Section 1029.16.

[BE] 1015.2.1 Glazing. Where glass is used to provide a guard or as a portion of the guard system, the guard shall comply with Section 2407 of the International Building Code. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.8 of the International Building Code, complying guards shall be located along glazed sides of open-sided walking surfaces.

[BE] 1015.3 Height. Required guards shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On stairways and stepped aisles, from the line connecting the leading edges of the tread nosings.
3. On ramps and ramped aisles, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual dwelling units in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or adjacent fixed seating.

2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.

3. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

4. The guard height in assembly seating areas shall comply with Section 1029.16 as applicable.

5. Along alternating tread devices and ships ladders, guards where the top rail also serves as a handrail shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

[BE] 1015.4 Opening limitations. Required guards shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required guard height.

Exceptions:
1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), guards shall not have openings that allow passage of a sphere 4 3/8 inches (111 mm) in diameter.

2. The triangular openings at the open sides of a stair, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.

3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, guards shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.

4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for alternating tread devices and ships ladders, guards shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.

5. In assembly seating areas, guards required at the end of aisles in accordance with Section 1029.16.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, guards shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.

6. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, guards on the open sides of stairs shall not have openings that allow passage of a sphere 4 3/8 (111 mm) inches in diameter.

[BE] 1015.5 Screen porches. Porches and decks that are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

[BE] 1015.6 Mechanical equipment, systems and devices. Guards shall be provided where various components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of such components. The guard shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

Exception: Guards are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from the roof edge or open side of the walking surface.


1. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the window when the window is in its largest opened position.

2. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F 2090.

3. Operable windows that are provided with window opening control devices that comply with Section 1015.8.1.

[BE] 1015.8.1 Window opening control devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1030.2.

SECTION 1016
EXIT ACCESS

[BE] 1016.1 General. The exit access shall comply with the applicable provisions of Sections 1003 through 1015. Exit access arrangement shall comply with Sections 1016 through 1021.

[BE] 1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. Exit access through an enclosed elevator lobby is permitted. Access to not less than one of the required exits shall be provided without travel through the enclosed elevator lobbies required by Section 3006.2, 3007 or 3008 of the International Building Code. Where the path of exit access travel passes through an enclosed elevator lobby the level of protection required for the enclosed elevator lobby is not required to be extended to the exit unless direct access to an exit is required by other Sections of this code.

2. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas and the area served are accessory to one or the other, are not a Group H occupancy and provide a discernible path of egress travel to an exit.
Exception: Means of egress are not prohibited through adjoining or intervening rooms or spaces in a Group H, S or F occupancy where the adjoining or intervening rooms or spaces are the same or a lesser hazard occupancy group.

3. An exit access shall not pass through a room that can be locked to prevent egress.

4. Means of egress from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.

5. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

Exceptions:

1. Means of egress are not prohibited through a kitchen area serving adjoining rooms constituting part of the same dwelling unit or sleeping unit.

2. Means of egress are not prohibited through stockrooms in Group M occupancies where all of the following are met:
   2.1. The stock is of the same hazard classification as that found in the main retail area.
   2.2. Not more than 50 percent of the exit access is through the stockroom.
   2.3. The stockroom is not subject to locking from the egress side.
   2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) aisle defined by full or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.

[BE] 1016.2.1 Multiple tenants. Where more than one tenant occupies any one floor of a building or structure, each tenant space, dwelling unit and sleeping unit shall be provided with access to the required exits without passing through adjacent tenant spaces, dwelling units and sleeping units.

Exception: The means of egress from a smaller tenant space shall not be prohibited from passing through a larger adjoining tenant space where such rooms or spaces of the smaller tenant occupy less than 10 percent of the area of the larger tenant space through which they pass; are the same or similar occupancy group; a discernable path of egress travel to an exit is provided; and the means of egress into the adjoining space is not subject to locking from the egress side. A required means of egress serving the larger tenant space shall not pass through the smaller tenant space or spaces.

SECTION 1017 EXIT ACCESS TRAVEL DISTANCE

[BE] 1017.1 General. Travel distance within the exit access portion of the means of egress system shall be in accordance with this section.

[BE] 1017.2 Limitations. Exit access travel distance shall not exceed the values given in Table 1017.2.

[BE] TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>WITHOUT SPRINKLER SYSTEM (feet)</th>
<th>WITH SPRINKLER SYSTEM (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, E, F-1, M, R, S-1</td>
<td>200</td>
<td>250b</td>
</tr>
<tr>
<td>I-1</td>
<td>Not Permitted</td>
<td>250b</td>
</tr>
<tr>
<td>B</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>F-2, S-2, U</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>H-1</td>
<td>Not Permitted</td>
<td>75d</td>
</tr>
<tr>
<td>H-2</td>
<td>Not Permitted</td>
<td>100d</td>
</tr>
<tr>
<td>H-3</td>
<td>Not Permitted</td>
<td>150d</td>
</tr>
<tr>
<td>H-4</td>
<td>Not Permitted</td>
<td>175d</td>
</tr>
<tr>
<td>H-5</td>
<td>Not Permitted</td>
<td>200d</td>
</tr>
<tr>
<td>I-2, I-3, I-4</td>
<td>Not Permitted</td>
<td>200d</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. See the following Sections for modifications to exit access travel distance requirements:
   Section 402.8 of the International Building Code: For the distance limitation in malls.
   Section 404.9 of the International Building Code: For the distance limitation through an atrium space.
   Section 407.4 of the International Building Code: For the distance limitation in Group I-2.
   Sections 408.6.1 and 408.8.1 of the International Building Code: For the distance limitations in Group I-3.
   Section 411.4 of the International Building Code: For the distance limitation in special amusement buildings.
   Section 412.7 of the International Building Code: For the distance limitations in aircraft manufacturing facilities.
   Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
   Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
   Section 1006.3.2: For buildings with one exit.
   Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
   Section 1029.7: For increased limitation in assembly seating.
   Section 3104.9 of the International Building Code: For the distance limitation in special amusement buildings.
   Section 3104.9 of the International Building Code: For the distance limitation in aircraft manufacturing facilities.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

[BE] 1017.2.1 Exterior egress balcony increase. Exit access travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided the last portion of the exit access leading to the exit occurs on an
SECTION 1018
AISLES

**[BE] 1018.1 General.** Aisles and aisle accessways serving as a portion of the exit access in the means of egress system shall comply with the requirements of this section. Aisles or aisle accessways shall be provided from all occupied portions of the exit access that contain seats, tables, furnishings, displays and similar fixtures or equipment. The minimum width or required capacity of aisles shall be unobstructed.

**Exception:** Encroachments complying with Section 1005.7.

**[BE] 1018.2 Aisles in assembly spaces.** Aisles and aisle accessways serving a room or space used for assembly purposes shall comply with Section 1029.

**[BE] 1018.3 Aisles in Groups B and M.** In Group B and M occupancies, the minimum clear aisle width shall be determined by Section 1005.1 for the occupant load served, but shall be not less than that required for corridors by Section 1020.2.

**Exception:** Nonpublic aisles serving less than 50 people and not required to be accessible by Chapter 11 of the International Building Code need not exceed 28 inches (711 mm) in width.

**[BE] 1018.4 Aisle accessways in Group M.** An aisle accessway shall be provided on not less than one side of each element within the merchandise pad. The minimum clear width for an aisle accessway not required to be accessible shall be 30 inches (762 mm). The required clear width of the aisle accessway shall be measured perpendicular to the elements and merchandise within the merchandise pad. The 30-inch (762 mm) minimum clear width shall be maintained to provide a path to an adjacent aisle or aisle accessway. The common path of egress travel shall not exceed 30 feet (9144 mm) from any point in the merchandise pad.

**Exception:** For areas serving not more than 50 occupants, the common path of egress travel shall not exceed 75 feet (22860 mm).

**[BE] 1018.5 Aisles in other than assembly spaces and Groups B and M.** In other than rooms or spaces used for assembly purposes and Group B and M occupancies, the minimum clear aisle capacity shall be determined by Section 1005.1 for the occupant load served, but the width shall be not less than that required for corridors by Section 1020.2.

**Exception:** Nonpublic aisles serving less than 50 people and not required to be accessible by Chapter 11 of the International Building Code need not exceed 28 inches (711 mm) in width.

SECTION 1019
EXIT ACCESS STAIRWAYS AND RAMPS

**[BE] 1019.1 General.** Exit access stairways and ramps serving as an exit access component in a means of egress system shall comply with the requirements of this section. The number of stories connected by exit access stairways and ramps shall include basements, but not mezzanines.

**[BE] 1019.2 All occupancies.** Exit access stairways and ramps that serve floor levels within a single story are not required to be enclosed.

**[BE] 1019.3 Occupancies other than Groups I-2 and I-3.** In other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this Section shall be enclosed with a shaft enclosure constructed in accordance with Section 713 of the International Building Code.

1. Exit access stairways and ramps that serve, or atmospherically communicate between, only two stories. Such interconnected stories shall not be open to other stories.

2. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.

3. Exit access stairways serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.

4. Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than
Group B and M occupancies, this provision is limited to
openings that do not connect more than four stories.

5. Exit access stairways and ramps within an atrium
    complying with the provisions of Section 404 of the
    International Building Code.

6. Exit access stairways and ramps in open parking garages
    that serve only the parking garage.

7. Exit access stairways and ramps serving open-air seating
    complying with the exit access travel distance
    requirements of Section 1029.7.

8. Exit access stairways and ramps serving the balcony,
gallery or press box and the main assembly floor in
occupancies such as theaters, places of religious worship,
auditoriums and sports facilities.

[BE] 1019.4 Group I-2 and I-3 occupancies. In Group I-2 and
I-3 occupancies, floor openings between stories containing exit
access stairways or ramps are required to be enclosed with a
shaft enclosure constructed in accordance with Section 713 of the
International Building Code.

Exception: In Group I-3 occupancies, exit access stairways or
ramps constructed in accordance with Section 408 of the
International Building Code are not required to be enclosed.

**SECTION 1020**

**CORRIDORS**

[BE] 1020.1 Construction. Corridors shall be fire-resistance
rated in accordance with Table 1020.1. The corridor walls
required to be fire-resistance rated shall comply with Section 708
of the International Building Code for fire partitions.

Exceptions:

1. A fire-resistance rating is not required for corridors in
   an occupancy in Group E where each room that is used
   for instruction has not less than one-half of the required means
   of egress doors opening directly to the exterior. Exterior
doors specified in this exception are required to be at
   ground level.

2. A fire-resistance rating is not required for corridors contained within a dwelling unit or sleeping unit in an
   occupancy in Groups I-1 and R.

3. A fire-resistance rating is not required for corridors in
   open parking garages.

4. A fire-resistance rating is not required for corridors in
   an occupancy in Group B that is a space requiring only a
   single means of egress complying with Section 1006.2.

5. Corridors adjacent to the exterior walls of buildings shall be permitted to have unprotected openings on
   unrated exterior walls where unrated walls are permitted
   by Table 602 of the International Building Code and
   unprotected openings are permitted by Table 705.8 of the
   International Building Code.

[BE] TABLE 1020.1

<table>
<thead>
<tr>
<th>CORRIDOR FIRE-RESISTANCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCCUPANCY</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>H-1, H-2, H-3</td>
</tr>
<tr>
<td>H-4, H-5</td>
</tr>
<tr>
<td>A, B, E, F, M, S, U</td>
</tr>
<tr>
<td>R</td>
</tr>
<tr>
<td>I-2a, I-4</td>
</tr>
<tr>
<td>I-1, I-3</td>
</tr>
</tbody>
</table>

- a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the International Building Code.
- b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the International Building Code.
- c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.

[BE] 1020.2 Width and capacity. The required capacity of
 corridors shall be determined as specified in Section 1005.1, but
the minimum width shall be not less than that specified in Table
1020.2.

Exception: In Group I-2 occupancies, corridors are not
required to have a clear width of 96 inches (2438 mm) in areas
where there will not be stretcher or bed movement for access
to care or as part of the defend-in-place strategy.

[BE] TABLE 1020.2

<table>
<thead>
<tr>
<th>MINIMUM CORRIDOR WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCCUPANCY</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Any facilities not listed below</td>
</tr>
<tr>
<td>Access to and utilization of mechanical, plumbing or electrical systems or equipment</td>
</tr>
<tr>
<td>With an occupant load of less than 50</td>
</tr>
<tr>
<td>Within a dwelling unit</td>
</tr>
<tr>
<td>In Group E with a corridor having an occupant load of 100 or more</td>
</tr>
<tr>
<td>In corridors and areas serving stretcher traffic in ambulatory care facilities</td>
</tr>
<tr>
<td>Group I-2 in areas where required for bed movement</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

[BE] 1020.3 Obstruction. The minimum width or required
capacity of corridors shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

[BE] 1020.4 Dead ends. Where more than one exit or exit access
doorway is required, the exit access shall be arranged such that
there are no dead ends in corridors more than 20 feet (6096 mm)
in length.
Exceptions:

1. In occupancies in Group I-3 of Condition 2, 3 or 4, the dead end in a corridor shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, I-1, M, R-1, R-2, R-4, S and U, where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of the dead-end corridors shall not exceed 50 feet (15 240 mm).
3. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

[BE] 1020.5 Air movement in corridors. Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.

Exceptions:

1. Use of a corridor as a source of makeup air for exhaust systems in rooms that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted, provided that each such corridor is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the corridor.
2. Where located within a dwelling unit, the use of corridors for conveying return air shall not be prohibited.
3. Where located within tenant spaces of 1,000 square feet (93 m²) or less in area, utilization of corridors for conveying return air is permitted.
4. Incidental air movement from pressurized rooms within health care facilities, provided that the corridor is not the primary source of supply or return to the room.

[BE] 1020.5.1 Corridor ceiling. Use of the space between the corridor ceiling and the floor or roof structure above as a return air plenum is permitted for one or more of the following conditions:

1. The corridor is not required to be of fire-resistancerrated construction.
2. The corridor is separated from the plenum by fire-resistance-rated construction.
3. The air-handling system serving the corridor is shut down upon activation of the air-handling unit smoke detectors required by the International Mechanical Code.
4. The air-handling system serving the corridor is shut down upon detection of sprinkler water flow where the building is equipped throughout with an automatic sprinkler system.
5. The space between the corridor ceiling and the floor or roof structure above the corridor is used as a component of an approved engineered smoke control system.

[BE] 1020.6 Corridor continuity. Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms. Where the path of egress travel within a fire-resistance-rated corridor to the exit includes travel along unenclosed exit access stairways or ramps, the fire-resistance-rating shall be continuous for the length of the stairway or ramp and for the length of the connecting corridor on the adjacent floor leading to the exit.

Exceptions:

1. Foyers, lobbies or reception rooms constructed as required for corridors shall not be construed as intervening rooms.
2. Enclosed elevator lobbies as permitted by Item 1 of Section 1016.2 shall not be construed as intervening rooms.

SECTION 1021
EGRESS BALCONIES

[BE] 1021.1 General. Balconies used for egress purposes shall conform to the same requirements as corridors for minimum width, required capacity, headroom, dead ends and projections.

[BE] 1021.2 Wall separation. Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors.

Exception: Separation is not required where the exterior egress balcony is served by not less than two stairways and a dead-end travel condition does not require travel past an unprotected opening to reach a stairway.

[BE] 1021.3 Openness. The long side of an egress balcony shall be at least 50 percent open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases.

[BE] 1021.4 Location. Exterior egress balconies shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the egress balcony to the following:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 of the International Building Code based on fire separation distance.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

SECTION 1022
EXITS

[BE] 1022.1 General. Exits shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An exit shall not be used for any purpose that interferes with its function as a means of egress. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge. Exits shall be continuous from the point of entry into the exit to the exit discharge.
[BE] 1022.2 Exterior exit doors. Buildings or structures used for human occupancy shall have not less than one exterior door that meets the requirements of Section 1010.1.1.

[BE] 1022.2.1 Detailed requirements. Exterior exit doors shall comply with the applicable requirements of Section 1010.1.

[BE] 1022.2.2 Arrangement. Exterior exit doors shall lead directly to the exit discharge or the public way.

SECTION 1023
INTERIOR EXIT STAIRWAYS AND RAMPS

[BE] 1023.1 General. Interior exit stairways and ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1024, except as permitted in Section 1028.1. An interior exit stairway or ramp shall not be used for any purpose other than as a means of egress and a circulation path.

[BE] 1023.2 Construction. Enclosures for interior exit stairways and ramps shall be constructed as fire barriers 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. Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Interior exit stairways and ramps shall have a fire-resistance rating not less than that required for the interior exit stairway and ramp. A fire door assembly complying with Section 716.5 of the International Building Code shall be installed in the fire barrier to provide a means of egress from the interior exit stairway and ramp to the exit passageway. Openings in the fire barrier other than the fire door assembly are prohibited. Penetrations of the fire barrier are prohibited.

Exceptions:

1. Penetrations of the fire barrier in accordance with Section 1023.5 shall be permitted.

2. Separation between an interior exit stairway or ramp and the exit passageway extension shall not be required where the interior exit stairway and the exit passageway extension are pressureized in accordance with Section 909.20.5 of the International Building Code.

[BE] 1023.4 Openings. Interior exit stairway and ramp opening protective shall be in accordance with the requirements of Section 716 of the International Building Code.

Openings in interior exit stairways and ramps other than unprotected exterior openings shall be limited to those required for exit access to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into interior exit stairways and ramps.

[BE] 1023.5 Penetrations. Penetrations into or through interior exit stairways and ramps are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization,
2. Fire protection systems,
3. Security systems,
4. Two-way communications,
5. Electrical raceway serving the interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches (0.010 m²). Such penetrations shall be protected in accordance with Section 714 of the International Building Code. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit stairways and ramps.

Exception: Membrane penetrations shall be permitted on the outside of the interior exit stairway and ramp. Such penetrations shall be protected in accordance with Section 714.4.2 of the International Building Code.

[BE] 1023.6 Ventilation. Equipment and ductwork for interior exit stairway and ramp ventilation as permitted by Section 1023.5 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the interior exit stairway and ramp by ductwork enclosed in construction as required for shafts.
2. Where such equipment and ductwork is located within the interior exit stairway and ramp, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be
conveyed through ducts enclosed in construction as required for shafts.

3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protective in accordance with Section 716 of the International Building Code for shaft enclosures.

The interior exit stairway and ramp ventilation systems shall be independent of other building ventilation systems.

[BE] 1023.7 Interior exit stairway and ramp exterior walls. Exterior walls of the interior exit stairway or ramp shall comply with the requirements of Section 705 of the International Building Code for exterior walls. Where nonrated walls or unprotected openings enclose the exterior of the stairway or ramps and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protective having a fire protection rating of not less than ¾ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

[BE] 1023.8 Discharge identification. An interior exit stairway and ramp shall not continue below its level of exit discharge unless an approved barrier is provided at the level of exit discharge to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1013.

[BE] 1023.9 Stairway identification signs. A sign shall be provided at each floor landing of an interior exit stairway and ramp connecting more than three stories designating the floor level, the terminus of the top and bottom of the interior exit stairway and ramp and the identification of the stairway or ramp. The sign shall also state the story of, and the direction to, the exit discharge and the availability of roof access from the interior exit stairway and ramp for the fire department. The sign shall be located 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions. In addition to the stairway identification sign, a floor-level sign in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor-level landing adjacent to the door leading from the interior exit stairway and ramp into the corridor to identify the floor level.

[BE] 1023.9.1 Signage requirements. Stairway identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the interior exit stairway and ramp shall be not less than 1½ inches (38 mm) in height.
3. The number designating the floor level shall be not less than of 5 inches (127 mm) in height and located in the center of the sign.
4. Other lettering and numbers shall be not less than 1 inch (25 mm) in height.
5. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.
6. Where signs required by Section 1023.9 are installed in the interior exit stairways and ramps of buildings subject to Section 1025, the signs shall be made of the same materials as required by Section 1025.4.

[BE] 1023.10 Elevator lobby identification signs. At landings in interior exit stairways where two or more doors lead to the floor level, any door with direct access to an enclosed elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating “Elevator Lobby.” Signage shall be in accordance with Section 1023.9.1, Items 4, 5 and 6.

[BE] 1023.11 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2 or 412.2.2.1 of the International Building Code, interior exit stairways and ramps shall be smokeproof enclosures in accordance with Section 909.20 of the International Building Code.

[BE] 1023.11.1 Termination and extension. A smokeproof enclosure shall terminate at an exit discharge or a public way. The smokeproof enclosure shall be permitted to be extended by an exit passageway in accordance with Section 1023.3. The exit passageway shall be without openings other than the fire door assembly required by Section 1023.3.1 and those necessary for egress from the exit passageway. The exit passageway shall be separated from the remainder of the building by 2-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.

Exceptions:

1. Openings in the exit passageway serving a smokeproof enclosure are permitted where the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure, and openings are protected as required for access from other floors.
2. The fire barrier separating the smokeproof enclosure from the exit passageway is not required, provided the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure.
3. A smokeproof enclosure shall be permitted to egress through areas on the level of exit discharge or vestibules as permitted by Section 1028.

[BE] 1023.11.2 Enclosure access. Access to the stairway or ramp within a smokeproof enclosure shall be by way of a vestibule or an open exterior balcony.

Exception: Access is not required by way of a vestibule or exterior balcony for stairways and ramps using the pressurization alternative complying with Section 909.20.5 of the International Building Code.
1023.12 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Section 905.3 and 905.4.

SECTION 1024
EXIT PASSAGEWAYS

[BE] 1024.1 Exit passageways. Exit passageways serving as an exit component in a means of egress system shall comply with the requirements of this section. An exit passageway shall not be used for any purpose other than as a means of egress and a circulation path.

[BE] 1024.2 Width and capacity. The required capacity of exit passageways shall be determined as specified in Section 1005.1 but the minimum width shall be not less than 44 inches (1118 mm), except that exit passageways serving an occupant load of less than 50 shall be not less than 36 inches (914 mm) in width. The minimum width or required capacity of exit passageways shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

[BE] 1024.3 Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour fire-resistance rating, and not less than that required for any connecting interior exit stairway or ramp. Exit passageways shall be constructed as fire barriers 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.

