

**ORDINANCE NO.**

**AN ORDINANCE REPEALING AND REPLACING ARTICLE 1 OF CITY CODE CHAPTER 25-12 TO ADOPT THE 2009 INTERNATIONAL BUILDING CODE AND LOCAL AMENDMENTS; AND AMENDING CITY CHAPTER 25-12 TO ADD NEW SECTIONS 25-12-266, 25-12-267, 25-12-268, 25-12-269, AND 25-12-270 RELATING TO PERMIT APPLICATIONS AND EXPIRATION.**

**BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:**

**PART 1.** Article 1, Division 1 (*Building Code*) of City Code Chapter 25-12 (*Technical Codes*) is repealed and replaced with a new Article 1, Division 1, to read as follows:

***ARTICLE 1. BUILDING CODE.***

**Division 1. International Building Code and Local Amendments**

**§ 25-12-1 BUILDING CODE.**

- (A) The 2009 International Building Code published by the International Code Council is adopted and incorporated into this section with deletions and amendments in Subsection (B) and Section 25-12-3 (*Local Amendments to the Building Code*).
- (B) The following provisions of the 2009 International Building Code are deleted. A subsection contained within a deleted section or subsection is not deleted, unless specifically listed below.

Sec. 101.2	Sec. 101.4.1	Sec 101.4.2	Sec. 101.4.3
Sec. 103	Sec. 105.1.1	Sec. 105.1.2	Sec. 105.3
Sec. 105.3.2	Sec. 105.5	Sec. 107.2.3	Sec. 107.2.5
Sec. 110.3	Sec. 110.3.1	Sec.110.3.2	Sec. 110.3.3
Sec. 110.3.4	Sec. 110.3.5	Sec. 110.3.6	Sec. 110.3.7
Sec. 110.3.8	Sec. 110.3.9	Sec. 110.3.10	Sec. 112.3
Sec. 113	Sec. 305.2	Sec. 308.2	Sec. 308.5.2
Sec. 310.1	Sec. 403.2.1	Sec. 403.2.1.1	Sec. 403.2.1.2
Sec. 403.5.3.1	Sec. 406.2.5	Sec. 406.3.8	Sec. 414.1.3
Sec. 501.2	Sec. 503.1.1	Sec. 504.2	Sec. 507.2
Sec. 507.3	Sec. 507.3.1	Sec. 509.4	Sec. 509.6

Sec. 708.14.1	Sec. 712.3.3	Sec. 713.3.1	Sec. 713.4.1.2
Sec. 714.2	Sec. 717.5	Sec. 901.5	Sec. 903.2.6
Sec. 903.2.7	Sec. 903.3.1.2.1	Sec. 903.3.5.2	Sec. 903.3.6
Sec. 904.9	Sec 904.11	Sec. 905.1	Sec. 905.3.1
Sec. 905.3.4.1	Sec. 905.5.3	Sec. 906.1	Sec. 907.2
Sec. 907.2.7	Sec. 907.2.8.1	Sec. 907.2.8.2	Sec. 907.2.9
Sec. 907.2.9.1	Sec. 907.2.13.2	Sec. 907.4.1	Sec. 907.5.2.3.4
Sec. 907.6.5	Sec. 909	Sec. 912.1	Sec. 912.3
Sec. 912.3.1	Table 1004.1.1	Sec. 1007.3	Sec. 1007.5
Sec. 1008.1.2	Sec. 1008.1.4.3	Sec. 1008.1.4.4	Sec. 1008.1.9.7
Sec. 1012.3.1	Sec. 1013.1	Sec. 1015.2.1	Sec. 1018.4
Sec. 1021.2	Table 1021.2	Sec. 1022.1	Sec. 1026.3
Sec. 1101.1	Sec. 1101.2	Sec. 1104.1	Sec. 1104.3.1
Sec. 1104.4	Sec. 1105.1	Sec. 1106.5	Sec. 1106.6
Sec. 1108.2.2	Sec. 1109.2.1.6	Sec. 1109.7	Sec. 1109.12.1
Sec. 1109.14	Sec. 1110.1	Sec. 1301	Sec. 1507.8
Table 1507.8	Sec. 1507.8.1	Sec. 1507.8.1.1	Sec. 1507.8.2
Sec. 1507.8.3	Sec. 1507.8.4	Sec. 1507.8.5	Table 1507.8.5
Sec. 1507.8.6	Sec. 1507.8.7	Table 1507.8.7	Sec. 1507.8.8
Sec. 1507.9	Sec. 1507.9.1	Sec. 1507.9.1.1	Sec. 1507.9.2
Sec. 1507.9.3	Sec. 1507.9.4	Sec. 1507.9.5	Sec. 1507.9.6
Table 1507.9.6	Sec. 1507.9.7	Sec. 1507.9.8	Table 1507.9.8
Sec. 1507.9.9	Sec. 1603.1.3	Sec. 1603.1.4	Sec. 1607.7.1
Sec. 1607.9.2	Sec. 1612	Sec. 1704.1.1	Sec. 3102.1
Sec. 3109.3	Sec. 3201.1	Sec. 3202.1	Sec. 3202.2.1
Sec. 3202.3.3	Chapter 34		

(C) The city clerk shall file a copy of the 2009 International Building Code with the official ordinances of the City.