[BE] 1024.4 Termination. Exit passageways on the level of exit discharge shall terminate at an exit discharge. Exit passageways on other levels shall terminate at an exit.

[BE] 1024.5 Openings. Exit passageway opening protectives shall be in accordance with the requirements of Section 716 of the International Building Code.

Except as permitted in Section 402.8.7 of the International Building Code, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway.

Where an interior exit stairway or ramp is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall comply with Section 1023.3.1.

Elevators shall not open into an exit passageway.

[BE] 1024.6 Penetrations. Penetrations into or through an exit passageway are prohibited except for the following:

1. Equipment and ductwork necessary for independent pressurization.
2. Equipment and ductwork necessary for independent ventilation or pressurization.
3. Fire protection systems.
4. Security systems.
5. Two-way communications.
6. Electrical raceway serving the interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches (0.010 m²).

Such penetrations shall be protected in accordance with Section 714 of the International Building Code. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit stairways and ramps.

Exception: Membrane penetrations shall be permitted on the outside of the exit passageway. Such penetrations shall be protected in accordance with Section 714.4.2 of the International Building Code.

[BE] 1024.7 Ventilation. Equipment and ductwork for exit passageway ventilation as permitted by Section 1024.6 shall comply with one of the following:

1. The equipment and ductwork shall be located exterior to the building and shall be directly connected to the exit passageway by ductwork enclosed in construction as required forshafts.
2. Where the equipment and ductwork is located within the exit passageway, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or the air shall be conveyed through ducts enclosed in construction as required forshafts.
3. Where located within the building, the equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required forshafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 of the International Building Code for shaft enclosures.

Exit passageway ventilation systems shall be independent of other building ventilation systems.

1024.8 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Section 905.3 and 905.4.

SECTION 1025
LUMINOUS EGRESS PATH MARKINGS

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

Exception: Luminous egress path markings shall not be required on the level of exit discharge in lobbies that serve as part of the exit path in accordance with Section 1028.1, Exception 1.

[BE] 1025.2 Markings within exit components. Egress path markings shall be provided in interior exit stairways, interior exit ramps and exit passageways, in accordance with Sections 1025.2.1 through 1025.2.6.

[BE] 1025.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Outlining stripes shall have a minimum horizontal width of 1 inch (25 mm) and a...
maximum width of 2 inches (51 mm). The leading edge of the stripe shall be placed not more than ½ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than ½ inch (12.7 mm) down the vertical face of the step.

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

[BE] 1025.2.3 Handrails. Handrails and handrail extensions shall be marked with a solid and continuous stripe having a minimum width of 1 inch (25 mm). The stripe shall be placed on the top surface of the handrail for the entire length of the handrail, including extensions and newel post caps. Where handrails or handrail extensions bend or turn corners, the stripe shall not have a gap of more than 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.4 Perimeter demarcation lines. Stair landings and other floor areas within interior exit stairways, interior exit ramps and exit passageways, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25 mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.4.1 Floor-mounted demarcation lines. Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

[BE] 1025.2.4.2 Wall-mounted demarcation lines. Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe not more than 4 inches (102 mm) above the finished floor. At the top or bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

[BE] 1025.2.4.3 Transition. Where a wall-mounted demarcation line transitions to a floor-mounted demarcation line, or vice-versa, the wall-mounted demarcation line shall drop vertically to the floor to meet a complimentary extension of the floor-mounted demarcation line, thus forming a continuous marking.

[BE] 1025.2.5 Obstacles. Obstacles at or below 6 feet 6 inches (1981 mm) in height and projecting more than 4 inches (102 mm) into the egress path shall be outlined with markings not less than 1 inch (25 mm) in width comprised of a pattern of alternating equal bands, of luminous material and black, with the alternating bands not more than 2 inches (51 mm) thick and angled at 45 degrees (0.79 rad). Obstacles shall include, but are not limited to, standpipes, hose cabinets, wall projections, and restricted height areas. However, such markings shall not conceal any required information or indicators including but not limited to instructions to occupants for the use of standpipes.

Exception: The minimum width of 1 inch (25 mm) shall not apply to markings listed in accordance with UL 1994.

[BE] 1025.2.6 Doors within the exit path. Doors through which occupants must pass in order to complete the exit path shall be provided with markings complying with Sections 1025.2.6.1 through 1025.2.6.3.

[BE] 1025.2.6.1 Emergency exit symbol. The doors shall be identified by a low-location luminous emergency exit symbol complying with NFPA 170. The exit symbol shall be not less than 4 inches (102 mm) in height and shall be mounted on the door, centered horizontally, with the top of the symbol not higher than 18 inches (457 mm) above the finished floor.

[BE] 1025.2.6.2 Door hardware markings. Door hardware shall be marked with not less than 16 square inches (406 m²) of luminous material. This marking shall be located behind, immediately adjacent to, or on the door handle or escutcheon. Where a panic bar is installed, such material shall be not less than 1 inch (25 mm) wide for the entire length of the actuating bar or touchpad.

[BE] 1025.2.6.3 Door frame markings. The top and sides of the door frame shall be marked with a solid and continuous 1-inch to 2-inch-wide (25 mm to 51 mm) stripe. Where the door molding does not provide sufficient flat surface on which to locate the stripe, the stripe shall be permitted to be located on the wall surrounding the frame.

[BE] 1025.3 Uniformity. Placement and dimensions of markings shall be consistent and uniform throughout the same enclosure.

[BE] 1025.4 Self-luminous and photoluminescent. Luminous egress path markings shall be permitted to be made of any material, including paint, provided that an electrical charge is not required to maintain the required luminance. Such materials shall include, but not be limited to, self-luminous materials and photoluminescent materials. Materials shall comply with either of the following standards:

1. UL 1994.
2. ASTM E 2072, except that the charging source shall be 1 footcandle (11 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 millicandels per square meter at 10 minutes and 5 millicandels per square meter after 90 minutes.
**BE** 1025.5 Illumination. Where photoluminescent exit path markings are installed, they shall be provided with not less than 1 footcandle (11 lux) of illumination for not less than 60 minutes prior to periods when the building is occupied and continuously during the building occupancy.

**SECTION 1026**

**HORIZONTAL EXITS**

**BE** 1026.1 Horizontal exits. Horizontal exits serving as an exit in a means of egress system shall comply with the requirements of this section. A horizontal exit shall not serve as the only exit from a portion of a building, and where two or more exits are required, not more than one-half of the total number of exits or total exit minimum width or required capacity shall be horizontal exits.

Exceptions:

1. Horizontal exits are permitted to comprise two-thirds of the required exits from any building or floor area for occupancies in Group I-2.
2. Horizontal exits are permitted to comprise 100 percent of the exits required for occupancies in Group I-3. Not less than 6 square feet (0.6 m²) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

**BE** 1026.2 Separation. The separation between buildings or refuge areas connected by a horizontal exit shall be provided by a fire wall complying with Section 706 of the International Building Code; or by a fire barrier complying with Section 707 of the International Building Code or a horizontal assembly complying with Section 711 of the International Building Code, or both. The minimum fire-resistance rating of the separation shall be 2 hours. Opening protectives in horizontal exits shall also comply with Section 716 of the International Building Code. Duct and air transfer openings in a fire wall or fire barrier that serves as a horizontal exit shall also comply with Section 717 of the International Building Code. The horizontal exit separation shall extend vertically through all levels of the building unless floor assemblies have a fire-resistance rating of not less than 2 hours and do not have unprotected openings.

Exception: A fire-resistance rating is not required at horizontal exits between a building area and an above-grade pedestrian walkway constructed in accordance with Section 3104 of the International Building Code, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as fire barriers shall be continuous from exterior wall to exterior wall so as to divide completely the floor served by the horizontal exit.

**BE** 1026.3 Opening protectives. Fire doors in horizontal exits shall be self-closing or automatic-closing when activated by a smoke detector in accordance with Section 716.2.6.6 of the International Building Code. Doors, where located in a cross-corridor condition, shall be automatic-closing by activation of a smoke detector installed in accordance with Section 716.2.6.6 of the International Building Code.

**BE** 1026.4 Refuge area. The refuge area of a horizontal exit shall be a space occupied by the same tenant or a public area and each such refuge area shall be adequate to accommodate the original occupant load of the refuge area plus the occupant load anticipated from the adjoining compartment. The anticipated occupant load from the adjoining compartment shall be based on the capacity of the horizontal exit doors entering the refuge area or the total occupant load of the adjoining compartment, whichever is less.

**BE** 1026.4.1 Capacity. The capacity of the refuge area shall be computed based on a net floor area allowance of 3 square feet (0.2787 m²) for each occupant to be accommodated therein. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-1, I-2 and I-3 occupancies and Group B ambulatory care facilities shall comply with Sections 407.5.3, 408.6.2, 420.6.1 and 422.3.2 of the International Building Code as applicable.

Exceptions: The net floor area allowable per occupant shall be as follows for the indicated occupancies:

1. Six square feet (0.6 m²) per occupant for occupancies in Group I-3.
2. Fifteen square feet (1.4 m²) per occupant for ambulatory occupancies in Group I-2.
3. Thirty square feet (2.8 m²) per occupant for nonambulatory occupancies in Group I-2.

**BE** 1026.4.2 Number of exits. The refuge area into which a horizontal exit leads shall be provided with exits adequate to meet the occupant requirements of this chapter, but not including the added occupant load imposed by persons entering the refuge area through horizontal exits from other areas. Not less than one refuge area exit shall lead directly to the exterior or to an interior exit stairway or ramp.

Exception: The adjoining compartment shall not be required to have a stairway or door leading directly outside, provided that the refuge area into which a horizontal exit leads has stairways or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

1026.5 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Section 905.3 and 905.4.

**SECTION 1027**

**EXTERIOR EXIT STAIRWAYS AND RAMPS**

**BE** 1027.1 Exterior exit stairways and ramps. Exterior exit stairways and ramps serving as an element of a required means of egress shall comply with this section.

**BE** 1027.2 Use in a means of egress. Exterior exit stairways shall not be used as an element of a required means of egress for Group I-2 occupancies. For occupancies in other than Group I-2, exterior exit stairways and ramps shall be permitted as an element of a required means of egress for buildings not exceeding six stories above grade plane or that are not high-rise buildings.

**BE** 1027.3 Open side. Exterior exit stairways and ramps serving as an element of a required means of egress shall be open
on not less than one side, except for required structural columns, beams, handrails and guards. An open side shall have not less than 35 square feet (3.3 m²) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

[BE] 1027.4 Side yards. The open areas adjoining exterior exit stairways or ramps shall be either yards, courts or public ways; the remaining sides are permitted to be enclosed by the exterior walls of the building.

[BE] 1027.5 Location. Exterior exit stairways and ramps shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the stairway or ramps, including landings, to:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 of the International Building Code based on fire separation distance.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: Exterior exit stairways and ramps serving individual dwelling units of Group R-3 shall have a fire separation distance of not less than 5 feet (1524 mm).

[BE] 1027.6 Exterior exit stairway and ramp protection. Exterior exit stairways and ramps shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an exterior exit stairway or ramp and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior wall shall be rated in accordance with Section 1023.7.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior exit stairway or ramp is served by an exterior exit ramp or balcony that connects two remote exterior exit stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the open-ended corridor of the building is not required for exterior exit stairways or ramps, provided that Items 1 through 3.5 are met:
   3.1. The building, including open-ended corridors, stairways and ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

3.2. The open-ended corridors comply with Section 1020.
3.3. The open-ended corridors are connected on each end to an exterior exit stairway or ramp complying with Section 1027.
3.4. The exterior walls and openings adjacent to the exterior exit stairway or ramp comply with Section 1023.7.
3.5. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m²) or an exterior stairway or ramp shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

4. In Group R-3 occupancies not more than four stories in height, exterior exit stairways and ramps serving individual dwelling units are not required to be separated from the interior of the building where the exterior exit stairway or ramp discharges directly to grade.

SECTION 1028
EXIT DISCHARGE

[BE] 1028.1 General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide a direct path of egress travel to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required exits.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of interior exit stairways and ramps is permitted to egress through areas on the level of discharge provided all of the following conditions are met:
   1.1. Discharge of interior exit stairways and ramps shall be provided with a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
   1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
   1.3. The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. Portions of the level of exit discharge with access to the egress path shall either be equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of interior exit stairways or ramps.
1.4. Where a required interior exit stairway or ramp and an exit access stairway or ramp serve the same floor level and terminate at the same level of exit discharge, the termination of the exit access stairway or ramp and the exit discharge door of the interior exit stairway or ramp shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the interior exit stairway or ramp and the last tread of the exit access stairway or termination of slope of the exit access ramp.

2. Not more than 50 percent of the number and minimum width or required capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following conditions are met:

2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating of the interior exit stairway or ramp enclosure.

2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).

2.3. The area is separated from the remainder of the level of exit discharge by a fire partition constructed in accordance with Section 708 of the International Building Code.

Exception: The maximum transmitted temperature rise is not required.

2.4. The area is used only for means of egress and exits directly to the outside.

3. Horizontal exits complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

[BE] 1028.2 Exit discharge width or capacity. The minimum width or required capacity of the exit discharge shall be not less than the minimum width or required capacity of the exits being served.

[BE] 1028.3 Exit discharge components. Exit discharge components shall be sufficiently open to the exterior so as to minimize the accumulation of smoke and toxic gases.

[BE] 1028.4 Egress courts. Egress courts serving as a portion of the exit discharge in the means of egress system shall comply with the requirements of Sections 1028.4.1 and 1028.4.2.

[BE] 1028.4.1 Width or capacity. The required capacity of egress courts shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm), except as specified herein. Egress courts serving Group R-3 and U occupancies shall be not less than 36 inches (914 mm) in width. The required capacity and width of egress courts shall be unobstructed to a height of 7 feet (2134 mm).

Exception: Encroachments complying with Section 1005.7.

Where an egress court exceeds the minimum required width and the width of such egress court is then reduced along the path of exit travel, the reduction in width shall be gradual. The transition in width shall be affected by a guard not less than 36 inches (914 mm) in height and shall not create an angle of more than 30 degrees (0.52 rad) with respect to the axis of the egress court along the path of egress travel. The width of the egress court shall not be less than the required capacity.

[BE] 1028.4.2 Construction and openings. Where an egress court serving a building or portion thereof is less than 10 feet (3048 mm) in width, the egress court walls shall have not less than 1-hour fire-resistance-rated construction for a distance of 10 feet (3048 mm) above the floor of the egress court. Openings within such walls shall be protected by opening protectives having a fire protection rating of not less than ¾ hour.

Exceptions:

1. Egress courts serving an occupant load of less than 10.

2. Egress courts serving Group R-3.

[BE] 1028.5 Access to a public way. The exit discharge shall provide a direct and unobstructed access to a public way.

Exception: Where access to a public way cannot be provided, a safe dispersal area shall be provided where all of the following are met:

1. The area shall be of a size to accommodate not less than 5 square feet (0.46 m²) for each person.

2. The area shall be located on the same lot not less than 50 feet (15 240 mm) away from the building requiring egress.

3. The area shall be permanently maintained and identified as a safe dispersal area.

4. The area shall be provided with a safe and unobstructed path of travel from the building.

SECTION 1029
ASSEMBLY

[BE] 1029.1 General. A room or space used for assembly purposes that contains seats, tables, displays, equipment or other material shall comply with this section.

[BE] 1029.1.1 Bleachers. Bleachers, grandstands and folding and telescopic seating, that are not building elements, shall comply with ICC 300.

[BE] 1029.1.1.1 Spaces under grandstands and bleachers. Spaces under grandstands or bleachers are used for purposes other than ticket booths less than 100 square feet (9.29 m²) and toilet rooms, such spaces shall be separated by fire barriers complying with Section 707 of the International Building Code and horizontal assemblies complying with Section 711 of the International Building Code with not less than 1-hour fire-resistance-rated construction.

Exceptions:

1. Ticket booths less than 100 square feet (9 m²) in area.

2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (93 m²) or less in area and equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

[BE] 1029.2 Assembly main exit. A building, room or space used for assembly purposes that has an occupant load of greater than 300 and is provided with a main exit, that main exit shall be of sufficient capacity to accommodate not less than one-half of the occupant load, but such capacity shall be not less than the total required capacity of all means of egress leading to the exit. Where the building is classified as a Group A occupancy, the main exit shall front on not less than one street or an unoccupied space of not less than 10 feet (3048 mm) in width that adjoins a street or public way. In a building, room or space used for assembly purposes where there is not a well-defined main exit or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total capacity of egress is not less than 100 percent of the required capacity.

[BE] 1029.3 Assembly other exits. In addition to having access to a main exit, each level in a building used for assembly purposes having an occupant load greater than 300 and provided with a main exit, shall be provided with additional means of egress that shall provide an egress capacity for not less than one-half of the total occupant load served by that level and shall comply with Section 1007.1. In a building used for assembly purposes where there is not a well-defined main exit or where multiple main exits are provided, exits for each level shall be permitted to be distributed around the perimeter of the building, provided that the total width of egress is not less than 100 percent of the required width.

[BE] 1029.4 Foyers and lobbies. In Group A-1 occupancies, where persons are admitted to the building at times when seats are not available, such persons shall be allowed to wait in a lobby or similar space, provided such lobby or similar space shall not encroach upon the minimum width or required capacity of the means of egress. Such foyers, if not directly connected to a public street by all the main entrances or exits, shall have a straight and unobstructed corridor or path of travel to every such main entrance or exit.

[BE] 1029.5 Interior balcony and gallery means of egress. For balconies, galleries or press boxes having a seating capacity of 50 or more located in a building, room or space used for assembly purposes, not less than two means of egress shall be provided, with one from each side of every balcony, gallery or press box.

[BE] 1029.6 Capacity of aisle for assembly. The required capacity of aisles shall be not less than that determined in accordance with Section 1029.6.1 where smoke-protected assembly seating is not provided and with Section 1029.6.2 or 1029.6.3 where smoke-protected assembly seating is provided and with Section 1029.6.3 where open-air assembly seating is provided.

[BE] 1029.6.1 Without smoke protection. The required capacity in inches (mm) of the aisles for assembly seating without smoke protection shall be not less than the occupant load served by the egress element in accordance with all of the following, as applicable:

1. Not less than 0.3 inch (7.6 mm) of aisle capacity for each occupant served shall be provided on stepped aisles having riser heights 7 inches (178 mm) or less and tread depths 11 inches (279 mm) or greater, measured horizontally between tread nosings.
2. Not less than 0.005 inch (0.127 mm) of additional aisle capacity for each occupant shall be provided for each 0.10 inch (2.5 mm) of riser height above 7 inches (178 mm).
3. Where egress requires stepped aisle descent, not less than 0.075 inch (1.9 mm) of additional aisle capacity for each occupant shall be provided on those portions of aisle capacity that do not have a handrail within a horizontal distance of 30 inches (762 mm).
4. Ramped aisles, where slopes are steeper than one unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.22 inch (5.6 mm) of clear aisle capacity for each occupant served. Level or ramped aisles, where slopes are not steeper than one unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.20 inch (5.1 mm) of clear aisle capacity for each occupant served.

[BE] 1029.6.2 Smoke-protected assembly seating. The required capacity in inches (mm) of the aisle for smoke-protected assembly seating shall be not less than the occupant load served by the egress element multiplied by the appropriate factor in Table 1029.6.2. The total number of seats specified shall be those within the space exposed to the same smoke-protected environment. Interpolation is permitted between the specific values shown. A life safety evaluation, complying with NFPA 101, shall be done for a facility utilizing the reduced width requirements of Table 1029.6.2 for smoke-protected assembly seating.

Exception: For open-air assembly seating with an occupant load not greater than 18,000, the required capacity in inches (mm) shall be determined using the factors in Section 1029.6.3.

[BE] TABLE 1029.6.2
CAPACITY FOR AISLES FOR SMOKE-PROTECTED ASSEMBLY

<table>
<thead>
<tr>
<th>TOTAL NUMBER OF</th>
<th>INCHES OF CAPACITY PER SEAT SERVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEATS IN THE SMOKE-PROTECTED ASSEMBLY SEATING</td>
<td>Stepped aisles with handrails within 30 inches</td>
</tr>
<tr>
<td>Equal to or less than 5,000</td>
<td>0.200</td>
</tr>
<tr>
<td>10,000</td>
<td>0.130</td>
</tr>
<tr>
<td>15,000</td>
<td>0.096</td>
</tr>
<tr>
<td>20,000</td>
<td>0.076</td>
</tr>
<tr>
<td>Equal to or greater than 25,000</td>
<td>0.060</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.
[BE] 1029.6.2.1 Smoke control. Aisles and aisle accessways serving a smoke-protected assembly seating area shall be provided with a smoke control system complying with Section 909 or natural ventilation designed to maintain the smoke level not less than 6 feet (1829 mm) above the floor of the means of egress.

[BE] 1029.6.2.2 Roof height. A smoke-protected assembly seating area with a roof shall have the lowest portion of the roof deck not less than 15 feet (4572 mm) above the highest aisle or aisle accessway.

Exception: A roof canopy in an outdoor stadium shall be permitted to be less than 15 feet (4572 mm) above the highest aisle or aisle accessway provided that there are no objects less than 80 inches (2032 mm) above the highest aisle or aisle accessway.

[BE] 1029.6.2.3 Automatic sprinklers. Enclosed areas with walls and ceilings in buildings or structures containing smoke-protected assembly seating shall be protected with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Exceptions:
1. The floor area used for contests, performances or entertainment provided that the roof construction is more than 50 feet (15 240 mm) above the floor level and the use is restricted to low fire hazard uses.
2. Press boxes and storage facilities less than 1,000 square feet (93 m²) in area.
3. Outdoor seating facilities where seating and the means of egress in the seating area are essentially open to the outside.

[BE] 1029.6.3 Open-air assembly seating. In open-air assembly seating, the required capacity in inches (mm) of aisles shall be not less than the total occupant load served by the egress element multiplied by 0.08 (2.0 mm) where egress is by stepped aisle and multiplied by 0.06 (1.52 mm) where egress is by level aisles and ramped aisles.

Exception: The required capacity in inches (mm) of aisles shall be permitted to comply with Section 1029.6.2 for the number of seats in the open-air assembly seating where Section 1029.6.2 permits less capacity.

[BE] 1029.7 Travel distance. The exit access travel distance to an exit door shall not be greater than 200 feet (60 960 mm) measured along the line of travel in sprinklered buildings. Travel distance shall be not more than 250 feet (76 200 mm) in sprinklered buildings. Where aisles are provided for seating, the distance shall be measured along the aisles and aisle accessways without travel over or on the seats.

Exceptions:
1. In facilities with smoke-protected assembly seating the total exit access travel distance shall be not greater than 400 feet (122 m). That portion of the total permitted exit access travel distance from each seat to the nearest entrance to a vomitory or concourse shall not exceed 200 feet (60 960 mm). The portion of the total permitted exit access travel distance from the entrance to the vomitory or concourse to one of the following shall not exceed 200 feet (60 960 mm).

1.1. The closest riser of an exit access stairway.
1.2. The closest slope of an exit access ramp.
1.3. An exit.

2. In facilities with open-air assembly seating of Type III, IV or V construction, the total exit access travel distance to one of the following shall not exceed 400 feet (122 m).
2.1. The closest riser of an exit access stairway.
2.2. The closest slope of an exit access ramp.
2.3. An exit.

3. In facilities with open-air assembly seating of Type I or II construction, the exit access travel distance shall not be limited.

[BE] 1029.8 Common path of egress travel. The common path of egress travel shall not exceed 30 feet (914 mm) from any seat to a point where an occupant has a choice of two paths of egress travel to two exits.

Exceptions:
1. For areas serving less than 50 occupants, the common path of egress travel shall not exceed 75 feet (22 860 mm).
2. For smoke-protected or open-air assembly seating, the common path of egress travel shall not exceed 50 feet (15 240 mm).

[BE] 1029.8.1 Path through adjacent row. Where one of the two paths of travel is across the aisle through a row of seats to another aisle, there shall be not more than 24 seats between the two aisles, and the minimum clear width between rows for the row between the two aisles shall be 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row between aisles.

Exception: For smoke-protected or open-air assembly seating there shall be not more than 40 seats between the two aisles and the minimum clear width shall be 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat.

[BE] 1029.9 Assembly aisles are required. Every occupied portion of any building, room or space used for assembly purposes that contains seats, tables, displays, similar fixtures or equipment shall be provided with aisles leading to exits or exit access doorways in accordance with this section.

[BE] 1029.9.1 Minimum aisle width. The minimum clear width for aisles shall comply with one of the following:

1. Forty-eight inches (1219 mm) for stepped aisles having seating on both sides.

Exception: Thirty-six inches (914 mm) where the stepped aisles serve less than 50 seats.

2. Thirty-six inches (914 mm) for stepped aisles having seating on only one side.

Exception: Twenty-three inches (584 mm) between a stepped aisle handrail and seating where a stepped aisle does not serve more than five rows on one side.

3. Twenty-three inches (584 mm) between a stepped aisle handrail or guard and seating where the stepped aisle is subdivided by a mid-aisle handrail.
4. Forty-two inches (1067 mm) for level or ramped aisles having seating on both sides.

   **Exceptions:**
   1. Thirty-six inches (914 mm) where the aisle serves less than 50 seats.
   2. Thirty inches (762 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.
   3. Thirty-six inches (914 mm) for level or ramped aisles having seating on only one side.

   **Exception:** Thirty inches (762 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.

[B] 1029.9.2 Aisle catchment area. The aisle shall provide sufficient capacity for the number of persons accommodated by the catchment area served by the aisle. The catchment area served by an aisle is that portion of the total space served by that Section of the aisle. In establishing catchment areas, the assumption shall be made that there is a balanced use of all means of egress, with the number of persons in proportion to egress capacity.

[B] 1029.9.3 Converging aisles. Where aisles converge to form a single path of egress travel, the required capacity of that path shall be not less than the combined required capacity of the converging aisles.

[B] 1029.9.4 Uniform width and capacity. Those portions of aisles, where egress is possible in either of two directions, shall be uniform in minimum width or required capacity.

[B] 1029.9.5 Dead-end aisles. Each end of an aisle shall be continuous to a cross aisle, foyer, doorway, vomitory, concourse or stairway in accordance with Section 1029.9.7 having access to an exit.

   **Exceptions:**
   1. Dead-end aisles shall be not greater than 20 feet (6096 mm) in length.
   2. Dead-end aisles longer than 16 rows are permitted where seats beyond the 16th row dead-end aisle are not more than 24 seats from another aisle, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.
   3. For smoke-protected assembly or open-air seating, the dead end aisle length of vertical aisles shall not exceed a distance of 21 rows.
   4. For smoke-protected assembly or open-air seating, a longer dead-end aisle is permitted where seats beyond the 21-row dead-end aisle are not more than 40 seats from another aisle, measured along a row of seats having an aisle accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

[B] 1029.9.6 Aisle measurement. The clear width for aisles shall be measured to walls, edges of seating and tread edges except for permitted projections.

   **Exception:** The clear width of aisles adjacent to seating at tables shall be permitted to be measured in accordance with Section 1029.13.1.

[B] 1029.9.6.1 Assembly aisle obstructions. There shall not be obstructions in the minimum width or required capacity of aisles.

   **Exception:** Handrails are permitted to project into the required width of stepped aisles and ramped aisles in accordance with Section 1014.8.

[B] 1029.9.7 Stairways connecting to stepped aisles. A stairway that connects a stepped aisle to a cross aisle or concourse shall be permitted to comply with the assembly aisle walking surface requirements of Section 1029.14. Transitions between stairways and stepped aisles shall comply with Section 1029.10.

[B] 1029.9.8 Stairways connecting to vomitories. A stairway that connects a vomitory to a cross aisle or concourse shall be permitted to comply with the assembly aisle walking surface requirements of Section 1029.14. Transitions between stairways and stepped aisles shall comply with Section 1029.10.

[B] 1029.10 Transitions. Transitions between stairways and stepped aisles shall comply with either Section 1029.10.1 or 1029.10.2.

[B] 1029.10.1 Transitions to stairways that maintain stepped aisle riser and tread dimensions. Stepped aisles, transitions and stairways that maintain the stepped aisle riser and tread dimensions shall comply with Section 1029.14 as one exit access component.

[B] 1029.10.2 Transitions to stairways that do not maintain stepped aisle riser and tread dimensions. Transitions between stairways and stepped aisles having different riser and tread dimensions shall comply with Sections 1029.10.2.1 through 1029.10.3.

[B] 1029.10.2.1 Stairways and stepped aisles in a straight run. Where stairways and stepped aisles are in a straight run, transitions shall have one of the following:

   1. A depth of not less than 22 inches (559 mm) where the treads on the descending side of the transition have greater depth.
   2. A depth of not less than 30 inches (762 mm) where the treads on the descending side of the transition have lesser depth.

[B] 1029.10.2.2 Stairways that change direction from stepped aisles. Transitions where the stairway changes direction from the stepped aisle shall have a minimum depth of 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater, between the stepped aisle and stairway.

[B] 1029.10.3 Transition marking. A distinctive marking stripe shall be provided at each nosing or leading edge adjacent to the transition. Such stripe shall not be less than 1 inch (25 mm), and not more than 2 inches (51 mm),
wide. The edge marking stripe shall be distinctly different from the stepped *aisle* contrasting marking stripe.

**[BE] 1029.11 Stepped aisles at vomitories.** Stepped aisles that change direction at vomitories shall comply with Section 1029.11.1. Transitions between a stepped aisle above a vomitory and a stepped aisle to the side of a vomitory shall comply with Section 1029.11.2.

**[BE] 1029.11.1 Stepped aisles that change direction at vomitories.** Stepped *aisle* treads where the stepped aisle changes direction at a vomitory shall have a depth of not less than 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater. The height of a stepped aisle tread above a transition at a vomitory shall comply with Section 1029.14.2.2.

**[BE] 1029.11.2 Stepped aisle transitions at the top of vomitories.** Transitions between the stepped *aisle* above a vomitory and stepped aisles to the side of a vomitory shall have a depth of not less than 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater.

**[BE] 1029.12 Construction.** *Aisles,* stepped *aisles* and ramped *aisles* shall be built of materials consistent with the types permitted for the type of construction of the building. Exception: *Wood handrails* shall be permitted for all types of construction.

**[BE] 1029.12.1 Walking surface.** The surface of *aisles,* stepped *aisles* and ramped *aisles* shall be of slip-resistant materials that are securely attached. The surface for stepped *aisles* shall comply with Section 1011.7.1.

**[BE] 1029.12.2 Outdoor conditions.** Outdoor *aisles,* stepped *aisles* and ramped *aisles* and outdoor approaches to *aisles,* stepped *aisles* and ramped *aisles* shall be designed so that water will not accumulate on the walking surface.

**[BE] 1029.13 Aisle accessways.** *Aisle accessways* for seating at tables shall comply with Section 1029.13.1. *Aisle accessways* for seating in rows shall comply with Section 1029.13.2.

**[BE] 1029.13.1 Seating at tables.** Where seating is located at a table or counter and is adjacent to an *aisle* or *aisle accessway,* the measurement of required clear width of the *aisle* or *aisle accessway* shall be made to a line 19 inches (483 mm) away from and parallel to the edge of the table or counter. The 19-inch (483 mm) distance shall be measured perpendicular to the side of the table or counter. In the case of other side boundaries for *aisles* or *aisle accessways,* the clear width shall be measured to walls, edges of seating and tread edges. Exception: Where tables or counters are served by fixed seats, the width of the *aisle* or *aisle accessway* shall be measured from the back of the seat.

**[BE] 1029.13.1.1 Aisle accessway capacity and width for seating at tables.** *Aisle accessways* serving arrangements of seating at tables or counters shall comply with the capacity requirements of Section 1005.1 but shall not have less than 12 inches (305 mm) of width plus ½ inch (12.7 mm) of width for each additional 1 foot (305 mm), or fraction thereof, beyond 12 of *aisle accessway* length measured from the center of the seat farthest from an *aisle.*

Exception: Portions of an *aisle accessway* having a length not exceeding 6 feet (1829 mm) and by a total of not more than four persons.

**[BE] 1029.13.1.2 Seating at table aisle accessway length.** The length of travel along the *aisle accessway* shall not exceed 30 feet (9144 mm) from any seat to the point where a person has a choice of two or more paths of egress travel to separate exits.

**[BE] 1029.13.2 Clear width of aisle accessways serving seating in rows.** Where seating rows have 14 or fewer seats, the minimum clear *aisle accessway* width shall be not less than 12 inches (305 mm) measured as the clear horizontal distance from the back of the row ahead and the nearest projection of the row behind. Where chairs have automatic or self-rising seats, the measurement shall be made with seats in the raised position. Where any chair in the row does not have an automatic or self-rising seat, the measurements shall be made with the seat in the down position. For seats with folding tablet arms, row spacing shall be determined with the tablet arm in the used position.

Exception: For seats with folding tablet arms, row spacing is permitted to be determined with the tablet arm in the stored position where the tablet arm when raised manually to vertical position in one motion automatically returns to the stored position by force of gravity.

**[BE] 1029.13.2.1 Dual access.** For rows of seating served by *aisles* or doorways at both ends, there shall be not more than 100 seats per row. The minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.3 inch (7.6 mm) for every additional seat beyond 14 seats where seats have backrests or beyond 21 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

Exception: For smoke-protected or open-air assembly seating, the row length limits for a 12-inch-wide (305 mm) *aisle accessway,* beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1029.13.2.1.

**[BE] 1029.13.2.2 Single access.** For rows of seating served by an *aisle* or doorway at only one end of the row, the minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.6 inch (15.2 mm) for every additional seat beyond seven seats where seats have backrests or beyond 10 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

Exception: For smoke-protected or open-air assembly seating, the row length limits for a 12-inch-wide (305 mm) *aisle accessway,* beyond which the *aisle accessway* minimum clear width shall be increased, are in Table 1029.13.2.1.

[BE] 1029.14.1 Ramped aisles. **Aisles** that are sloped more than one unit vertical in 20 units horizontal (5-percent slope) shall be considered to be a ramped **aisle**. Ramped **aisles** that serve as part of an accessible route in accordance with Sections 1009 of this code and Section 1108.2 of the **International Building Code** shall have a maximum slope of one-unit vertical in 12 units horizontal (8-percent slope). The slope of other ramped **aisles** shall not exceed one-unit vertical in 8 units horizontal (12.5-percent slope).

[BE] 1029.14.1.1 Cross slope. The slope measured perpendicular to the direction of travel of a ramped **aisle** shall not be steeper than one unit vertical in 48 units horizontal (2-percent slope).

[BE] 1029.14.1.2 Landings. Ramped **aisles** shall have landings in accordance with Sections 1012.6 through 1012.6.5. Landings for ramped **aisles** shall be permitted to overlap required **aisles** or cross **aisles**.

[BE] 1029.14.1.3 Edge protection. Ramped **aisles** shall have edge protection in accordance with Sections 1012.10 and 1012.10.1.

**Exception:** In assembly spaces with **fixed seating**, edge protection is not required on the sides of ramped **aisles** where the ramped **aisles** provide access to the adjacent seating and **aisles** accessways.

[BE] 1029.14.2 Stepped aisles. **Aisles** with a slope exceeding one unit vertical in eight units horizontal (12.5-percent slope) shall consist of a series of risers and treads that extends across the full width of **aisles** and complies with Sections 1029.14.2.1 through 1029.14.2.4.

[BE] 1029.14.2.1 Treads. Tread depths shall not be less than 11 inches (279 mm) and shall have dimensional uniformity.

**Exception:** The tolerance between adjacent treads shall not exceed \( \frac{3}{16} \) inch (4.8 mm).

[BE] 1029.14.2.2 Risers. Where the gradient of stepped **aisles** is to be the same as the gradient of adjoining seating areas, the riser height shall be not less than 4 inches (102 mm) nor more than 8 inches (203 mm) and shall be uniform within each **flight**.

**Exceptions:**

1. Riser height nonuniformity shall be limited to the extent necessitated by changes in the gradient of the adjoining seating area to maintain adequate sightlines. Where nonuniformities exceed \( \frac{3}{16} \) inch (4.8 mm) between adjacent risers, the exact location of such nonuniformities shall be indicated with a distinctive marking stripe on each tread at the **nosing** or leading edge adjacent to the nonuniform risers. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide. The edge marking stripe shall be distinctly different from the contrasting marking stripe.

2. Riser heights not exceeding 9 inches (229 mm) shall be permitted where they are necessitated by the slope of the adjacent seating areas to maintain sightlines.

[BE] 1029.14.2.2.1 Construction tolerances. The tolerance between adjacent risers on a stepped **aisle** that were designed to be equal height shall not exceed \( \frac{3}{16} \) inch (4.8 mm). Where the stepped **aisle** is designed in accordance with Exception 1 of Section 1029.14.2.2, the stepped **aisle** shall be constructed so that each riser of unequal height, determined in the direction of descent, is not more than \( \frac{3}{8} \) inch (9.5 mm) in height different from adjacent risers where stepped **aisle** treads are less than 22 inches (560 mm) in depth and \( \frac{3}{8} \) inch (19.1 mm) in height different from adjacent risers where stepped **aisle** treads are 22 inches (560 mm) or greater in depth.

[BE] 1029.14.2.3 Tread contrasting marking stripe. A contrasting marking stripe shall be provided on each tread at the **nosing** or leading edge such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide.

**Exception:** The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

[BE] 1029.14.2.4 Nosing and profile. **Nosing** and riser profile shall comply with Sections 1011.5.5 through 1011.5.5.3.

[BE] 1029.15 Seat stability. In a building, room or space used for assembly purposes, the seats shall be securely fastened to the floor.

**Exceptions:**

1. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with 200 or fewer seats, the seats shall not be required to be fastened to the floor.

2. In a building, room or space used for assembly purposes or portions thereof with seating at tables and without ramped or tiered floors for seating, the seats shall not be required to be fastened to the floor.

3. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with greater than 200 seats, the seats shall be fastened together in groups of not less than three or the seats shall be securely fastened to the floor.

4. In a building, room or space used for assembly purposes where flexibility of the seating arrangement is an integral part of the design and function of the space and seating is on tiered levels, not more than 200 seats shall not be required to be fastened to the floor. Plans showing seating, tiers and **aisles** shall be submitted for approval.

5. Groups of seats within a building, room or space used for assembly purposes separated from other seating by railings, **guards**, partial height walls or similar barriers with level floors and having not more than 14 seats per group shall not be required to be fastened to the floor.

6. Seats intended for musicians or other performers and separated by railings, **guards**, partial height walls or
similar barriers shall not be required to be fastened to the floor.

[BE] 1029.16 Handrails. Ramped aisles having a slope exceeding one unit vertical in 15 units horizontal (6.7-percent slope) and stepped aisles shall be provided with handrails in compliance with Section 1014 located either at one or both sides of the aisle or within the aisle width.

Exceptions:
1. Handrails are not required for ramped aisles with seating on both sides.
2. Handrails are not required where, at the side of the aisle, there is a guard with a top surface that complies with the graspability requirements of handrails in accordance with Section 1014.3.
3. Handrail extensions are not required at the top and bottom of stepped aisles and ramped aisles to permit crossovers within the aisles.

[BE] 1029.16.1 Discontinuous handrails. Where there is seating on both sides of the aisle, the mid-aisle handrails shall be discontinuous with gaps or breaks at intervals not exceeding five rows to facilitate access to seating and to permit crossing from one side of the aisle to the other. These gaps or breaks shall have a clear width of not less than 22 inches (559 mm) and not greater than 36 inches (914 mm), measured horizontally, and the mid-aisle handrail shall have rounded terminations or bends.

[BE] 1029.16.2 Handrail termination. Handrails located on the side of stepped aisles shall return to a wall, guard or the walking surfaces or shall be continuous to the handrail of an adjacent stepped aisle flight.

[BE] 1029.16.3 Mid-aisle termination. Mid-aisle handrails shall not extend beyond the lowest riser and shall terminate within 18 inches (381 mm), measured horizontally, from the lowest riser. Handrail extensions are not required.

Exception: Mid-aisle handrails shall be permitted to extend beyond the lowest riser where the handrail extensions do not obstruct the width of the cross aisle.

[BE] 1029.16.4 Rails. Where mid-aisle handrails are provided in stepped aisles, there shall be an additional rail located approximately 12 inches (305 mm) below the handrail. The rail shall be adequate in strength and attachment in accordance with Section 1607.8.1.2 of the International Building Code.

[BE] 1029.17 Assembly guards. Guards adjacent to seating in a building, room or space used for assembly purposes shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015 except where provided in accordance with Sections 1029.17.1 through 1029.17.4. At bleachers, grandstands and folding and telescopic seating, guards must be provided where required by ICC 300 and Section 1029.17.1.

[BE] 1029.17.1 Perimeter guards. Perimeter guards shall be provided where the footboards or walking surface of seating facilities are more than 30 inches (762 mm) above the floor or grade below. Where the seatboards are adjacent to the perimeter, guard height shall be 42 inches (1067 mm) high minimum, measured from the seatboard. Where the seats are self-rising, guard height shall be 42 inches (1067 mm) high minimum, measured from the floor surface. Where there is an aisle between the seating and the perimeter, the guard height shall be measured in accordance with Section 1015.3.

Exceptions:
1. Guards that impact sightlines shall be permitted to comply with Section 1029.17.3.
2. Bleachers, grandstands and folding and telescopic seating shall not be required to have perimeter guards where the seating is located adjacent to a wall and the space between the wall and the seating is less than 4 inches (102 mm).

[BE] 1029.17.2 Cross aisles. Cross aisles located more than 30 inches (762 mm) above the floor or grade below shall have guards in accordance with Section 1015. Where an elevation change of 30 inches (762 mm) or less occurs between a cross aisle and the adjacent floor or grade below, guards not less than 26 inches (660 mm) above the aisle floor shall be provided.

Exception: Where the backs of seats on the front of the cross aisle project 24 inches (610 mm) or more above the adjacent floor of the aisle, a guard need not be provided.

[BE] 1029.17.3 Sightline-constrained guard heights. Unless subject to the requirements of Section 1029.17.4, a fascia or railing system in accordance with the guard requirements of Section 1015 and having a minimum height of 26 inches (660 mm) shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating.

[BE] 1029.17.4 Guards at the end of aisles. A fascia or railing system complying with the guard requirements of 1015 shall be provided for the full width of the aisle where the foot of the aisle is more than 30 inches (762 mm) above the floor or grade below. The fascia or railing shall be not less than 36 inches (914 mm) high and shall provide not less than 42 inches (1067 mm) measured diagonally between
SECTION 1030
EMERGENCY ESCAPE AND RESCUE

[BE] 1030.1 General. In addition to the means of egress required by this chapter, emergency escape and rescue openings shall be provided in the following occupancies:

1. Group R-2 occupancies located in stories with only one exit or access to only one exit as permitted by Tables 1006.3.3(1) and 1006.3.3(2).

2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth story above grade plane shall have not fewer than one exterior emergency escape and rescue opening in accordance with this section. Where basements contain one or more sleeping rooms, emergency escape and rescue openings shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. Such openings shall open directly into a public way or to a yard or court that opens to a public way.

Exceptions:

1. Basements with a ceiling height of less than 80 inches (2032 mm) shall not be required to have emergency escape and rescue openings.

2. Emergency escape and rescue openings are not required from basements or sleeping rooms that have an exit door or exit access door that opens directly into a public way or to a yard, court or exterior exit balcony that opens to a public way.

3. Basements without habitable spaces and having not more than 200 square feet (18.6 m²) in floor area shall not be required to have emergency escape and rescue openings.

4. Within individual dwelling and sleeping units in Groups R-2 and R-3, where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided that the basement has one of the following:

   a. One means of egress and one emergency escape and rescue opening.

   b. Two means of egress.