## § 25-12-2 CITATIONS TO THE BUILDING CODE.

In the City Code, “Building Code” means the 2009 International Building Code adopted by Section 25-12-1 (*Building Code*), as amended by Section 25-12-3 (*Local Amendments to the Building Code*). In this article, “this code” means the Building Code.

## § 25-12-3 LOCAL AMENDMENTS TO THE BUILDING CODE.

The following provisions are local amendments to the 2009 International Building Code. Each provision in this section is a substitute for the identically numbered provision deleted by Section 25-12-1(B) (*Building Code*) or is an addition to the 2009 International Building Code.

**101.2 Scope.** The provisions of this code shall apply to the construction, alteration or addition, movement, enlargement, replacement, repair, equipment, use and occupancy, including a change in occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

### **Exceptions:**

1. Detached one- and two-family dwellings and multiple single-family dwellings (town houses) 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.
2. Existing buildings undergoing repair, alteration, additions, relocation, or a change of use shall comply with the 2009 International Existing Building Code as adopted and incorporated into this code.

**101.4.1 Gas.** The provisions of the International Fuel Gas Code and the Plumbing Code shall apply to the installation of gas piping from the point of delivery, gas appliances and related accessories as covered by this code. The Plumbing Code supersedes the International Fuel Gas Code to the extent of conflict. These requirements apply to gas piping systems extending from the point of delivery to the inlet connections of appliances and the installation and operation of residential and commercial gas appliances and related accessories.

**101.4.2 Mechanical.** The provisions of the International Mechanical Code and the Mechanical Code shall apply to the installation, alterations, repairs and replacement of mechanical systems, including equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air conditioning and refrigeration systems, incinerators and other energy related systems. The Mechanical Code supersedes the International Mechanical Code to the extent of conflict.

**101.4.3 Plumbing.** The provisions of the International Plumbing Code and the Plumbing Code shall apply to the installation, alterations, repairs and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances, and where connected to a water or sewage system and all aspects of a medical gas system. The Plumbing Code supercedes the International Plumbing Code to the extent of conflict.

The provisions of the International Private Sewage Disposal Code and the Plumbing Code shall apply to private sewage disposal systems. The Plumbing Code supercedes the International Private Sewage Code to the extent of conflict.

**103 Building official.** The City Manager shall appoint a building official to administer and interpret this code. The building official may appoint one or more deputy building officials.

**105.3 Application for permit.** To obtain a permit, the applicant shall first file an application in writing on a form furnished by the department of building safety for that purpose. Such application must meet each of the following requirements:

1. Identify and describe the work to be covered by the permit for which the application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by construction documents and other information as required in Section 107 (*Submittal Documents*).
5. State the valuation of the proposed work.
6. Be signed by the applicant, or the applicant's authorized agent.
7. Give such other data and information as required by the building official.
8. An application must include certification by a registered professional engineer that trench safety systems have been designed in accordance with state law and OSHA standards.

**105.5 Time Limitation on Application; Permit Expiration and Reactivation.** Time limits on permit applications and requirements for permit expiration and reactivation, including a review fee for expired permits, are set forth in Chapter 25-12, Article 13 (*Administration of Technical Codes*).

**105.8 Transfer of permit.** The building official is authorized to establish a building permit transfer policy.

**107.2.2.3 Fire protection at penetrations.** Deferred submittal shop drawings and schedules that are submitted shall indicate the fire protective assemblies proposed for installation at all penetrations through fire and smoke construction in accordance with Sections 713 (*Penetrations*) and 714 (*Fire-Resistant Joint Systems*).

**107.2.3 Means of Egress.** The construction documents shall show in sufficient detail the location, construction, size and character of all portions of means of egress in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, as applicable in Section 101.2 (*Scope*) and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in every room or space that is part of an assembly occupancy.

**107.2.5 Site plan.** The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations: and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. For a building or structure involving below-grade construction, the site plan shall show the location of proposed earth retention system components allowed under Section 3202.1.4 (*Earth Retention System Components*). The building official is authorized to waive or modify the requirement of the site plan when the application for permit is for alteration or repair or when otherwise warranted.

**108.5 Temporary earth retention systems.** Temporary earth retention system components used to facilitate below-grade construction of a building or structure shall conform to Sections 1811 (*Earth Retention Systems*) and Section 3202.1.4 (*Earth retention system components*).