[BE] 1030.1.1 Operational constraints and opening control devices. Emergency escape and rescue openings shall be operational from inside the room without the use of keys or tools. Window-opening control devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening.

[BE] 1030.2 Minimum size. Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.53 m²).

Exception: The minimum net clear opening for grade-floor emergency escape and rescue openings shall be 5 square feet (0.46 m²).

[BE] 1030.2.1 Minimum dimensions. The minimum net clear opening height dimension shall be 24 inches (610 mm).

The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

[BE] 1030.3 Maximum height from floor. Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

[BE] 1030.4 Window wells. An emergency escape and rescue opening with a finished sill height below the adjacent ground level shall be provided with a window well in accordance with Sections 1030.4.1 and 1030.4.2.

[BE] 1030.4.1 Minimum size. The minimum horizontal area of the window well shall be 9 square feet (0.84 m²), with a minimum dimension of 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.

[BE] 1030.4.2 Ladders or steps. Window wells with a vertical depth of more than 44 inches (1118 mm) shall be equipped with an approved permanently affixed ladder or steps. Ladders or rungs shall have an inside width of not less than 12 inches (305 mm), shall project not less than 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center (o.c.) vertically for the full height of the window well. The ladder or steps shall not encroach into the required dimensions of the window well by more than 6 inches (152 mm). The ladder or steps shall not be obstructed by the emergency escape and rescue opening. Ladders or steps required by this section are exempt from the stairway requirements of Section 1011.

[BE] 1030.5 Bars, grilles, covers and screens. Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided that the minimum net clear opening size complies with Sections 1030.1.1 through 1030.4.2 and such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening. Where such bars, grilles, covers, screens or similar devices are installed in existing buildings, they shall not reduce the net clear opening of the emergency escape and rescue opening and smoke alarms shall be installed in accordance with Section 907.2.10 regardless of the valuation of the alteration.

SECTION 1031
MAINTENANCE OF THE MEANS OF EGRESS

1031.1 General. The means of egress for buildings or portions thereof shall be maintained in accordance with this section.

1031.2 Reliability. Required exit accesses, exits and exit discharges shall be continuously maintained free from obstructions or impediments to full instant use in the case of fire or other emergency where the building area served by the means of egress is occupied. An exit or exit passageway shall not be used for any purpose that interferes with a means of egress.

1031.2.1 Security devices and egress locks. Security devices affecting means of egress shall be subject to approval of the fire code official. Security devices and locking arrangements in the means of egress that restrict, control, or delay egress shall be installed and maintained as required by this chapter.
1031.2.2 Locking arrangements in educational occupancies. In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors from classrooms, offices and other occupied rooms shall be permitted to be provided with locking arrangements designed to keep intruders from entering the room where all of the following conditions are met:

1. The door shall be capable of being unlocked from outside the room with a key or other approved means.
2. The door shall be openable from within the room in accordance with Section 1010.1.9.
3. Modifications shall not be made to existing listed panic hardware, fire door hardware or door closers.
4. Modifications to fire door assemblies shall be in accordance with NFPA 80.

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

1031.3.1 Group I-2. In Group I-2, the required clear width for aisles, corridors and ramps that are part of the required means of egress shall comply with Section 1020.2. The facility shall have a plan to maintain the required clear width during emergency situations.

Exception: In areas required for bed movement, equipment shall be permitted in the required width where all of the following provisions are met:

1. The equipment is low hazard and wheeled.
2. The equipment does not reduce the effective clear width for the means of egress to less than 5 feet (1525 mm).
3. The equipment is limited to:
   3.1 Equipment and carts in use.
   3.2 Medical emergency equipment.
   3.3 Infection control carts.
   3.4 Patient lift and transportation equipment.
4. Medical emergency equipment and patient lift and transportation equipment, when not in use, are required to be located on one side of the corridor.
5. The equipment is limited in number to not more than one per patient sleeping room or patient care room within each smoke compartment.

[BE] 1031.4 Exit signs. Exit signs shall be installed and maintained in accordance with the building code that was in effect at the time of construction and the applicable provisions in Section 1104. Decorations, furnishings, equipment or adjacent signage that impairs the visibility of exit signs, creates confusion or prevents identification of the exit shall not be allowed.

1031.5 Nonexit identification. Where a door is adjacent to, constructed similar to and can be confused with a means of egress door, that door shall be identified with an approved sign that identifies the room name or use of the room.

1031.6 Finishes, furnishings and decorations. Means of egress doors shall be maintained in such a manner as to be distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Furnishings, decorations or other objects shall not be placed so as to obstruct exits, access thereto, egress therefrom, or visibility thereof. Hangings and draperies shall not be placed over exit doors or otherwise be located to conceal or obstruct an exit. Mirrors shall not be placed on exit doors. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of exit.

1031.7 Emergency escape and rescue openings. Required emergency escape and rescue openings shall be maintained in accordance with the code that was in effect at the time of construction, and both of the following:

1. Required emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.
2. Bars, grilles, grates or similar devices are allowed to be placed over emergency escape and rescue openings provided that the minimum net clear opening size complies with the code that was in effect at the time of construction and such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the emergency escape and rescue opening.

1031.8 Inspection, testing and maintenance. Two-way communication systems for areas of refuge shall be inspected and tested on a yearly basis to verify that all components are operational. Where required, the tests shall be conducted in the presence of the fire code official. Records of inspection, testing and maintenance shall be maintained.

1031.9 Floor identification signs. The floor identification signs required by Sections 1023.9 and 1104.24 shall be maintained in an approved manner.

1031.10 Emergency lighting equipment inspection and testing. Emergency lighting shall be maintained in accordance with Section 1008 and shall be inspected and tested in accordance with Sections 1031.10.1 and 1031.10.2.

1031.10.1 Activation test. Emergency lighting equipment shall be tested monthly for a duration of not less than 30 seconds. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing and self-diagnostics, a visual inspection of the emergency lighting equipment shall be conducted monthly to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired.

1031.10.2 Power test. Battery-powered emergency lighting equipment shall be tested annually by operating the equipment on battery power for not less than 90 minutes.
FIGURE 1023.9
STAIRWELL SIGNAGE

Notes:

1. The sign face shall be 12” x 12” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

2. Font style used is Handel Gothic BT Capital fonts.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG3 4090 Series or equivalent) applied as a background to the aluminum plate.

4. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.
FIGURE 1023.9.1
ELEVATOR LOBBY SIGN

Notes:

1. The sign face shall be 12” x 14” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

2. Font style used is Handel Gothic BT Capital fonts.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG³ 4090 Series or equivalent) applied as a background to the aluminum plate.

4. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.
CHAPTER 11
CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

User note:

About this chapter: Chapter 11 applies to existing buildings constructed prior to the adoption of the code and is intended to ensure a minimum degree of fire and life safety to persons occupying existing buildings by providing for alterations to such buildings that do not comply with the minimum requirements of the International Building Code®. The provisions address general fire safety features such as requirements for fire alarm systems in some existing buildings and general means of egress, and include a section dedicated to existing Group I-2 occupancies.

SECTION 1101
GENERAL

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code. Unless specifically indicated in this chapter all work done on new and existing systems shall meet the requirements of the current adopted codes and standards.

1101.2 Intent. The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the International Building Code.

1101.3 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7 and the International Building Code.

1101.4 Owner notification. When a building is found to be in noncompliance with this chapter, the fire code official shall duly notify the owner of the building. Upon receipt of such notice, the owner shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.

1101.4.1 Construction documents. Construction documents necessary to comply with this chapter shall be completed and submitted within a time schedule approved by the fire code official.

1101.4.2 Completion of work. Work necessary to comply with this chapter shall be completed within a time schedule approved by the fire code official.

1101.4.3 Extension of time. The fire code official is authorized to grant necessary extensions of time when it can be shown that the specified time periods are not physically practical or pose an undue hardship. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an acceptable systematic plan of correction with the fire code official.

SECTION 1102
DEFINITION

1102.1 Definition. The following term is defined in Chapter 2: EXISTING.

SECTION 1103
FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS

1103.1 Required construction. Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2 through 1103.9.

The provisions of this chapter shall not be construed to allow the elimination of fire protection systems or a reduction in the level of fire safety provided in buildings constructed in accordance with previously adopted codes.

A modification that increases the area protected by a fire protection system by 50 percent, or a fire alarm control panel replacement shall be considered a new installation. When the fire alarm control panel is replaced the entire fire alarm system shall be brought to the current performance and installation standards in accordance with Section 907.5. When fees for modifications exceed the fees for new systems, fees for new systems shall apply.

Exception: Group U occupancies.

<table>
<thead>
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<th>TABLE 1103.1</th>
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<td>OCCUPANCY AND USE REQUIREMENTS*</td>
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Effective July 19, 2019
2018 INTERNATIONAL FIRE CODE WITH PHOENIX AMENDMENTS
### 1103.1 Historic buildings

Facilities designated as historic buildings shall develop a fire protection plan in accordance with NFPA 914. The fire protection plans shall comply with the maintenance and availability provisions in Sections 404.3 and 404.4. When the fire alarm control panel is replaced, the entire fire alarm system shall be brought to the current performance and installation standards in accordance with Section 907.5.

### 1103.2 Emergency responder radio coverage in existing buildings

Existing buildings that do not have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, shall be equipped with such coverage according to one of the following:

1. Where an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.
2. Within a time frame established by the adopting authority.

**Exception:** Where it is determined by the fire code official that the radio coverage system is not needed.

### 1103.3 Existing elevators

Existing elevators, escalators and moving walks shall comply with the requirements of Sections 1103.3.1 and 1103.3.2.
1103.3.1 Elevators, escalators and moving walks. Existing elevators, escalators and moving walks in Group I-2 Condition 2 occupancies shall comply with ASME A17.3. Elevator operation.

1103.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for fire-fighting or rescue purposes shall be provided with emergency operation in accordance with ASME A17.3.

Exceptions:

1. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where protected at the elevator shaft openings with automatic sprinkler systems installed in accordance with Section 716.5 of the International Building Code and where all of the following conditions are met:
   1.1. The doors shall be provided with vision panels of approved fire protection-rated glazing so located as to furnish clear vision of the approach to the elevator. Such glazing shall not exceed 100 square inches (0.665 m²) in area.
   1.2. The doors shall be held open but be automatic-closing by activation of a fire alarm initiating device installed in accordance with the requirements of NFPA 72 as for Phase I Emergency Recall Operation, and shall be located at each floor served by the elevator; in the associated elevator machine room, control space, or control room; and in the elevator hoistway, where sprinklers are located in those hoistways.
   1.3 The doors, when closed, shall have signs visible from the approach area stating: WHEN THESE DOORS ARE CLOSED OR IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRWAYS.

2. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where provided with automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

3. Freight elevators in buildings provided with both automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2 and not less than one ASME 17.3-compliant elevator serving the same floors.

Elimination of previously installed Phase I emergency recall or Phase II emergency in-car systems shall not be permitted.

1103.3.2.1 Elevator emergency exit. Elevator cars with a total travel distance of 75 feet (22 860mm) or more shall include a locked emergency exit that can be opened from outside the car. The key or combination to the lock shall be kept in the Fire Command Center.

1103.3.2.2 Emergency door release. Elevator doors shall provide a hoistway access escutcheon hole (drop-key hole) on the outside for emergency release. The key shall be kept in the Fire Command Center, or an approved location.

1103.4 Vertical openings. Interior vertical openings, including but not limited to stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building, shall be enclosed or protected as specified in Sections 1103.4.1 through 1103.4.10. Modification to existing smoke control system shall be in accordance with Sections 901.6.2.1 and 901.6.2.2 and 909.

1103.4.1 Group I-2 and I-3 occupancies. In Group I-2 and I-3 occupancies, interior vertical openings connecting two or more stories shall be protected with 1-hour fire-resistance-rated construction.

Exceptions:

1. In Group I-2, unenclosed vertical openings not exceeding two connected stories and not concealed within the building construction shall be permitted as follows:
   1.1. The unenclosed vertical openings shall be separated from other unenclosed vertical openings serving other floors by a smoke barrier.
   1.2. The unenclosed vertical openings shall be separated from corridors by smoke partitions.
   1.3. The unenclosed vertical openings shall be separated from other fire or smoke compartments on the same floors by a smoke barrier.
   1.4. On other than the lowest level, the unenclosed vertical openings shall not serve as a required means of egress.

2. In Group I-2, atriums connecting three or more stories shall not require 1-hour fire-resistance-rated construction where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3, and all of the following conditions are met:
   2.1. For other than existing approved atriums with a smoke control system, where the atrium was constructed and is maintained in accordance with the code in effect at the time the atrium was created, the atrium shall have a smoke control system that is in compliance with Section 909. Modification to existing smoke control system shall be in accordance with Sections 901.6.2.1 and 901.6.2.2.
   2.2. Glass walls forming a smoke partition or a glass-block wall assembly shall be permitted when in compliance with Condition 2.2.1 or 2.2.2.

   2.2.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:
      2.2.1.1. Automatic sprinklers are provided along both sides of the
separation wall and doors, or on the room side only if there is not a walkway or occupied space on the atrium side.

2.2.1.2. The sprinklers shall be not more than 12 inches (305 mm) away from the face of the glass and at intervals along the glass of not greater than 72 inches (1829 mm).

2.2.1.3. Windows in the glass wall shall be non-operating type.

2.2.1.4. The glass wall and windows shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the sprinkler system operates.

2.2.1.5. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the sprinkler system without obstruction.

2.2.2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 of the International Building Code and having a 3/4-hour fire protection rating is provided.

2.3. Where doors are provided in the glass wall, they shall be either self-closing or automatic-closing and shall be constructed to resist the passage of smoke.

3. In Group I-3 occupancies, exit stairways or ramps and exit access stairways or ramps constructed in accordance with Section 408 in the International Building Code.

1103.4.2 Three to five stories. In other than Group I-2 and I-3 occupancies, interior vertical openings connecting three to five stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:
1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.4 Atriums and covered malls. In other than Group I-2 and I-3 occupancies, interior vertical openings in a covered mall building or a building with an atrium shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:
1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.

1103.4.5 Escalators in Group B and M occupancies. In Group B and M occupancies escalators creating vertical openings connecting any number of stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 installed throughout the building, with a draft curtain and closely spaced sprinklers around the escalator opening.

1103.4.6 Escalators connecting four or fewer stories. In other than Group B and M occupancies, escalators creating vertical openings connecting four or fewer stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 shall be installed throughout the building, and a draft curtain with closely spaced sprinklers shall be installed around the escalator opening.

1103.4.7 Escalators connecting more than four stories. In other than Group B and M occupancies, escalators creating vertical openings connecting five or more stories shall be protected by 1-hour fire-resistance-rated construction.

1103.4.8 Occupancies other than Group I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this Section shall be protected by 1-hour fire-resistance-rated construction.

1. Exit access stairways and ramps that serve, or atmospherically communicate between, only two stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.

4. Exit access stairways and ramps within an atrium complying with the provisions of Section 404 of the International Building Code.

5. Exit access stairways and ramps in open parking garages that serve only the parking garage.

6. Exit access stairways and ramps serving open-air seating complying with the exit access travel distance requirements of Section 1029.7 of the International Building Code.

7. Exit access stairways and ramps serving the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

1103.4.9 Waste and linen chutes. In Group I-2 occupancies, existing waste and linen chutes shall comply with Sections 1103.4.9.1 through 1103.4.9.5.

1103.4.9.1 Enclosure. Chutes shall be enclosed with 1-hour fire-resistance-rated construction. Opening protective for such chutes shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.4.9.2 Chute intakes. Chute intakes shall comply with Section 1103.4.9.2.1 or 1103.4.9.2.2.

1103.4.9.2.1 Chute intake direct from corridor. Where intake to chutes is direct from a corridor, the intake opening shall be equipped with a chute-intake door in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.4.9.2.2 Chute intake via a chute-intake room. Where the intake to chutes is accessed through a chute-intake room, the room shall be enclosed with 1-hour fire-resistance-rated construction. Opening protective for the intake room shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 3/4 hour. Opening protective for the chute enclosure shall be in accordance with Section 1103.4.9.1.

1103.4.9.3 Automatic sprinkler system. Chutes shall be equipped with an approved automatic sprinkler system in accordance with Section 903.2.11.2.

1103.4.9.4 Chute discharge rooms. Chutes shall terminate in a dedicated chute discharge room. Such rooms shall be separated from the remainder of the building by not less than 1-hour fire-resistance-rated construction. Opening protective for such discharge room shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.4.9.5 Chute discharge protective. Chute discharges shall be equipped with a self-closing or automatic-closing protective in accordance with Section 716 of the International Building Code and having a fire protection rating of not less than 1 hour.

1103.4.10 Flue-fed incinerators. Existing flue-fed incinerator rooms and associated flue shafts shall be protected with 1-hour fire-resistance-rated construction and shall not have other vertical openings connected with the space other than the associated flue. Opening protective for such incinerators shall be in accordance with Section 716 of the International Building Code and have a fire protection rating of not less than 1 hour.

1103.5 Sprinkler systems. An automatic sprinkler system shall be provided in existing buildings in accordance with Sections 1103.5.1 through 1103.5.7.

1103.5.1 Group A-2. Where alcoholic beverages are consumed in a Group A-2 occupancy having an occupant load of 300 or more, the fire area containing the Group A-2 occupancy shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

1103.5.2 Group I-2. In Group I-2, an automatic sprinkler system shall be provided in accordance with Section 1105.9.

1103.5.3 Group I-2 Condition 2. In addition to the requirements of Section 1103.5.2, existing buildings of Group I-2 Condition 2 occupancy shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The automatic sprinkler system shall be installed as established by the adopting ordinance.

1103.5.4 Pyroxylin plastics. An automatic sprinkler system shall be provided throughout existing buildings where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg). Vaults located within buildings for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system capable of discharging 1.66 gallons per minute per square foot (68 L/min/m²) over the area of the vault.

1103.5.5 Bret Tarver Sprinkler Ordinance. An approved automatic sprinkler system shall be installed throughout all levels of all new Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies of any size and throughout all Group R-3 occupancies including one-and two-family dwellings built under the International Residential Code, and Group U occupancies of more than 5,000 square feet.

The calculated area of Group R-3 occupancies shall include all livable space and the area of any attached garage and carports or areas located under living spaces.

Automatic sprinkler systems shall be installed in accordance with NFPA 13 for Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies. Automatic sprinkler systems shall be installed in accordance with NFPA 13R for residential occupancies up to and including four stories in height, in Groups R-1, R-2, R-4 occupancies and NFPA 13D for one and two-family dwellings and mobile homes in Group R-3.
and R-4 occupancies with six to ten licensed beds. Exceptions to or reductions in code requirements are not allowed for the installation of residential sprinkler systems installed in accordance with NFPA 13R and NFPA 13D unless specifically allowed by the International Building Code. Exceptions to or reductions in code requirements for NFPA 13 systems allowed in the International Building Code are allowed.

Exceptions:

1. Detached gazebos, temporary tents and ramadas for residential and public use.
2. Independent building of any construction or occupancy, other than Group E or H, of 700 square feet (65 m²) or less.
3. Detached noncombustible carports or parking canopies regardless of size, and detached noncombustible canopies used exclusively for automotive motor fuel dispensing station not exceeding 5,000 square feet (464 m²).
4. Factory-built buildings utilized as temporary office buildings similar to real estate leasing offices and construction offices.
5. Playground equipment, carwashes and small canopies for shade that are less than 5,000 square feet (464 m²) in area, and constructed of limited or noncombustible material and are more than 5 feet (1524 mm) from the nearest structure.

1103.5.5.1 Retrofit. Existing buildings are required to comply with the provisions of Sections 903.1.2 to 903.1.7.

1103.5.5.2 Retrofit in Group R-3 occupancies. One or more additions within any 3-year period are made to a Group R3 occupancy and comply with the following:

1. The aggregate of the additions exceeds 50 percent of the square footage of the house as of June 17, 2002.
2. The new total area of the building is greater than 5,000 square feet (464 m²).

The calculated area of Group R-3 occupancies shall include all livable space and the area of any attached garage, carports, aircraft hangar or basement.

1103.5.5.3 Building additions. Building additions in existing occupancies other than Group R-3 shall be protected by an automatic fire sprinkler when:

1. Building additions that equal 50 percent or more of the existing building floor area, or exceed 10,000 square feet (929 m²), whichever is less.
2. Two or more building permits related to increased square footage are issued over any three consecutive years:
   2.1. The aggregate of the additions exceeds 50 percent of the square footage of the building as of June 17, 2002.
   2.2. The new total area of the building is greater than 10,000 square feet (929 m²).

3. Are required to be protected in accordance with the City of Phoenix Building Code or City of Phoenix Residential Code.

1103.5.5.4 Building remodels. An automatic fire sprinkler system shall be installed when 50 percent or more of the roof structure is replaced or repaired or when the removal of existing fire-rated assemblies results in an increase of the original basic fire area.

1103.5.5.5 Change of occupancy within hazard level 1. An automatic fire sprinkler system shall be installed in a building, regardless of the building area, undergoes a change of occupancy within hazard level 1.

1103.5.5.6 Change of occupancy over 2,500 square feet (232 m²). An automatic fire sprinkler system shall be installed in any building 2,500 square feet (232 m²) or greater that undergoes a change of occupancy.

1103.5.5.7 Change of occupancy under 2,500 square feet (232 m²). An automatic fire sprinkler system shall be installed in any building 2,500 square feet (232 m²) or less that undergoes a change of occupancy to a higher hazard level as defined by Table 903.1.7.

Exceptions: An automatic fire sprinkler system is not required when:

1. The occupancy is 1,500 square feet (139 m²) or less; and
2. There are openings entirely above the adjoining ground level totaling at least 20 square feet (1.85 m²) in each 50 linear feet (15 240 mm) or fraction thereof, of exterior wall in the story on at least one side. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from the exterior and shall not be obstructed in a manner that firefighting or rescue cannot be accomplished from the exterior; and
3. The occupancy is not classified as Group H.

+ TABLE 1103.5.5.5 HAZARD LEVEL

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<th>HAZARD LEVEL</th>
<th>1997 UBC OCCUPANCY TYPE</th>
<th>2018 IFC OCCUPANCY TYPE</th>
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<td>4 (lowest)</td>
<td>B, M, U, R-3</td>
<td>B, M, U, R-3</td>
</tr>
</tbody>
</table>

1. Business, Ambulatory Care Facility
2. Provided for guidance of equivalent occupancy types
3. Sprinklered buildings. When existing nonsprinklered buildings of mixed occupancy are required to install sprinklers based on a change of occupancy classification, sprinklers shall be installed throughout the fire area that includes the new occupancy. The fire-resistance rating of fire barriers or horizontal assemblies separating sprinklered and nonsprinklered fire areas shall be a minimum of 2 hours. Fire department connection signage shall be in accordance with Section 912.
Exception: Group R-1, R-2, R-4 occupancies and multistory buildings.

**1103.5.6.1 Change of occupancy to Group B or M under the Building Department Adaptive Reuse Interpretation.** When an occupancy undergoes a change of occupancy to a Group B or M from a Group B or M an automatic fire sprinkler system shall be installed.

**Exceptions:**

1. The fire area containing the occupancy has a total area of 5,000 square feet (464.515 m²) or less and,
2. The fire areas are separated by a minimum 2-hour fire resistance rated assemblies and,
3. The occupancy does not store, handle or use hazardous materials over the exempt amount and,
4. Only one control area is allowed for the building.

**1103.5.6.2 Changes in commodity hazard.** Changes of commodity to a higher hazard classification or storage configuration that exceeds the capabilities of the existing sprinkler system design shall require the sprinkler system to be modified. The sprinkler system shall be modified to provide an approved design in accordance with NFPA 13, or other applicable design standard, for the commodity present in the building or area. In existing nonsprinklered buildings storage above the ordinary hazard class shall require automatic fire sprinkler installation throughout the building.

**1103.5.7 Installation of quick-response sprinklers in existing light hazard occupancy sprinkler systems being modified.** When existing occupancies and sprinkler systems are being remodeled or renovated, existing standard-response sprinklers shall be replaced with quick-response sprinklers as follows:

1. When any tenant improvement, system repair or replacement is made to an existing fire area, existing standard-response sprinklers shall be replaced with quick-response sprinklers; and
2. When an existing system with standard-response sprinklers is being modified, the standard response sprinklers shall be replaced with quick response sprinklers throughout the tenant space, floor or suite. When 50 percent of the floor sprinklers are replaced, all sprinklers on the entire floor shall be replaced with quick-response sprinklers.

**1103.6 Standpipes.** Existing structures shall be equipped with standpipes installed in accordance with Section 905 where required in Sections 1103.6.1 and 1103.6.2. The fire code official is authorized to approve the installation of manual standpipe systems to achieve compliance with this section where the responding fire department is capable of providing the required hose flow at the highest standpipe outlet.

**1103.6.1 Existing multiple-story buildings.** Existing buildings with occupied floors located more than 50 feet (15 240 mm) above the lowest level of fire department access or more than 50 feet (15 240 mm) below the highest level of fire department access shall be equipped with standpipes.

**1103.6.2 Existing helistops and heliports.** Existing buildings with a rooftop helistop or heliport located more than 30 feet (9144 mm) above the lowest level of fire department access to the roof level on which the helistop or heliport is located shall be equipped with standpipes in accordance with Section 2007.5.

**1103.6.3 Pressure reducing valve settings.** When a new or replacement fire pump serving an automatic standpipe is installed, existing standpipes shall be designed in accordance with NFPA 14 and the following requirements.

1. Pressure reducing valves shall be set to provide a minimum 250 gpm at 100-170 psi when installed inside a structure.
2. Standpipe outlets on the roof shall be designed to provide a minimum 500 gpm at 100 psi for the first standpipe and up to a total of 1,000 gpm at 100 psi for all standpipe water supplies.

**1103.7 Fire alarm systems.** An approved fire alarm system shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through 1103.7.6 and provide occupant notification in accordance with Section 907.5 unless other requirements are provided by other sections of this code.

When an existing building is required to install a fire alarm an approved automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA 72. Where automatic sprinkler protection is provided in accordance with Section 903.3.1.1 or 903.3.1.2 and connected to the building fire alarm system, automatic heat detection required by this section shall not be required.

**1103.7.1 Fire alarm devices.** When an existing building is required to install a fire alarm, devices, combinations of devices, appliances and equipment shall be approved. The automatic fire detectors shall be smoke detectors, except an approved alternative type of detector shall be installed in spaces such as boiler rooms where, during normal operation, products of combustion are present in sufficient quantity to actuate a smoke detector system based on a change of occupancy classification, use or retroactive requirements per the building or fire code, fire alarm devices shall be installed throughout the area.

**1103.7.1.1 Occupancy requirements.** A fire alarm system shall be installed in accordance with Sections 1103.7.2 through 1103.8.1.

**Exception:** Occupancies with an existing, previously approved fire alarm system in compliance with 907.5.2.1.

**1103.7.1.2 Visible alarms in existing facilities.** Visual fire alarm devices shall be installed in public and common areas of existing facilities in accordance with Sections 907.5.2.3 through 907.5.2.3.4.

**1103.7.1.3 Visual alarms in Group I-1 and Group R-1.** Shall be in accordance with Section 1103.7.2 and 1103.7.5.2. (1103.7.6.1.)

**1103.7.1.4 Changes in occupancy.** When a building undergoes a change in occupancy classification, the fire
alarm system shall comply with the requirements of Section 907.2 for that occupancy.

1103.7.1.1.5 Building renovations. Buildings undergoing renovations, alterations or modifications consisting of structural renovations including the addition, removal or relocation of walls and partitions, shall have visual alarm devices installed in any new public or common area created by the renovations.

1103.7.1.1.6 Fire alarm panel replacement. Visual alarm devices shall be installed in public and common areas, including elevator lobbies, restrooms, and corridors of building core areas when an existing fire alarm control panel is replaced.

1103.7.1.1.7 Presignal system. Presignal systems shall not be installed unless approved by the fire code official. Where a presignal system is installed, 24-hour personnel supervision shall be provided at a location approved by the fire department, in order that the alarm signal can be actuated in the event of fire or other emergency.

1103.7.1.1.8 Protected areas in buildings with partial fire alarm systems. A minimum of 2 hours in nonautomatic sprinkler protected or 1 hour in automatic sprinkler-protected fire-resistance-rated fire barriers or horizontal assemblies shall separate the fire alarm protected and nonprotected areas.

1103.7.1.2 Audible alarms. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm. Group A, B, E, F, H, I, M, R, S and U occupancies shall meet Public Mode Audible Requirements of NFPA 72.

Exceptions:
1. Visible alarm notification appliances shall be allowed in lieu of audible alarm notification appliances in critical care areas of Group I-2 occupancies.
2. Where provided, audible notification appliances located in each occupant evacuation elevator lobby in accordance with Section 3008.10.1 of the International Building Code shall be connected to a separate notification zone for manual paging only.
3. Group I occupancies shall be allowed to use Private Mode Audible Requirements of NFPA 72 when approved. Registered design professionals shall specify on plans and in construction documents the specific mode for each area of the occupancy. When the private mode is specified, the designer shall provide written documentation for the use of this mode.

1103.7.1.2.1 Average sound pressure. The audible alarm notification appliances shall provide and be maintained to provide a sound pressure level of 15 decibels (dB) above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater, in every occupiable space within the building.

1103.7.1.2.2 Maximum sound pressure. The maximum sound pressure level for audible alarm notification appliances shall be 110 dB at the minimum hearing distance from the audible appliance. Where the average ambient noise is greater than 95 dB, visible notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

Exception: Group I occupancies shall be allowed to use Private Mode Audible Requirements of NFPA 72, when approved.

Registered design professionals shall specify on plans and in construction documents the specific mode for each area of the occupancy. When the private mode is specified, the designer shall provide written documentation for the use of this mode.

1103.7.1.2.3 Zones. Each floor shall be zoned separately and a zone shall not exceed 22,500 square feet (2090 m²). The length of any zone shall not exceed 300 feet (91 440 mm) in any direction.

Exception: Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13. See Section 903.4.1 for sprinkler alarm monitoring requirements.

1103.7.1.2.4 Zoning indicator panel (fire alarm annunciator panel). A zoning indicator panel and the associated controls shall be provided in an approved location. The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm silencing switch.

1103.7.1.2.5 Location. In buildings greater than one story or 22,500 square feet (2090 m²), the fire alarm panel or a fire alarm annunciator panel shall be installed in a location that is visible from the lobby or area adjacent to the primary fire department response entrance. It shall be permissible to locate the fire alarm panel in a room immediately adjacent to this lobby provided the door to this room is accessible to the fire department, visible from the lobby and is provided with a permanent, visible placard noting the location of the fire alarm control panel.

Exception: A zone indicator panel is not required for single-story buildings protected by a fire alarm system where the initiating devices consist of automatic sprinklers supplied by a single sprinkler system.

1103.7.1 Group E. A fire alarm system shall be installed in existing Group E occupancies in accordance with Section 907.2.3.

Exceptions:
1. A manual fire alarm system is not required in a building with a maximum area of 1,000 square feet (93 m²) that contains a single classroom and is located no closer than 50 feet (15 240 mm) from another building.
2. A manual fire alarm system is not required in Group E occupancies with an occupant load less than 50.

1103.7.2 Group I-1. An automatic fire alarm system shall be installed in existing Group I-1 residential care/assisted living facilities in accordance with Section 907.2.6.1.

Exception: Where each sleeping room has a means of egress door opening directly to an exterior egress balcony that leads directly to the exits in accordance with Section
1019, and the building is not more than three stories in height.

1103.7.3 Group I-2. In Group I-2, an automatic fire alarm system shall be installed in accordance with Section 1105.10.

1103.7.4 Group I-3. An automatic and manual fire alarm system shall be installed in existing Group I-3 occupancies in accordance with Section 907.2.6.3.

1103.7.5 Group R-1. A fire alarm system and smoke alarms shall be installed in existing Group R-1 occupancies in accordance with Sections 1103.7.5.1 through 1103.7.5.2.1.

1103.7.5.1 Group R-1 hotel and motel 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 existing Group R-1 hotels and motels more than three stories or with more than 20 sleeping units.

Exceptions:

1. Buildings less than two stories in height where all sleeping units, attics and crawl spaces are separated by 1-hour fire-resistance-rated construction and each sleeping unit has direct access to a public way, egress court or yard.

2. Manual fire alarm boxes are not required throughout the building when 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; and
   2.2. The notification appliances will activate upon sprinkler water flow; and
   2.3. Not less than one manual fire alarm box is installed at an approved normally accessible location.

1103.7.5.1.1 Group R-1 hotel and motel automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 hotels and motels throughout all interior corridors serving sleeping rooms not equipped with an approved, supervised automatic sprinkler system installed in accordance with Section 903.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

1103.7.5.2 Group R-1 boarding and rooming houses 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 existing Group R-1 boarding and rooming houses.

Exception: Buildings less than two stories in height where single-station smoke alarms meeting or exceeding the requirements of Section 907.2.10.1 where all sleeping units, attics and crawl spaces are separated by 1-hour fire-resistance-rated construction and each sleeping unit has direct access to a public way, egress court or yard.

1103.7.5.2.1 Group R-1 boarding and rooming houses automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 boarding and rooming houses throughout all interior corridors serving sleeping units not equipped with an approved, supervised sprinkler system installed in accordance with Section 903.

Exception: Buildings equipped with single-station smoke alarms meeting or exceeding the requirements of Section 907.2.11.1 and where the fire alarm system includes at least one manual fire alarm box per floor arranged to initiate the alarm.

1103.7.6 Group R-2. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-2 occupancies more than three stories in height or with more than 16 dwelling or sleeping units.

Exceptions:

1. Where each living unit is separated from other contiguous living units by fire barriers having a fire-resistance rating of not less than ¼ hour, and where each living unit has either its own independent exit or its own independent stairway or ramp discharging at grade.

2. A separate fire alarm system is not required in buildings that are equipped throughout with an approved supervised automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and having a local alarm to notify all occupants.

3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open ended corridors designed in accordance with Section 1027.6, Exception 3.

4. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units, do not exceed three stories in height and comply with both of the following:
   4.1. Each dwelling unit is separated from other contiguous dwelling units by fire barriers having a fire-resistance rating of not less than 3/4 hour.
   4.2. Each dwelling unit is provided with hard-wired, interconnected smoke alarms as required for new construction in Section 907.2.10.

1103.8 Single and multiple-station smoke alarms. Single and multiple-station smoke alarms shall be installed in existing
 Exceptions:

1. Where the code that was in effect at the time of construction required smoke alarms and smoke alarms complying with those requirements are already provided.

2. Where smoke alarms have been installed in occupancies and dwellings that were not required to have them at the time of construction, additional smoke alarms shall not be required provided that the existing smoke alarms comply with requirements that were in effect at the time of installation.

3. Where smoke detectors connected to a fire alarm system have been installed as a substitute for smoke alarms.

 Exception: Interconnection is not required in buildings that are not served from a commercial power source.

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

 Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.

2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.

3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing alterations or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for building wiring without the removal of interior finishes.

1103.9 Carbon monoxide alarms. Carbon monoxide alarms shall be installed in existing dwelling units and sleeping units where those units include any of the conditions identified in Sections 915.1.2 through 915.1.6. The carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.

 Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.

2. Carbon monoxide alarms are permitted to be solely battery operated in dwelling units that are not served from a commercial power source.

3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

1103.10 Medical gases. Medical gases stored and transferred in health-care related facilities shall be in accordance with Chapter 53.

 SECTION 1104
 MEANS OF EGRESS FOR EXISTING BUILDINGS

1104.1 General. Means of egress in existing buildings shall comply with the minimum egress requirements where specified in Table 1104.2.5 as further enumerated in Sections 1104.2 through 1104.25, and the building code that applied at the time of construction. Where the provisions of this chapter conflict with the building code that applied at the time of construction, the most restrictive provision shall apply. Existing buildings that were not required to comply with a building code at the time of construction shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25.

1104.2 Elevators, escalators and moving walks. Elevators, escalators and moving walks shall not be used as a component of a required means of egress.

 Exceptions:

1. Elevators used as an accessible means of egress where allowed by Section 1009.4.

2. Previously approved elevators, escalators and moving walks in existing buildings.

1104.3 Exit sign illumination. Exit signs shall be internally or externally illuminated. The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 foot-candles (54 lux). Internally illuminated signs shall provide equivalent luminance and be listed for the purpose.
Exception: Approved self-luminous signs that provide evenly illuminated letters shall have a minimum luminance of 0.06 foot-lamberts (0.21 cd/m²).

1104.4 Power source. Where emergency illumination is required in Section 1104.5, exit signs shall be visible under emergency illumination conditions.

Exception: Approved signs that provide continuous illumination independent of external power sources are not required to be connected to an emergency electrical system.

1104.5 Illumination emergency power. Where means of egress illumination in provided, the power supply for means of egress illumination shall normally be provided by the premises’ electrical supply. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the following occupancies where such occupancies require two or more means of egress:

1. Group A having 50 or more occupants.
   Exception: Assembly occupancies used exclusively as a place of worship and having an occupant load of less than 300.

2. Group B buildings three or more stories in height, buildings with 100 or more occupants above or below a level of exit discharge serving the occupants or buildings with 1,000 or more total occupants.

3. Group E in interior, exit access and exit stairways and ramps, corridors, windowless areas with student occupancy, shops and laboratories.

4. Group F having more than 100 occupants.
   Exception: Buildings used only during daylight hours and that are provided with windows for natural light in accordance with the International Building Code.

5. Group I.

6. Group M.
   Exception: Buildings less than 3,000 square feet (279 m²) in gross sales area on one story only, excluding mezzanines.

7. Group R-1.
   Exception: Where each sleeping unit has direct access to the outside of the building at grade.

   Exception: Where each dwelling unit or sleeping unit has direct access to the outside of the building at grade.

   Exception: Where each sleeping unit has direct access to the outside of the building at ground level.

1104.5.1 Emergency power duration and installation. Emergency power for means of egress illumination shall be provided in accordance with Section 1203. In other than Group I-2, emergency power shall be provided for not less than 60 minutes for systems requiring emergency power. In Group I-2, the essential electrical system shall comply with Sections 1105.5.1 and 1105.5.2.

1104.6 Guards. Guards complying with this section shall be provided at the open sides of means of egress that are more than 30 inches (762 mm) above the floor or grade below.

1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards on the open side of stairs shall be not less than 30 inches (760 mm) high.
2. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.
3. Existing guards in assembly seating areas.

1104.6.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 6-inch-diameter (152 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm).

Exceptions:

1. At elevated walking surfaces for access to, and use of, electrical, mechanical or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.
2. In occupancies in Group I-3, F, H or S, the clear distance between intermediate rails measured at right angles to the rails shall not exceed 21 inches (533 mm).
3. Approved existing open guards.

1104.7 Size of doors. The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width 28 inches (711 mm). Where this section requires a minimum clear opening width of 28 inches (711 mm) and a door opening includes two doors leaves without a mullion, one leaf shall provide a clear opening width of 28 inches (711 mm). The minimum clear opening height of doorways shall be 80 inches (2032 mm).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in occupancies in Group R-2 and R-3 units that are not required to be an Accessible Type A unit or Type B unit.
2. Door openings to storage closets less than 10 square feet (0.93 m²) in area shall not be limited by the minimum clear opening width.
3. The width of door leaves in revolving doors that comply with Section 1010.1.4.1 shall not be limited.
4. The maximum width of door leaves in power operated doors that comply with Section 1010.1.4.2 shall not be limited.
5. Door openings within a dwelling unit shall have a minimum clear opening height of 78 inches (1981mm).
6. In dwelling and sleeping units that are not required to be Accessible units, Type A units or Type B units, exterior door openings, other than the required exit door, shall
shall be applied to the latch side.

7. Exit access doors serving a room not larger than 70 square feet (6.5 m) shall have a minimum door leaf width of 24 inches (610 mm).

8. The minimum clear opening width shall not apply to doors for nonaccessible showers or sauna compartments.

9. The minimum clear opening width shall not apply to the doors for nonaccessible toilet stalls.

10. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

1104.7.1 Group I-2. In Group I-2 occupancies, means of egress doors where used for the movement of beds shall provide a minimum clear opening width of 41 1/2 inches (1054 mm). Doors serving as means of egress doors not used for movement of beds shall provide a minimum clear opening width of 32 inches (813 mm).

1104.7.2 Ambulatory care. In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a minimum clear opening width of 32 inches (813 mm).

1104.7.3 Group R-3 and R-4. In Group R-3 or R-4 occupancies a key locking device on the main entrance door in state licensed facilities classified and designated as “directed care” shall be allowed when the following stipulations are complied with:

1. The facility’s State license states “Directed Care,” and
2. Each employee has a key on their person at all times they are in the facility that will open the door from the inside. Failure to maintain compliance with these requirements shall require immediate removal of the key locking device and replacement with an approved locking device that does not require a key or special knowledge to open the door from the inside.

1104.8 Opening force for doors. The opening force for interior side-swinging doors without closers shall not exceed a 5 pound (22 N) force. The opening forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other side-swinging, sliding and folding doors, the door latch shall release when subjected to a force of not more than 15 pounds (66 N). The door shall be set in motion when subjected to a force not exceeding 30 pounds (133 N). The door shall swing to a full open position when subjected to a force of not more than 50 pounds (222 N). Forces shall be applied to the latch side.

1104.8 Opening force for doors. The opening force for interior side-swinging doors without closers shall not exceed a 5 pound (22 N) force. The opening forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. For other side-swinging, sliding and folding doors, the door latch shall release when subjected to a force of not more than 15 pounds (66 N). The door shall be set in motion when subjected to a force not exceeding 30 pounds (133 N). The door shall swing to a full open position when subjected to a force of not more than 50 pounds (222 N). Forces shall be applied to the latch side.

1104.9 Revolving doors. Revolving doors shall comply with the following:

1. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of stairways or escalators. A dispersal area shall be provided between the stairways or escalators and the revolving doors.

2. The revolutions per minute for a revolving door shall not exceed those shown in Table 1104.9.

3. Each revolving door shall have a conforming side hinged swinging door in the same wall as the revolving door and within 10 feet (3048 mm).

**Exceptions:**

1. A revolving door is permitted to be used without an adjacent swinging door for street-floor elevator lobbies provided a stairway, escalator or door from other parts of the building does not discharge through the lobby and the lobby does not have any occupancy or use other than as a means of travel between elevators and a street.

2. Existing revolving doors where the number of revolving doors does not exceed the number of swinging doors within 20 feet (6096 mm).

### TABLE 1104.9

<table>
<thead>
<tr>
<th>INSIDE DIAMETER (feet-inches)</th>
<th>POWER-DRIVEN-TYPE SPEED CONTROL (rpm)</th>
<th>MANUAL-TYPE SPEED CONTROL (rpm)</th>
</tr>
</thead>
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<tr>
<td>6-6</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>7-0</td>
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<td>7</td>
<td>8</td>
</tr>
<tr>
<td>10-0</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

1104.9.1 Egress component. A revolving door used as a component of a means of egress shall comply with Section 1104.9 and all of the following conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the required egress capacity.

2. Each revolving door shall be credited with not more than a 50-person capacity.

3. Revolving doors shall be capable of being collapsed when a force of not more than 130 pounds (578 N) is applied within 3 inches (76 mm) of the outer edge of a wing.

1104.10 Stair dimensions for existing stairways. Existing stairways in buildings shall be permitted to remain if the rise does not exceed 8 1/4 inches (210 mm) and the run is not less than 9 inches (229 mm). Existing stairways can be rebuilt.

**Exception:** Other stairways approved by the fire code official.

1104.10.1 Dimensions for replacement stairways. The replacement of an existing stairway in a structure shall not be required to comply with the new stairway requirements of
Section 1011 where the existing space and construction will not allow a reduction in pitch or slope.

1104.11 Winders. Existing winders shall be allowed to remain in use if they have a minimum tread depth of 6 inches (152 mm) and a minimum tread depth of 9 inches (229 mm) at a point 12 inches (305 mm) from the narrowest edge.

1104.12 Curved stairways. Existing curved stairways shall be allowed to continue in use, provided that the minimum depth of tread is 10 inches (254 mm) and the smallest radius shall be not less than twice the width of the stairway.

1104.13 Stairway handrails. Stairways shall have handrails on at least one side. Handrails shall be located so that all portions of the stairway width required for egress capacity are within 44 inches (1118 mm) of a handrail.

Exception: Aisle stairs provided with a center handrail are not required to have additional handrails.

1104.13.1 Height. Handrail height, measured above stair tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 42 inches (1067 mm).

1104.14 Slope of ramps. Ramp runs utilized as part of a means of egress shall have a running slope not steeper than one-unit vertical in 10 units horizontal (10-percent slope). The slope of other ramps shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).

1104.15 Width of ramps. Existing ramps are permitted to have a minimum width of 30 inches (762 mm) but not less than the width required for the number of occupants served as determined by Section 1005.1. In Group I-2, ramps serving as a means of egress and used for the movement of patients in beds shall comply with Section 1105.6.3.

1104.16 Fire escape stairways. Fire escape stairways shall comply with Sections 1104.16.1 through 1104.16.7.

1104.16.1 Existing means of egress. Fire escape stairways shall be permitted in existing buildings but shall not constitute more than 50 percent of the required exit capacity.

1104.16.2 Opening protectives. Doors and windows within 10 feet (3048 mm) of fire escape stairways shall be protected with 3/4-hour opening protectives.

Exception: Opening protectives shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

1104.16.3 Dimensions. Fire escape stairways shall meet the minimum width, capacity, riser height and tread depth as specified in Section 1104.10.

1104.16.4 Access. Access to a fire escape stairway from a corridor shall not be through an intervening room. Access to a fire escape stairway shall be from a door or window meeting the criteria of Section 1005.1. Access to a fire escape stairway shall be directly to a balcony, landing or platform. These shall be no higher than the floor or window sill level and no lower than 8 inches (203 mm) below the floor level or 18 inches (457 mm) below the window sill.

1104.16.5 Materials and strength. Components of fire escape stairways shall be constructed of noncombustible materials. Fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot (4.78 kN/m²). Fire escape stairways and balconies shall be provided with a top and intermediate handrail on each side.

1104.16.6 Termination. The lowest balcony shall not be more than 18 feet (5486 mm) from the ground. Fire escape stairs shall extend to the ground or be provided with counterbalanced stairs reaching the ground.

Exception: For fire escape stairways serving 10 or fewer occupants, an approved fire escape ladder is allowed to serve as the termination.

1104.16.7 Maintenance. Fire escape stairways shall be kept clear and unobstructed at all times and shall be maintained in good working order.

1104.17 Corridor construction. Corridors serving an occupant load greater than 30 and the openings therein shall provide an effective barrier to resist the movement of smoke. Transoms, louvers, doors and other openings shall be kept closed or be self closing. In Group I-2, corridors in areas housing patient sleeping or care rooms shall comply with Section 1105.5.

Exceptions:
1. Corridors in occupancies other than in Group H, that are equipped throughout with an approved automatic sprinkler.
2. Corridors in occupancies in Group E where each room utilized for instruction or assembly has not less than one half of the required means of egress doors opening directly to the exterior of the building at ground level.
3. Corridors that are in accordance with the International Building Code.

1104.17.1 Corridor openings. Openings in corridor walls shall comply with the requirements of the International Building Code.

Exceptions:
1. Where 20-minute fire door assemblies are required, solid wood doors not less than 1.75 inches (44 mm) thick or insulated steel doors are allowed.
2. Openings protected with fixed wire glass set in steel frames.
3. Openings covered with 0.5-inch (12.7 mm) gypsum wallboard or 0.75-inch (19.1 mm) plywood on the room side.
4. Opening protection is not required where the building is equipped throughout with an approved automatic sprinkler system.

1104.18 Dead-ends. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that dead ends do not exceed the limits specified in Table 1104.18.
In Group I-2, in smoke compartments containing patient sleeping rooms and treatment rooms, dead end corridors shall be in accordance with Section 1105.5.6.

Exceptions:

1. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

2. In existing buildings, existing dead-end corridors shall be permitted to comply with lengths established in Section 1104.18.

1104.19 Exit access travel distance. Exits shall be located so that the maximum length of exit access travel, measured from the most remote point to an approved exit along the natural and unobstructed path of egress travel, does not exceed the distances given in Table 1104.18.

1104.20 Common path of egress travel. The common path of egress travel shall not exceed the distances given in Table 1104.18.

1104.21 Stairway discharge identification. An interior exit stairway or ramp that continues below its level of exit discharge shall be arranged and marked to make the direction of egress to a public way readily identifiable.

Exception: Stairways that continue one-half story beyond their levels of exit discharge need not be provided with barriers where the exit discharge is obvious.

1104.22 Exterior stairway protection. Exterior exit stairways shall be separated from the interior of the building as required in Section 1027.6. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for buildings that are two stories or less above grade where the level of exit discharge serving such occupancies is the first story above grade.

2. Separation from the interior of the building is not required where the exterior stairway is served by an exterior balcony that connects two remote exterior stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall not less than 50 percent of the height of the enclosing wall, with the top of the opening not less than 7 feet (2134 mm) above the top of the balcony.

3. Separation from the interior of the building is not required for an exterior stairway located in a building or structure that is permitted to have unenclosed interior stairways in accordance with Section 1023.

4. Separation from the interior of the building is not required for exterior stairways connected to open ended corridors, provided that:

   4.1. The open-ended corridors comply with Section 1020.

   4.2. The open-ended corridors are connected on each end to an exterior exit stairway complying with Section 1027.

   4.3. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3 m²) or an exterior stairway shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

### TABLE 1104.18

<table>
<thead>
<tr>
<th>OCCUPANCY</th>
<th>COMMON PATH OF EGRESS TRAVEL LIMIT</th>
<th>DEAD-END LIMIT</th>
<th>EGRESS ACCESS TRAVEL DISTANCE LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsprinklered (feet)</td>
<td>Sprinklered (feet)</td>
<td>Unsprinklered (feet)</td>
</tr>
<tr>
<td>Group A</td>
<td>20/75&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20/75&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Group B'</td>
<td>75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group E</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group F-1, S-1&lt;sup&gt;d,f&lt;/sup&gt;</td>
<td>75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group F-2, S-2&lt;sup&gt;d,f&lt;/sup&gt;</td>
<td>75&lt;sup&gt;b&lt;/sup&gt;</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Group H-1</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Group H-2</td>
<td>50</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Group H-3</td>
<td>50</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Group H-4</td>
<td>75</td>
<td>75</td>
<td>20</td>
</tr>
<tr>
<td>Group</td>
<td>Aisle Width (inches)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group H-5</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I-1</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I-2 (Health care)</td>
<td>Notes d, e, f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I-3 (Detention and correctional—Use Conditions II, III, IV, V)</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group I-4 (Day care centers)</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group M (Covered or open mall)</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group M (Mercantile)</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group R-1 (Hotels)</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group R-2 (Apartments)</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group R-3 (One and two-family)</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group R-4 (Residential care/assisted living)</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Uf</td>
<td>75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NR = No Requirements.

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m².

a. See Section 1029.9.5 for dead-end aisles in Group A occupancies.

b. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.

c. See Section 412.7 of the International Building Code for special requirements on spacing of doors in aircraft hangars.

d. Separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.5.6.

e. In smoke compartments containing care recipient sleeping rooms and treatment rooms, dead-end corridors shall comply with Section 1105.6.5.

f. In Group I-2, Condition 2, care recipient sleeping rooms or any suite that includes care recipient sleeping rooms shall comply with Section 1105.7.

g. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall not be more than 100 feet.

h. Where the building, or portion of the building, is limited to one story and the height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet or more, the exit access travel distance is increased to 400 feet.

i. For covered and open malls, the exit access travel distance is increased to 400 feet.

1104.23 Minimum aisle width. The minimum clear width of aisles shall comply with the following:

1. Forty-two inches (1067 mm) for stepped aisle having seating on each side.

   **Exception:** Thirty-six inches (914 mm) where the stepped aisle serves fewer than 50 seats.

2. Thirty-six inches (914 mm) for stepped aisles having seating on only one side.

   **Exceptions:**

   1. Thirty inches (760 mm) for catchment areas serving not more than 60 seats.

   2. Twenty-three inches (584 mm) between a stepped aisle handrail and seating when a stepped aisle does not serve more than five rows on one side.

   3. Twenty inches (508 mm) between a stepped aisle handrail or guard and seating where the aisle is subdivided by a mid-aisle handrail.

   4. Forty-two inches (1067 mm) for level or ramped aisles having seating on both sides.

   **Exceptions:**

   1. Thirty-six inches (914 mm) where the aisle serves fewer than 50 seats.

   2. Thirty inches (760 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.

   3. Thirty-six inches (914 mm) for level or ramped aisles having seating on only one side.

   **Exception:** Thirty inches (760 mm) for catchment areas serving not more than 60 seats and not serving as part of an accessible route.

   6. In Group I-2 where aisles are used for movement of patients in beds, aisles shall comply with Section 1105.6.7.

1104.24 Stairway floor number signs. Existing stairways shall be marked in accordance with Section 1023.9.

1104.25 Egress path markings. Existing high-rise buildings of Group A, B, E, I, M and R-1 occupancies shall be provided with luminous egress path markings in accordance with Section 1025.
It shall be up to owners to install egress path markings. In the event of a power outage any liability for injury would fall upon the owner. All existing facilities shall have egress paths marked by January 1, 2023.

**Exception:** Open, unenclosed stairwells in historic buildings designated as historic under a state or local historic preservation program.

### SECTION 1105

**CONSTRUCTION REQUIREMENTS FOR EXISTING GROUP I-2**

**1105.1 General.** Existing Group I-2 shall meet all of the following requirements:

1. The minimum fire safety requirements in Section 1103.
2. The minimum mean of egress requirements in Section 1104.
3. The additional egress and construction requirements in Section 1105.

Where the provisions of this chapter conflict with the construction requirements that applied at the time of construction, the most restrictive provision shall apply.

**1105.2 Applicability.** The provisions of Sections 1105.3 through 1105.8, 1105.10 and 1105.11 shall apply to the existing Group I-2 fire area.

**1105.3 Construction.** Group I-2, Condition 2 shall not be located on a floor level higher than the floor level limitation in Table 1105.3 based on the type of construction.

#### TABLE 1105.2

**FLOOR LEVEL LIMITATIONS FOR GROUP I-2 CONDITION 2**

<table>
<thead>
<tr>
<th>CONSTRUCTION TYPE</th>
<th>AUTOMATIC SPRINKLER SYSTEM</th>
<th>ALLOWABLE FLOOR LEVEL*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>IA</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>P</td>
</tr>
<tr>
<td>IB</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>P</td>
</tr>
<tr>
<td>IIA</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>P</td>
</tr>
<tr>
<td>IIB</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>NP</td>
</tr>
<tr>
<td>IIIA</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>P</td>
</tr>
<tr>
<td>IIIB</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>NP</td>
</tr>
<tr>
<td>IV</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>NP</td>
</tr>
<tr>
<td>VA</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>NP</td>
</tr>
<tr>
<td>VB</td>
<td>Note b</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>Note c</td>
<td>NP</td>
</tr>
</tbody>
</table>

P = Permitted; NP = Not permitted.

- a. Floor level shall be counted based on the number of stories above grade.
- b. The building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
- c. The building is equipped with an *automatic sprinkler system* in accordance with Section 1105.8.

**1105.4 Incidental uses in existing Group I-2.** Incidental uses associated with and located within existing single-occupancy or mixed-occupancy Group I-2 buildings and that generally pose a greater level of risk to such occupancies shall comply with the provisions of Sections 1105.4.1 through 1105.4.2.1. Incidental uses in Group I-2 occupancies are limited to those listed in Table 1105.4.

**1105.4.1 Occupancy classification.** Incidental uses shall not be individually classified in accordance with Section 302.1 of the *International Building Code*. Incidental uses shall be included in the building occupancies within which they are located.

**1105.4.2 Area limitations.** Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.

**1105.4.3 Separation and protection.** The incidental uses listed in Table 1105.4 shall be separated from the remainder of the building or equipped with an *automatic sprinkler system*, or both, in accordance with the provisions of that table.

**1105.4.3.1 Separation.** Where Table 1105.4 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building in accordance with Section 509.4.1 of the *International Building Code*.
1105.4.3.2 Protection. Where Table 1105.4 permits an automatic sprinkler system without a fire-resistance rated separation, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke in accordance with Section 509.4.2 of the International Building Code.

1105.4.3.2.1 Protection limitation. Except as otherwise specified in Table 1105.4 for certain incidental uses, where an automatic sprinkler system is provided in accordance with Table 1105.4, only the space occupied by the incidental use need be equipped with such a system.

1105.5 Corridor construction. In Group I-2, in areas housing patient sleeping or care rooms, corridor walls and the opening protectives therein shall provide a barrier designed to resist the passage of smoke in accordance with Sections 1105.5.1 through 1105.5.7.

1105.5.1 Materials. The walls shall be of materials permitted by the building type of construction.

1105.5.2 Fire-resistance rating. Unless required elsewhere in this code, corridor walls are not required to have a fire-resistance rating. Corridor walls that were installed as fire-resistance-rated assemblies in accordance with the applicable codes under which the building was constructed, remodeled or altered shall be maintained unless modified in accordance with the International Existing Building Code.

TABLE 1105.3
RESIDENTIAL USES IN EXISTING GROUP I-2 OCCUPANCIES

<table>
<thead>
<tr>
<th>ROOM OR AREA</th>
<th>SEPARATION AND/OR PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furnace room where any piece of equipment is over 400,000 Btu per hour input</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Refrigerant machinery room</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Hydrogen fuel gas rooms, not classified as Group H</td>
<td>2 hours</td>
</tr>
<tr>
<td>Incinerator rooms</td>
<td>2 hours and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Paint shops not classified as Group H</td>
<td>2 hours; or 1 hour and provide automatic sprinkler system</td>
</tr>
<tr>
<td>Laboratories and vocational shops, not classified as Group H</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Laundry rooms over 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Patient rooms equipped with padded surfaces</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Physical plant maintenance shops</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Waste and linen collection rooms with containers with total volume of 10 cubic feet or greater</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Storage rooms greater than 100 square feet</td>
<td>1 hour or provide automatic sprinkler system</td>
</tr>
<tr>
<td>Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptable power supplies</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

For SI: 1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

1105.5.3 Corridor wall continuity. Corridor walls shall extend from the top of the foundation or floor below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ceiling above where the ceiling membrane is constructed to limit the passage of smoke.
3. The underside of a lay-in ceiling system where the ceiling system is constructed to limit the passage of smoke and where the ceiling tiles weigh not less than 1 pound per square foot (4.88 kg/m²) of tile.

1105.5.4 Openings in corridor walls. Openings in corridor walls shall provide protection in accordance with Sections 1105.5.4.1 through 1105.5.4.3.

1105.5.4.1 Windows. Windows in corridor walls shall be sealed to limit the passage of smoke, or the window shall be automatic-closing upon detection of smoke, or the window opening shall be protected by an automatic closing device that closes upon detection of smoke.

Exception: In smoke compartments not containing patient sleeping rooms, pass-through windows or similar openings shall be permitted in accordance with Section 1105.5.4.3.

1105.5.4.2 Doors. Doors in corridor walls shall comply with Sections 1105.5.4.2.1 through 1105.5.4.2.3.
1105.4.2.1 Louvers. Doors in corridor walls shall not include louvers, transfer grills or similar openings.

Exception: Doors shall be permitted to have louvers, transfer grills or similar openings at toilet rooms or bathrooms; storage rooms that do not contain storage of flammable or combustible material; and storage rooms that are not required to be separated as incidental uses.

1105.4.2.2 Corridor doors. Doors in corridor walls shall limit the transfer of smoke by complying with the following:

1. Doors shall be constructed of not less than 1 1/2 inch-thick (44 mm) solid bonded-core wood or capable of resisting fire not less than 1/2 hour.

Exception: Corridor doors in buildings equipped throughout with an automatic sprinkler system.

2. Frames for side-hinged swinging doors shall have stops on the sides and top to limit transfer of smoke.

3. Where provided, vision panels in doors shall be a fixed glass window assembly installed to limit the passage of smoke. Existing wired glass panels 4. Door undercuts shall not exceed 1 inch (25 mm).

5. Doors shall be positive latching with devices that resist not less than 5 pounds (22.2 N). Roller latches are prohibited.

6. Mail slots or similar openings shall be permitted in accordance with Section 1105.4.3.

1105.4.2.3 Dutch doors. Where provided, dutch doors shall comply with Section 1105.4.2.2. In addition, dutch doors shall be equipped with latching devices on either the top or bottom leaf to allow leaves to latch together. The space between the leaves shall be protected with devices such as astragals to limit the passage of smoke.

1105.4.2.4 Self or automatic-closing doors. Where self or automatic-closing doors are required, closers shall be maintained in operational condition.

1105.4.3 Openings in corridor walls and doors. In other than smoke compartments containing patient sleeping rooms, mail slots, pass-through windows or similar openings shall not be required to be protected where the aggregate area of the openings between the corridor and a room are not greater than 80 square inches (51613 mm²) and are located with the top edge of any opening not higher than 48 inches above the floor.

1105.5 Penetrations. The space around penetrating items shall be filled with an approved material to limit the passage of smoke.

1105.5.6 Joints. Joints shall be filled with an approved material to limit the passage of smoke.

1105.5.7 Ducts and air transfer openings. The space around a duct penetrating a smoke partition shall be filled with an approved material to limit the passage of smoke. Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section 717.3.2.2 of the International Building Code.

Exception: Where the installation of a smoke damper will interfere with the operation of a required smoke control system in accordance with Section 909, approved alternative protection shall be utilized.

1105.6 Means of egress. In addition to the means of egress requirements in Section 1104, Group I-2 facilities shall meet the means of egress requirements in Sections 1105.6.1 through 1105.6.7.

1105.6.1 Size of door. Means of egress doors used for the movement of patients in beds shall provide a minimum clear width of 41 1/2 inches (1054 mm). The height of the door opening shall be not less than 80 inches (2032 mm).

Exceptions:

1. Door closers and door stops shall be permitted to be 78 inches (1981 mm) minimum above the floor.

2. In Group I-2, Condition 1, existing means of egress doors used for the movement of patients in beds that provide a minimum clear width of 32 inches (813 mm) shall be permitted to remain.

1105.6.2 Group I-2 occupancies. In Group I-2, where a door serves as an opening protective in a fire barrier, smoke barrier or fire wall and where the door is equipped with a hold-open device, such door shall automatically close upon any of the following conditions:

1. Actuation of smoke detectors initiating the hold open device.

2. Activation of the fire alarm system within the zone.

3. Activation of an automatic sprinkler system within the zone.

1105.6.3 Ramps. In areas where ramps are used for movement of patients in beds, the clear width of the ramp shall be not less than 48 inches (1219 mm).

1105.6.4 Corridor width. In areas where corridors are used for movement of patients in beds, the clear width of the corridor shall be not less than 48 inches (1219 mm).

1105.6.5 Dead-end corridors. In smoke compartments containing patient sleeping rooms and treatment rooms, dead-end corridors shall not exceed 30 feet (9144 mm) unless approved by the fire code official.

1105.6.6 Separation of exit access doors. Patient sleeping rooms, or any suite that includes patient sleeping rooms, of more than 1,000 square feet (92.9 m²) shall have not less than two exit access doors placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the patient sleeping room or suite to be served, measured in a straight line between exit access doors.

1105.6.7 Aisles. In areas where aisles are used for movement of patients in beds, the clear width of the aisle shall be not less than 48 inches (1219 mm).

1105.7 Smoke compartments. Smoke compartments shall be provided in existing Group I-2, Condition 2, in accordance with Sections 1105.7.1 through 1105.7.6.

1105.7.1 Design. Smoke barriers shall be provided to subdivide each story used for patients sleeping with an
occupant load of more than 30 patients into not fewer than two smoke compartments.

1105.7.1.1 **Refuge areas.** Refuge areas shall be provided within each smoke compartment. The size of the refuge area shall accommodate the occupants and care recipients from the adjoining smoke compartment. Where a smoke compartment is adjoined by two or more smoke compartments, the minimum area of the refuge area shall accommodate the largest occupant load of the adjoining compartments. The size of the refuge area shall provide the following:

1. Not less than 30 net square feet (2.8 m²) for each care recipient confined to a bed or stretcher.
2. Not less than 15 square feet (1.4 m²) for each resident in a Group I-2 using mobility assistance devices.
3. Not less than 6 square feet (0.6 m²) for each occupant not addressed in Items 1 and 2. Areas of spaces permitted to be included in the calculation of the refuge area are corridors, sleeping areas, treatment rooms, lounge or dining areas and other lowhazard areas.

1105.7.2 **Smoke barriers.** Smoke barriers shall be constructed in accordance with Section 709 of the *International Building Code.*

**Exceptions:**

1. Existing smoke barriers are permitted to remain where the existing smoke barrier has a minimum fire-resistance rating of 1/2 hour.
2. Smoke barriers shall be permitted to terminate at an atrium enclosure in accordance with Section 404.6 of the *International Building Code.*

1105.7.3 **Opening protectives.** Openings in smoke barriers shall be protected in accordance with Section 716 of the *International Building Code.* Opening protectives shall have a minimum fire protection rating of 1/3 hour.

**Exceptions:**

1. Existing wired glass vision panels in doors shall be permitted to remain.
2. Existing non labeled protection plates shall be permitted to remain.

1105.7.4 **Penetrations.** Penetrations of smoke barriers shall comply with the *International Building Code.*

**Exception:** Approved existing materials and methods of construction.

1105.7.5 **Joints.** Joints made in or between smoke barriers shall comply with the *International Building Code.*

**Exception:** Approved existing materials and methods of construction.

1105.7.6 **Duct and air transfer openings.** Penetrations in a smoke barrier by duct and air transfer openings shall comply with Section 717 of the *International Building Code.*

**Exception:** Where existing duct and air transfer openings in smoke barriers exist without smoke dampers, they shall be permitted to remain. Any changes to existing smoke dampers shall be submitted for review and approved in accordance with Section 717 of the *International Building Code.*

1105.8 **Group I-2 care suites.** Care suites in existing Group I-2, Condition 2 occupancies shall comply with Sections 407.4.4 through 407.4.4.6.2 of the *International Building Code.*

1105.9 **Group I-2 automatic sprinkler system.** An automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be provided throughout the floor containing the Group I-2 fire area. The sprinkler system shall be provided throughout the floor where the Group I-2 occupancy is located, on all floors between the Group I-2 occupancy fire area and the level of exit discharge, the level of exit discharge, and all floors below the level of exit discharge.

**Exception:** Floors classified as an open parking garage are not required to be sprinklered.

1105.10 **Group I-2 automatic fire alarm system.** An automatic fire alarm system shall be installed in existing Group I2 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 that manual fire alarm boxes are visible, are provided with ready access, and travel distances required in Section 907.4.2.1 are not exceeded.

1105.11 **Essential electrical systems.** Essential electrical systems in Group I-2, Condition 2 occupancies shall be in accordance with Sections 1105.11.1 and 1105.11.2.

1105.11.1 **Where required.** Where required by NFPA 99, Group I-2, Condition 2 occupancies shall be provided with an essential electrical system in accordance with NFPA 99.

1105.11.2 **Installation and duration.** In Group I-2, Condition 2 occupancies, the installation and duration of operation of existing essential electrical systems shall be based on a hazard vulnerability analysis conducted in accordance with NFPA 99.

**REQUIREMENTS FOR OUTDOOR OPERATIONS**

1106.1 **Tire storage yards.** Existing tire storage yards shall be provided with fire apparatus access roads in accordance with Sections 1105.1.1 and 1105.1.2.

1106.1.1 **Access to piles.** Access roadways shall be within 150 feet (45 720 mm) of any point in the storage yard where storage piles are located, at least 20 feet (6096 mm) from any storage pile.

1106.1.2 **Location within piles.** Fire apparatus access roads shall be located within all pile clearances identified in Section 3405.4 and within all fire breaks required in Section 3405.5.
FIGURE 1104.24
PRIMARY STAIRWELL SIGNAGE

Notes:

1. The sign face shall be 12” x 14” and fabricated from .080 aluminum sheet with 1 ½ inch radius corners.

2. Font style used is Handel Gothic BT Capital fonts.

3. The sign face shall have a white 3M diamond grade reflective sheeting (DG3 4090 Series or equivalent) applied as a background to the aluminum plate.

4. Lettering / graphics shall be high performance, non-reflective, cuttable vinyl (WM 7725 Series) inverse cut to allow white reflective background to show through.

5. All sign imaging shall be in compliance with the reflective sheeting manufacturer’s match component systems.

6. To form a graffiti barrier 3mm 1160 protection overlay film may be applied over sign.
CHAPTER 12
ENERGY SYSTEMS

User note:
About this chapter: Chapter 12 was added to address the current energy systems found in this code, and is provided for the introduction of a wide range of systems to generate and store energy in, on and adjacent to buildings and facilities. The expansion of such energy systems is related to meeting today's energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders. More specifically, this chapter addresses standby and emergency power, photovoltaic systems, fuel cell energy systems, battery storage systems and capacitor energy storage.

SECTION 1201
GENERAL

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation and maintenance of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

1201.2 Electrical wiring and equipment. Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with Chapter 12 and NFPA 70.

1201.3 Mixed system installation. Where approved, the aggregate kWh energy in a fire area shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the fire code official, a hazard mitigation analysis shall be provided and approved in accordance with Section 104.7.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

SECTION 1202
DEFINITIONS

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

BATTERY SYSTEM, STATIONARY STORAGE.
BATTERY TYPES.
LEAD-ACID BATTERY.
CAPACITOR ARRAY.
CAPACITOR ENERGY STORAGE SYSTEM.
CRITICAL CIRCUIT.
EMERGENCY POWER SYSTEM.
ENERGY MANAGEMENT SYSTEM.
FUEL CELL POWER SYSTEM, STATIONARY.
STANDBY POWER SYSTEM.
STATIONARY BATTERY ARRAY.
STATIONARY FUEL CELL POWER SYSTEM.

SECTION 1203
EMERGENCY AND STANDBY POWER SYSTEMS

1203.1 General. Emergency power systems and standby power systems required by this code or the International Building Code shall comply with Sections 1203.1.1 through 1203.1.9.

1203.1.1 Stationary generators. Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200.

1203.1.2 Fuel line piping protection. Fuel lines supplying a generator set inside a high-rise building shall be separated from areas of the building other than the room the generator is located in by an approved method, or an assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.

1203.1.3 Installation. Emergency power systems and standby power systems shall be installed in accordance with the International Building Code, NFPA 70, NFPA 110 and NFPA 111.

1203.1.4 Load transfer. Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

1203.1.5 Load duration. Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.

1203.1.6 Uninterruptable power source. An uninterrupted source of power shall be provided for equipment where required by the manufacturer’s instructions, the listing, this code or applicable referenced standards.

1203.1.7 Interchangeability. Emergency power systems and standby power systems shall be an acceptable alternative for installations that require standby power systems.

1203.1.8 Group I-2 occupancies. In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the International Building Code and where new or replacement essential electrical systems are installed and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary
generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

1203.1.9 Maintenance. Existing installations shall be maintained in accordance with the original approval and Section 1203.4.

1203.2 Where required. Emergency and standby power systems shall be provided where required by Sections 1203.2.1 through 1203.2.18.

1203.2.1 Ambulatory care facilities. Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the International Building Code.

1203.2.2 Elevators and platform lifts. Standby power shall be provided for elevators and platform lifts as required in Sections 606.2, 1009.4.1, and 1009.5.

1203.2.3 Emergency responder radio coverage systems. Standby power shall be provided for emergency responder radio coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.

1203.2.4 Emergency voice/alarm communication systems. Emergency power shall be provided for emergency voice/alarm communication systems as required in Section 907.5.2.2.5. The system shall be capable of powering the required load for a duration of not less than 24 hours, as required in NFPA 72.

1203.2.5 Exit signs. Emergency power shall be provided for exit signs as required in Section 1013.6.3. The system shall be capable of powering the required load for a duration of not less than 90 minutes.

1203.2.6 Gas detection systems. Emergency power shall be provided for gas detection systems where required by Sections 1203.2.9 and 1203.2.16. Standby power shall be provided for gas detection systems where required by Section 916.5.

1203.2.7 Group I-2 occupancies. Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 407.11 of the International Building Code.

1203.2.8 Group I-3 occupancies. Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks.

Exceptions:

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the International Building Code.

2. Emergency power is not required where remote mechanical operating releases are provided.

1203.2.9 Hazardous materials. Emergency and standby power shall be provided in occupancies with hazardous materials as required in the following sections: 1. Sections 5004.7 and 5005.1.5 for hazardous materials. 2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases. 3. Section 6204.1.11 for organic peroxides.

1203.2.10 High-rise buildings. Standby power and emergency power shall be provided for high-rise buildings as required in Section 403 of the International Building Code, and shall be in accordance with Section 1203.

1203.2.11 Horizontal sliding doors. Standby power shall be provided for horizontal sliding doors as required in Section 1010.1.4.3. The standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.

1203.2.12 Hydrogen fuel gas rooms. Standby power shall be provided for hydrogen fuel gas rooms as required by Section 5808.7.

1203.2.13 Laboratory suites. Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

1203.2.14 Means of egress illumination. Emergency power shall be provided for means of egress illumination in accordance with Sections 1008.3 and 1104.5.1.

1203.2.15 Membrane structures. Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with Section 2702 of the International Building Code. Auxiliary inflation systems shall be provided in temporary air-supported and airinflated membrane structures in accordance with Section 3103.10.4.

1203.2.16 Semiconductor fabrication facilities. Emergency power shall be provided for semiconductor fabrication facilities as required in Section 2703.15.

1203.2.17 Smoke control systems. Standby power shall be provided for smoke control systems as required in Section 909.11.

1203.2.18 Underground buildings. Emergency and standby power shall be provided in underground buildings as required in Section 405 of the International Building Code and shall be in accordance with Section 1203.

1203.2.19 Connected facilities. Power and lighting facilities or the fire command center and elevators specified in Sections 403.4.8.2 and 403.6 of the International Building Code, as applicable, and electrically powered fire pumps required to maintain pressure, shall be transferable to the standby source. Standby power shall be provided for at least one elevator to serve all floors and be transferable to any elevator.

1203.3 Critical circuits. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

1203.4 Maintenance. Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

1203.4.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99.

1203.4.2 Schedule. Inspection, testing and maintenance of emergency and standby power systems shall be in accordance with an approved schedule established upon completion and approval of the system installation.

Effective July 19, 2019
1203.4.3 Records. Records of the inspection, testing and maintenance of emergency and standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be maintained.

1203.4.4 Switch maintenance. Emergency and standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by Section 1203.4.2. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer’s instructions.

1203.5 Operational inspection and testing. Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

Exception: Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

1203.5.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99.

1203.5.2 Transfer switch test. The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position.

1203.6 Supervision of maintenance and testing. Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

SECTION 1204

SOLAR PHOTOVOLTAIC POWER SYSTEMS

1204.1 General. Solar photovoltaic systems shall be installed in accordance with Sections 1204.2 through 1204.5, and the International Building Code or International Residential Code. The electrical portion of solar PV systems shall be installed in accordance with NFPA 70.

1204.2 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1204.2.1 through 1204.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

Exceptions:
1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.

1204.2.1 Solar photovoltaic systems for Group R-3 buildings. Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 1204.2.1.1 through 1204.2.1.3.

Exceptions:
1. These requirements shall not apply to structures designed and constructed in accordance with the International Residential Code.
2. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal or less.

1204.2.2 Emergency escape and rescue openings. Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

1204.3 Other than Group R-3 buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1204.3.1 through 1204.3.3.

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1204.2.1.1 through 1204.2.1.3 are a suitable alternative.

1204.3.1 Perimeter pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

1204.3.2 Interior pathways. Interior pathways shall be provided between array sections to meet the following requirements:

1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.
3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.

1204.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
   2.1. A pathway not less than 8 feet (2438 mm) wide.
   2.2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
   2.3. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438
mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.

1204.4 Ground-mounted photovoltaic panel systems. Ground-mounted photovoltaic panel systems shall comply with Section 1204.1 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic arrays.

1204.5 Buildings with rapid shutdown. Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with Sections 1204.5.1 through 1204.5.3.

1204.5.1 Rapid shutdown type. The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(1) and state the following:

   SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE “OFF” POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY.

2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of 3/16 inch (5 mm) in black on a white back-
ground. The label shall be in accordance with Figure 1204.5.1(2) and state the following:

THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN. TURN RAPID SHUTDOWN SWITCH TO THE “OFF” POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

1204.5.1.1 Diagram. The labels in Section 1204.5.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the solar photovoltaic system that are not shut down when the rapid shutdown switch is turned off.

1204.5.1.2 Location. The rapid shutdown label in Section 1204.5.1 shall be located not greater than 3 feet (914 mm) from the service disconnecting means to which the photovoltaic systems are connected, and shall indicate the location of all identified rapid shutdown switches if not at the same location.

1204.5.2 Buildings with more than one rapid shutdown type. Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1204.5.1 or solar photovoltaic systems where only portions of the systems on the building contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

1204.5.3 Rapid shutdown switch. A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following:

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

SECTION 1205
STATIONARY FUEL CELL POWER SYSTEMS

1205.1 General. Stationary fuel cell power systems in new and existing occupancies shall comply with this section.

1205.2 Permits. Permits shall be obtained for stationary fuel cell power systems as set forth in Section 105.7.10.

1205.3 Equipment. Stationary fuel cell power systems shall comply with the following:

1. Prepackaged fuel cell power systems shall be listed and labeled in accordance with CSA FC 1.

2. The modules and components in a preengineered fuel cell power system shall be listed and labeled in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer’s instructions and the module and component listings.

3. Field-fabricated fuel cell power systems shall be approved based on a review of the technical report provided in accordance with Section 104.7.2. The report shall be prepared by and bear the stamp of a registered design professional and shall include:

3.1. A fire risk evaluation.

3.2. An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.

3.3. Documentation of the fuel cell power system’s compliance with applicable NFPA 2 and NFPA 853 construction requirements.

1205.4 Installation. Stationary fuel cell power systems shall be installed and maintained in accordance with NFPA 70 and NFPA 853, the manufacturer’s installation instructions, and the listing. Stationary fuel cell power systems fueled by hydrogen shall be installed and maintained in accordance
with NFPA 2 and NFPA 70, the manufacturer’s installation instructions and the listing.

1205.5 Residential use. Stationary fuel cell power systems shall not be installed in Group R-3 and R-4 buildings, or dwelling units associated with Group R-2 buildings unless they are specifically listed for residential use.

1205.6 Indoor installations. Stationary fuel cell power systems installed in indoor locations shall comply with Sections 1205.6 through 1205.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

1205.6.1 Listed. Stationary fuel cell power systems installed indoors shall be specifically listed and labeled for indoor use.

1205.6.2 Separation. Rooms containing stationary fuel cell power systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the International Building Code.


Exception: Stationary fuel cell power systems with an aggregate rating less than 50 kW shall not be required to be separated from other occupancies provided that the systems comply with Section 9.3 of NFPA 853.

1205.7 Vehicle impact protection. Where stationary fuel cell power systems are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

1205.8 Outdoor installation. Stationary fuel cell power systems located outdoors shall be separated by not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Any portion of a designated means of egress system.
8. Other exposure hazards.

1205.9 Fuel supply. The design, location and installation of the fuel supply for stationary fuel cell power systems shall comply with Chapter 53, Chapter 58 and the International Fuel Gas Code, based on the particular fuel being supplied to the system.

1205.10 Manual shutoff. Access to a manual shutoff valve shall be provided for the fuel piping within 6 feet (1829 mm) of any fuel storage tank serving the fuel cell and within 6 feet (1829 mm) of the power system. If the fuel tank and the stationary fuel cell power system are less than 12 feet (3658 mm) apart, a single shutoff valve shall be permitted. If the stationary fuel cell power system is located indoors, the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise approved by the fire code official.

1205.11 Ventilation and exhaust. Ventilation and exhaust for stationary fuel cell power systems shall be provided in accordance with NFPA 853.

1205.12 Fire suppression. Fire suppression for stationary fuel cell power system installations shall be provided in accordance with NFPA 853.

1205.13 Gas detection systems. Stationary fuel cell power systems shall be provided with a gas detection system. Detection shall be provided in approved locations in the fuel cell power system enclosure, the exhaust system or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL).
1205.13.1 System activation. The activation of the gas detection system shall automatically:
1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in approved locations.

SECTION 1206
ELECTRICAL ENERGY STORAGE SYSTEMS

1206.1 Scope. The provisions in this section are applicable to energy storage systems designed to provide electrical power to a building or facility. These systems are used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities. Energy storage system in Group R-3 and R-4 occupancies in accordance with 1206.2.1 and 1206.4.

1206.1.1 Permits. Permits shall be obtained for the construction and operation of stationary storage battery systems with a capacity of more than 3 kWh in accordance with Section 105.7.2.

Exception: Operating permits are not required for Group R-3 and R-4 occupancies.

1206.2 Stationary storage battery systems. Stationary storage battery systems having capacities exceeding the values shown in Table 1206.2 shall comply with Section 1206.2.1 through 1206.2.12.6, as applicable.

1206.2.1 Permits. Permits shall be obtained for the construction and operation of stationary storage battery systems with a capacity of more than 3 kWh in accordance with Section 105.7.2.

1206.2.2 Construction documents. The following information shall be provided with the permit application:
1. Location and layout diagram of the room in which the stationary storage battery system is to be installed.
2. Details on hourly fire-resistance-rated assemblies provided.
3. Quantities and types of storage batteries and battery systems.
4. Manufacturer’s specifications, ratings and listings of storage batteries and battery systems.
5. Details on energy management systems.
6. Location and content of signage.
7. Details on fire-extinguishing, smoke detection and ventilation systems.
8. Rack storage arrangement, including seismic support criteria.

TABLE 1206.2
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.

<table>
<thead>
<tr>
<th>BATTERY TECHNOLOGY</th>
<th>CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow batteries</td>
<td>20 kWh</td>
</tr>
<tr>
<td>Lead acid, all types</td>
<td>70 kWh</td>
</tr>
<tr>
<td>Lithium, all types</td>
<td>20 kWh</td>
</tr>
<tr>
<td>Nickel cadmium (Ni-Cd)</td>
<td>70 kWh</td>
</tr>
<tr>
<td>Sodium, all types</td>
<td>20 kWh²</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>10 kWh</td>
</tr>
</tbody>
</table>

For SI: 1 kilowatt hour = 3.6 megajoules.

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

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

c. 70 kWh for sodium-ion technologies.

1206.2.3 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:
1. Battery technologies not specifically identified in Table 1206.2 are provided.
2. More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities in accordance with Section 1206.2.9.

1206.2.3.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the fire code official. Only single-failure modes shall be considered.
1. Thermal runaway condition in a single-battery storage rack, module or array.
2. Failure of any energy management system.
3. Failure of any required ventilation system.
4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the stationary battery storage system.
6. Failure of the smoke detection, fire-extinguishing or gas detection system.
7. Spill neutralization not being provided or failure of the secondary containment system.
8. Failure of temperature control.

1206.2.3.2 Analysis approval. The fire code official is authorized to approve the hazardous mitigation analysis provided that the hazard mitigation analysis demonstrates all of the following:

1. Fires or explosions will be contained within unoccupied battery storage rooms for the minimum duration of the fire-resistance-rated walls identified in Table 509.1 of the International Building Code.

2. Fires and explosions in battery cabinets in occupied work centers will be detected in time to allow occupants within the room to evacuate safely.

3. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in excess of Immediately Dangerous to Life or Health (IDLH) levels in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.

4. Flammable gases released from batteries during charging, discharging and normal operation shall not exceed 25 10 percent of their lower flammability limit (LFL).

5. Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.

1206.2.3.3 Additional protection measures. Construction, equipment and systems that are required for the stationary storage battery system to comply with the hazard mitigation analysis, including but not limited to those specifically described in Section 1206.2, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

1206.2.3.4 Large scale fire testing. Where required in section 1206, large scale fire testing shall be conducted on a representative stationary storage battery system in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory. The test report shall be provided to the fire code official for review and approval in accordance with Section 104.7.2.

1206.2.3.5 Fire remediation. Where a fire or other event has damaged a stationary storage battery system and ignition or re-ignition of the stationary storage battery system is possible, the fire code official may require the system owner, agent, or lessee, take actions, at their expense, to mitigate the hazard or remove the damaged equipment from the premise to a safe location.

1206.2.3.6 Forensic analysis. The fire code official may also require a forensic analysis of the cause of failure by an independent laboratory approved by the fire code official in accordance with Section 104.10.2.

1206.2.4 Seismic and structural design. Stationary storage battery systems shall comply with the seismic design requirements in Chapter 16 of the International Building Code, and shall not exceed the floor-loading limitation of the building.

1206.2.5 Vehicle impact protection. Where stationary storage battery systems are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

1206.2.6 Combustible storage. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 1206.2.8.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.

1206.2.7 Testing, maintenance and repair. Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer’s instructions. Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management systems, other storage batteries and other safety systems. Introducing other types of storage batteries into the stationary storage battery system or other types of electrolytes into flow battery systems shall be treated as a new installation and require approval by the fire code official before the replacements are introduced into service.

1206.2.8 Location and construction. Rooms and areas containing stationary storage battery systems shall be designed, located and constructed in accordance with Sections 1206.2.8.1 through 1206.2.8.7.4.

1206.2.8.1 Location. Stationary storage battery systems shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access,

2. Where the floor level is located below the lowest level of exit discharge.

Exceptions:

1. Lead acid and nickel cadmium stationary storage battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.

2. Where approved, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.

3. Where approved by the fire code official, installations shall be permitted on higher and lower floors.

4. Installations on noncombustible rooftops of buildings exceeding 75 feet (22 860 mm) in height that do not obstruct fire department rooftop operations, where approved by the fire code official.

1206.2.8.2 Separation. Rooms containing stationary storage battery systems shall be separated from other areas of the building in accordance with Section 509.1 of the International Building Code. Battery systems shall be allowed to be in the same room with the equipment they support.
1206.2.8.3 Stationary battery arrays. Storage batteries, prepackaged stationary storage battery systems and preengineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 kWh (180 megajoules) each. Each stationary battery array shall be spaced not less than 3 feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions:

1. Lead acid and nickel cadmium storage battery arrays.
2. Listed preengineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 kWh (900 megajoules) each.
3. The fire code official is authorized to approve listed, preengineered and prepackaged battery arrays with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire-resistance rating of the room separation specified in Table 509 of the International Building Code.

1206.2.8.4 Separate rooms. Where stationary batteries are installed in a separate equipment room that can be accessed only by authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

1206.2.8.5 Occupied work centers. Where stationary storage batteries are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

1206.2.8.5.1 Cabinets. Where stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

1206.2.8.6 Signage. Approved signs shall be provided on or adjacent to all entry doors for battery storage rooms or areas and on enclosures of battery storage cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent:

2. The identification of the electrochemical battery energy storage system technology present. "Energized Electrical Circuits"
3. If water reactive electrochemical battery energy storage system are present the signage shall include "APPLY NO WATER"
4. Current contact information, including phone number, for personnel authorized to service the equipment and fire mitigation personnel.

Exception: Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

1206.2.8.6.1 Electrical disconnects. Where the stationary storage battery system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.

1206.2.8.6.2 Cabinet signage. Battery storage cabinets provided in occupied work centers in accordance with Section 1206.2.8.5 shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical and chemical hazards, as required by Section 1206.2.12.

1206.2.8.7 Outdoor installations. Stationary storage battery systems located outdoors shall comply with Sections 1206.2.8.7 through 1206.2.8.7.4, in addition to all applicable requirements of Section 1206.2. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as battery storage rooms.

Remote outdoor installations include stationary battery systems located more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.

Installations near exposures include all outdoor stationary battery systems that are not more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.

Exception: Stationary battery arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

### TABLE 1206.2.8.7 OUTDOOR INSTALLATIONS

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Remote Installations</th>
<th>Installations Near Exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Installation Requirements</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Size and separation</td>
<td>No</td>
<td>Yes *</td>
</tr>
<tr>
<td>Smoke and automatic fire detection</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire suppression systems</td>
<td>Yes b</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum enclosure size</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Means of egress separation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Clearance to exposures</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Technology specific protection</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
a. In outdoor walk-in units, spacing is not required between energy storage systems units and the walls of the enclosure.

b. Where approved by the fire code official, fire suppression systems are permitted to be omitted.

1206.2.8.7.1 Separation. Stationary storage battery systems located outdoors shall be separated by a minimum 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

Exception: The fire code official is authorized to approve smaller separation distances if largescale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

1206.2.8.7.2 Means of egress. Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

Exception: The fire code official is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

1206.2.8.7.3 Security of outdoor areas. Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

1206.2.8.7.4 Walk-in units. Where a stationary storage battery system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.

1206.2.9 Maximum allowable quantities. Fire areas within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 1206.2.9 shall comply with all applicable Group H occupancy requirements in this code and the International Building Code.

Exception: Where approved by the fire code official, areas containing stationary storage batteries that exceed the amounts in Table 1206.2.9 shall be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with Section 1206.2.3 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

1206.2.9.1 Mixed battery systems. Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a Group H occupancy in accordance with Table 1206.2.9.

1206.2.10 Storage batteries and equipment. The design and installation of storage batteries and related equipment shall comply with Sections 1206.2.10.1 through 1206.2.10.8.

Battery storage systems installations shall comply with the requirements of this Section in accordance with the applicable requirements of Table 1206.2.10

1206.2.10.1 Listings. Storage batteries and battery storage systems shall comply with the following:

1. Storage batteries shall be listed in accordance with UL 1973.
2. Prepackaged and preengineered stationary storage battery systems shall be listed in accordance with UL 9540.

Exception: Lead-acid batteries are not required to be listed.

1206.2.10.2 Prepackaged and preengineered systems. Prepackaged and preengineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer’s instructions.

<table>
<thead>
<tr>
<th>BATTERY TECHNOLOGY</th>
<th>MAXIMUM ALLOWABLE QUANTITIES</th>
<th>GROUP H OCCUPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow batteries</td>
<td>600 kwh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Lead acid, all types</td>
<td>Unlimited</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Lithium, all types</td>
<td>600 kwh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Nickel cadmium (Ni-Cd)</td>
<td>Unlimited</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Sodium, all types</td>
<td>600 kwh</td>
<td>Group H-2</td>
</tr>
<tr>
<td>Other battery technologies</td>
<td>200 kwh</td>
<td>Group H-2</td>
</tr>
</tbody>
</table>

For SI: 1 kilowatt hour = 3.6 megajoules.
Compliance Required b  Battery Technology  Other Battery Storage Systems and Battery Technologies b 

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Battery Technology</th>
<th>Other Battery Storage Systems and Battery Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust ventilation</td>
<td>Lead-acid</td>
<td>Ni-Cad &amp; Ni-MH</td>
</tr>
<tr>
<td>Spill control and neutralization</td>
<td>Yes e</td>
<td>Yes e</td>
</tr>
<tr>
<td>Explosion control</td>
<td>Yes a</td>
<td>Yes a</td>
</tr>
<tr>
<td>Safety Caps</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Thermal runaway</td>
<td>Yes e</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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

d. Not required for lead-acid and nickel cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.

e. Not required for vented (i.e. flooded) type lead acid batteries.

1206.2.10.3 Energy management system. An approved energy management system shall be provided for battery technologies other than lead-acid and nickel cadmium for monitoring and balancing cell voltages, currents and temperatures within the manufacturer’s specifications. The system shall transmit an alarm signal to an approved location and to an approved annunciator panel if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

1206.2.10.3.1 Annunciator panel. The approved annunciator panel shall visibly indicate any hazardous temperature or other conditions. The location of the annunciator panel shall be approved by the fire code official.

1206.2.10.4 Battery chargers. Battery chargers shall be compatible with the battery chemistry and the manufacturer’s electrical ratings and charging specifications. Battery chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed preengineered or prepackaged stationary storage battery system.

1206.2.10.5 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.

1206.2.10.6 Safety caps. Where required by Table 1206.2.10, Vented batteries shall be provided with flame-arresting safety caps.

1206.2.10.7 Thermal runaway. Where required by Section 1206.2.12, Table 1206.2.10 storage batteries shall be provided with a listed device or other approved method to prevent, detect and control thermal runaway.

1206.2.10.8 Toxic and highly toxic gas. Stationary storage battery systems that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall comply with Section 1206.2.11.3 and Chapter 60.

1206.2.11 Fire protection and life safety systems. Fire-protection and life safety systems shall be provided in accordance with Sections 1206.2.11.1 through 1206.2.11.7. All alarm, and supervisory signals from the fire protection and life safety systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, and to an approved annunciator panel.

1206.2.11.1 Fire-extinguishing systems. Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13. If the storage battery types are not addressed in Chapter 5 of NFPA 13, the fire code official is authorized to approve the fire-extinguishing system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

Exception: Spaces or areas containing stationary storage battery systems used exclusively for telecommunications equipment in accordance with Section 903.2.

1206.2.11.1.1 Fire-extinguishing systems. Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be
protected by an automatic fire suppression system designed and installed in accordance with the most stringent of the following:

1. An automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a minimum density of 0.6 gpm/ft.² based on the fire area or 2,500 ft.² (232 m²) design area, whichever is smaller.
2. Where approved, an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification based on large scale fire testing.
3. The alternate automatic fire extinguishing systems designed and installed in accordance with Section 904, provided the installation is approved by the fire code official based on large scale fire testing.

Exception: Fire suppression systems for lead acid and nickel cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.

1206.2.11.2 Fire department connections. Fire Department connections shall be installed in an approved location.

1206.11.3 Hydrants. Fire hydrants shall be installed and maintained in accordance with Chapter 5 and Chapter 9.

1206.11.4 Alternative fire-extinguishing systems. Battery systems that utilize water-reactive materials shall be protected by an approved alternative automatic fire extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of storage batteries in the room. The fire code official shall be permitted to approve the alternative fire extinguishing system based on full-scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.

1206.2.11.2.1.5 Smoke detection system. An approved automatic smoke detection system shall be installed in rooms containing stationary storage battery systems in accordance with Section 907.2.

1206.2.11.3 Ventilation. Where required by Table 1206.2.10, ventilation of rooms containing stationary storage battery systems shall be provided in accordance with the International Mechanical Code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 10 percent of the lower flammability limit, or for hydrogen, 1.0 percent of the total volume of the room.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.00508 m³/(s • m²)] of floor area, but not less than 150 cfm (4 m³/min). The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.

1206.2.11.3.1 Cabinet ventilation. Where cabinets located in occupied spaces contain storage batteries that are required by Table 1206.2.10 to be provided with ventilation, the cabinet shall be provided with ventilation in accordance with Section 1206.2.11.3.

1206.2.11.3.2 Supervision. Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an approved central station, proprietary or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

1206.2.11.3.3 Standby power. Mechanical exhaust ventilation shall be provided with a minimum of 6 hours of standby power in accordance with International Building Code.

1206.2.11.3.4 Mechanical exhaust ventilation controls. Clearly identified separate switches shall be provided to both to activate the mechanical exhaust ventilation system and to shutoff the ventilation system.

1206.2.11.4 Gas detection system. Where required by Section 1206.2.3 or 1206.2.10.8 rooms containing stationary storage battery systems shall be protected by a gas detection system complying with Section 916. The gas detection system shall be designed to activate where the level of flammable gas exceeds 25 10 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gas exceeds one half of the IDLH.

1206.2.11.4.1 System activation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visible alarms in the battery storage room.
2. Transmission of an alarm to an approved location.
3. De-energizing of the battery charger.
4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.

Exception: Lead-acid and nickel-cadmium stationary storage battery systems shall not be required to comply with Items 1, 2 and 3.
1206.2.11.5 Spill control and neutralization. Where required by Table 1206.2.10, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing stationary storage batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.

2. For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

1206.2.11.5.1 Spill control barrier. Each rack of batteries, or group of racks shall be provided with a liquid-tight 4-inch (102 mm) spill control barrier which extends at least 1-inch (25 mm) beyond the battery rack in all directions.

1206.2.11.6 Explosion Control. Where required by Table 1206.2.10, explosion control, complying with Section 911, NFPA 68 and NFPA 69, shall be provided for rooms, areas or walk-in units containing electrochemical battery energy storage system technologies.

Exceptions:

1. Where approved, explosion control is permitted to be waived by the fire code official based on large scale fire testing which demonstrates that flammable gases are not liberated from electrochemical battery energy storage system cells or modules.

2. Where approved, explosion control is permitted to be waived by the fire code official based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical battery energy storage system technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the lower flammable limit (LFL) anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.

1206.2.11.7 Emergency energy release. An approved means must be provided to safely release stored energy from the batteries in an emergency situation.

1206.2.12 Specific battery-type requirements. This section includes requirements applicable to specific types of storage batteries. Stationary storage battery systems with more than one type of storage battery shall comply with requirements applicable to each battery type.

Ventilation, spill control and neutralization, explosion control, safety caps and thermal runaway shall be required in accordance with Table 1206.2.10

1206.2.12.1 Lead-acid storage batteries. Stationary storage battery systems utilizing lead-acid storage batteries shall comply with the following:

1. The signage in Section1206.2.8.6 shall indicate the room contains lead-acid batteries.

1206.2.12.2 Nickel-cadmium (Ni-Cd) storage batteries. Stationary storage battery systems utilizing nickel cadmium (Ni-Cd) storage batteries shall comply with the following:

1. The signage in Section1206.2.8.6 shall indicate the room contains lead-acid batteries.

1206.2.12.3 Lithium-ion storage batteries. The signage in Section 1206.2.8.6 shall indicate the type of lithium batteries contained in the room.

1206.2.12.4 Sodium-beta storage batteries. Stationary storage battery systems utilizing sodium-beta storage batteries shall comply with the following:

1. The signage in Section 1206.2.8.6 shall indicate the type of sodium batteries in the room and include the instructions, “APPLY NO WATER.”

1206.2.12.5 Flow storage batteries. Stationary storage battery systems utilizing flow storage batteries shall comply with the following:

1. The signage required in Section 1206.2.8.6 shall indicate the type of flow batteries in the room.

1206.2.12.6 Other battery technologies. Stationary storage battery systems utilizing battery technologies other than those described in Sections 1206.2.12.1 through 1206.2.12.5 shall comply with the following:

1. Gas detection systems complying with Section 916 shall be provided in accordance with Section 1206.2.11.4 where the batteries have the potential to produce toxic or highly toxic gas in the storage room or cabinet in excess of the permissible exposure limits (PEL) during charging, discharging and normal system operation.

2. In addition to the signage required in Section 1206.2.8.6, the marking shall identify the type of batteries present, describe the potential hazards associated with the battery type, and indicate that the room contains energized electrical circuits.

1206.2.13 Special Installations. Rooftop and open parking garage battery energy storage system installations shall comply with Sections 1206.2.13 through 1206.2.13.6. Signage shall comply with section 1206.2.8.6.

1206.2.13.1 Rooftop installations. For the purpose of Table 1206.2.13, rooftop installations are those located on the roofs of buildings.

1206.2.13.2 Open parking garage installations. For the purpose of Table 1206.2.13, open parking garage installations are those located in a structure or portion of a structure that complies with Section 406.5 of the International Building Code.

<table>
<thead>
<tr>
<th>Compliance Required</th>
<th>Rooftops</th>
<th>Open Parking Garages</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Installation Requirements</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Size and separation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
1206.2.13.3 Clearance to exposures. Battery storage systems located on rooftops and in open parking garages shall be separated by a minimum 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop battery energy storage system is mounted
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed
3. Lot lines
4. Public ways
5. Stored combustible materials
6. Locations where motor vehicles can be parked
7. Hazardous materials
8. Other exposure hazards

Exceptions:
1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1524 mm) above and extending 5 feet (1524 mm) beyond the physical boundary of the battery energy storage system installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the battery energy storage system and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large scale fire testing.

1206.2.13.4 Fire suppression systems. Battery storage systems located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the battery energy storage system enclosure in accordance with Section 1206.2.11.1. Areas containing battery energy storage system other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1206.2.11.1.

1206.2.13.5 Rooftop installations. Battery storage systems and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:
1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. Battery storage systems and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from a battery storage systems or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.
6. The battery storage systems shall be the minimum of 10 feet (3048 mm) from the fire service access point on the roof top.

1206.2.13.6 Open parking garages. Battery storage systems and associated equipment that are located in open parking garages shall comply with all of the following:
1. Battery storage systems shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.

Exception: This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.
2. Battery storage systems shall not be located within 25 feet (7620 mm) of exits leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
3. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 feet (1024 mm) from the outer enclosure of the battery energy storage system.

1206.3 Capacitor energy storage systems. Capacitor energy storage systems having capacities exceeding 3 kWh (10.8 megajoules) shall comply with Sections 1206.3 through 1206.3.2.6.1.

Exception: Capacitors regulated by NFPA 70, Chapter 460, and capacitors included as a component part of other listed electrical equipment are not required to comply with this section.
1206.3.1 Permits. Permits shall be obtained for the installation of capacitor energy storage systems in accordance with Section 105.7.3.

1206.3.2 Location and construction. Rooms and areas containing capacitor energy storage systems shall be designed, located and constructed in accordance with Sections 1206.3.2 through 1206.3.2.5.

1206.3.2.1 Location. Capacitor energy storage systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

1206.3.2.2 Separation. Rooms containing capacitor energy storage systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the International Building Code.


1206.3.2.3 Capacitor arrays. Capacitor energy storage systems shall be segregated into capacitor arrays not exceeding 50 kWh each. Each array shall be spaced not less than 3 feet (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exception: Capacitor energy storage systems in noncombustible containers located outdoors shall not be required to be spaced 3 feet (914 mm) from the container walls.

1206.3.2.4 Signage. Approved signs shall be provided on doors or in locations adjacent to the entrances to capacitor energy storage system rooms and shall include the following or equivalent verbiage and information:

1. “CAPACITOR ENERGY STORAGE ROOM.”
2. “THIS ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS.”
3. An identification of the type of capacitors present and the potential hazards associated with the capacitor type.

1206.3.2.5 Electrical disconnects. Where the capacitor energy storage system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means identifying the location of the capacitor energy storage system disconnecting means in accordance with NFPA 70.

1206.3.2.6 Outdoor installation. Capacitor energy systems located outdoors shall comply with Sections 1206.3.2.6 through 1206.3.2.6.4 in addition to all applicable requirements of Section 1206.3. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as capacitor storage rooms.

Exception: Capacitor arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

1206.3.2.6.1 Separation. Capacitor energy systems located outdoors shall be not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

Exception: The fire code official is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

1206.3.2.6.2 Means of egress. Capacitor energy storage systems located outdoors shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

Exception: The fire code official is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

1206.3.2.6.3 Security of outdoor areas. Outdoor areas in which capacitor energy storage systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

1206.3.2.6.4 Walk-in units. Where a capacitor energy storage system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of capacitors and electronics, and shall not be occupied for other purposes.

1206.3.3 Maximum allowable quantities. Fire areas within buildings containing capacitor energy storage systems that exceed 600 kWh of energy capacity shall comply with all applicable Group H occupancy requirements in this code and the International Building Code.

1206.3.4 Capacitors and equipment. The design and installation of capacitor energy storage systems and related equipment shall comply with Sections 1206.3.4.1 through 1206.3.4.5.

1206.3.4.1 Listing. Capacitors and capacitor energy storage systems shall comply with the following:

1. Capacitors shall be listed in accordance with UL 1973.
2. Prepackaged and preengineered stationary capacitor energy storage systems shall be listed in accordance with UL 9540.

**1206.3.4.2 Prepackaged and preengineered systems.** In addition to other applicable requirements of this code, prepackaged and preengineered capacitor energy storage systems shall be installed in accordance with their listing and the manufacturer’s instructions.

**1206.3.4.3 Energy management system.** An approved energy management system shall be provided for monitoring and balancing capacitor voltages, currents and temperatures within the manufacturer’s specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

**1206.3.4.4 Capacitor chargers.** Capacitor chargers shall be compatible with the capacitor manufacturer’s electrical ratings and charging specifications. Capacitor chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed preengineered or prepackaged capacitor energy storage system.

**1206.3.4.5 Toxic and highly toxic gas.** Capacitor energy storage systems that have the potential to release toxic and highly toxic materials during charging, discharging and normal use conditions shall comply with Chapter 60.

**1206.3.5 Fire-extinguishing and detection systems.** Fire-extinguishing and smoke detection systems shall be provided in capacitor energy storage system rooms in accordance with Sections 1206.3.5.1 through 1206.3.5.2.

**1206.3.5.1 Fire-extinguishing systems.** Rooms containing capacitor energy storage systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific capacitor technologies shall be in accordance with Chapter 5 of NFPA 13. If the capacitor types are not addressed in Chapter 5 of NFPA 13, the fire code official is authorized to approve the automatic sprinkler system based on full-scale fire and fault condition testing conducted by an approved laboratory.

**1206.3.5.1.1 Alternative fire-extinguishing systems.** Capacitor energy storage systems that utilize water-reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of capacitors in the room. The fire code official shall be permitted to approve the system based on full-scale fire and fault condition testing conducted by an approved laboratory.

**1206.3.5.2 Smoke detection system.** An approved automatic smoke detection system shall be installed in rooms containing capacitor energy storage systems in accordance with Section 907.2.

**1206.3.5.3 Ventilation.** Where capacitors release flammable gases during normal operating conditions, ventilation of rooms containing capacitor energy storage systems shall be provided in accordance with the International Mechanical Code and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammability limit.

2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.000508 m³/(s • m²)] of floor area, but not less than 150 cfm (4 m³/min).

The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the ceiling for gases having a vapor density less than air.

**1206.3.5.3.1 Supervision.** Required mechanical ventilation systems for rooms containing capacitor energy storage systems shall be supervised by an approved central station, proprietary or remote station service, or shall initiate an audible and visible signal at an approved, constantly attended on-site location.

**1206.3.5.4 Spill control and neutralization.** Where capacitors contain liquid electrolyte, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing capacitors as follows:

1. For capacitors with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.

2. For capacitors with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

**1206.3.6 Testing, maintenance and repair.** Capacitors and associated equipment and systems shall be tested and maintained in accordance with the manufacturer’s instructions. Any capacitors or system components used to replace existing units shall be compatible with the capacitor charger, energy management systems, other capacitors, and other safety systems. Introducing different capacitor technologies into the capacitor energy storage system shall be treated as a new installation and require approval by the fire code official before the replacements are introduced into service.

**1206.4 Energy storage system in Group R-3 and R-4 occupancies.** Energy storage systems in Group R-3 and R-4 occupancies shall be installed and maintained in accordance with this section. The temporary use of an owner or occupant's electric powered vehicle as an energy storage system shall be in accordance with Section 1206.4.

**1206.4.1 Equipment listings.** Energy storage system shall be listed and labeled for residential use in accordance with UL 9540.

**Exceptions:**
1. Where approved, repurposed unlisted battery systems from electric vehicles may be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.

2. Energy storage system less than 1 kWh.

1206.4.2 Installation. Energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.

1206.4.2.1 Spacing. Individual units shall be separated from each other by at least 3 feet (914 mm) of spacing unless smaller separation distances are documented and approved by the fire code official to be adequate based on large scale fire testing.

1206.4.3 Location. Energy storage system shall only be installed in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space and sleeping units in accordance with Section 406.3.2 of the International Building Code.
3. Outdoors on exterior walls in accordance with 1206.4.3.1
4. Utility closets and storage or utility spaces within dwelling units and sleeping units.

1206.4.3.1 Exterior wall installations. Energy storage system shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

1. The maximum energy capacity of individual energy storage system units shall not exceed 20 kWh.
2. The energy storage system shall comply with applicable requirements in Sections 1206.
3. The energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.
4. Individual energy storage system units shall be separated from each other by not less than 3 feet (914 mm).
5. The energy storage system shall be separated from doors, windows, operable openings into buildings, or HVAC inlets by at least 5 feet (1524 mm).

   Exception: Where approved by the fire code official, smaller separation distances in items 4 and 5 may be permitted based on large scale fire testing

1206.4.4 Energy ratings. Individual energy storage system units shall have a maximum rating of 20 kWh. The aggregate rating structure shall not exceed:

1. 40 kWh within utility closets and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

1206.4.5 Electrical installation. Energy storage system shall be installed in accordance with NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.

1206.4.6 Fire detection. Rooms and areas within dwellings units, sleeping units and attached garages in which energy storage system are installed shall be protected by smoke alarms in accordance with Section 907.2.10. A heat detector listed and interconnected to the smoke alarms shall be installed in locations within dwelling units, sleeping units and attached garages where smoke alarms cannot be installed based on their listing.

1206.4.7 Protection from impact. Stationary storage battery systems installed in a location subject to vehicle damage shall be protected by approved barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the International Mechanical Code.

1206.4.8 Ventilation. Indoor installations of energy storage system that include batteries that produce hydrogen or other flammable gases during charging shall be provided with ventilation in accordance with Section 1206.2.11.3.

1206.4.9 Toxic and highly toxic gas. Energy storage system that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.