**109.7 Plan review fees.** An applicant must pay a plan review fee, adopted by separate ordinance, when plans and specifications are submitted for review under Section 107 (*Submittal Documents*). The building official shall compute the building plan review fees using the total value of all construction work for which the permit is issued as well as the value of all finish work, painting, roofing, electrical, plumbing, heating, air conditioning, elevators, fire-extinguishing systems, and other permanent equipment. The building official shall charge an additional plan review fee if plans are incomplete or changed so as to require additional plan review. The plan review fees referenced in this section are in addition to the permit fees referenced in Section 109.1 (*Payment of fees*).

**110.3 Required inspections.** The building official, upon notification, shall make the inspections set forth in Sections 110.3.1 (*Building pre-construction inspection*) through 110.3.12 (*Final inspection*).

**110.3.1 Building pre-construction inspection.** This is the first inspection conducted. The inspector verifies the permits that were issued for work at a site and meets with the contractor or owner at the site to review plans and identify potential issues. The inspector notifies the contractor of the inspector's work hours and identifies required inspections.

**110.3.2 Layout Inspection.** A layout inspection shall be made after all foundation forms have been erected and are in place, but before any concrete is placed.

**110.3.3 Footing and foundation inspection.** Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C 94, the concrete need not be on the job.

**110.3.4 Concrete slab and under-floor inspection.** Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

**110.3.5 Lowest floor elevation.** In flood hazard areas, upon placement of the lowest floor, including the basement, and prior to further vertical construction, the elevation certification required in Section 1612.5 (*Flood hazard documentation*) shall be submitted to the building official.

**110.3.6 Frame inspection.** Framing inspections shall be made after the roof deck or sheathing, all framing, fireblocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are approved.

**110.3.7 Lath and gypsum board inspection.** Lath and gypsum board inspections shall be made after lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or gypsum board joints and fasteners are taped and finished.

**110.3.8 Fire-and smoke-resistant penetrations.** Protection of joints and penetrations in fire-resistance-rated assemblies, smoke barriers and smoke partitions shall not be concealed from view until inspected and approved.

**110.3.9 Energy efficiency inspections.** Inspections shall be made to determine compliance with the energy efficiency requirements of the Energy Code, as adopted by Chapter 25-12, Article 12 (*Energy Code*), and shall include, but not be limited to, inspections for: envelope insulation R and U values, fenestration U value, duct system R value, and HVAC and water-heating equipment efficiency.

**110.3.10 Other inspections.** In addition to the inspections specified above, the building official is authorized to make or require other inspections of any construction work to

ascertain compliance with the provisions of this code and other laws that are enforced by the building official.

**110.3.11 Special inspections.** For special inspections, see Section 1704 (*Special Inspections*).

**110.3.12 Final inspection.** The final inspection shall be made after all work required by the building permit is completed.

**111.5 Maintenance of records.** The building owner, or his authorized agent, must maintain a copy of the certificate of occupancy on the premises and provide it to an authorized official on request.

**112.3 Authority to disconnect service utilities.** The building official shall have the authority to authorize disconnection of utility service to the building, structure, or service system regulated by this code and the codes referenced under this section.

**112.3.1 Circumstances for which utilities may be disconnected.** The building official may disconnect utilities if the building official determines that:

1. disconnection is necessary to eliminate an immediate hazard to life or property;
2. an owner or occupant is in violation of a stop work order;
3. electrical work has been installed without a permit;
4. plumbing or gas piping has been installed without a permit; or
5. development does not comply with the land development regulations.

**112.3.2 Notice.** This section prescribes notice requirements for disconnection of utilities.

**112.3.2.1 Disconnection because of an immediate threat to life or property.** If disconnection of utilities is necessary to eliminate an immediate hazard to life, the building official shall notify the serving utility and whenever possible, the owner and occupant of the building, structure, or service system of the decision prior to taking any action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service system shall be notified in writing, by certified mail, return receipt requested, as soon as practical thereafter.

**112.3.2.2 Disconnection for a reason other than an immediate threat to life or property.** If the disconnection of utilities is for a reason other than to eliminate an immediate hazard to life, the building official shall give notice according to this section. Notice shall first be provided for the violation in accordance with the applicable section of Title 25 (*Land Development*). The notice of violation shall include a statement that the building official may authorize the disconnection of utilities if the violation is not cured within the timeframe established in the notice of violation. If the owner or occupant fails

to comply with the notice of violation, the building official may issue a notice to the owner and occupant stating that utilities to the property will be disconnected not less than one week after the date that the notice is mailed. The notice must identify each utility that will be disconnected.

## **SECTION 113 BUILDING AND FIRE CODE BOARD OF APPEALS**

Regulations regarding the Building and Fire Code Board of Appeals are found in Chapter 2-1 of the City Code.

**202.1 Supplemental definitions.** The definitions in this subsection apply throughout this code and supplement the definitions in Section 202 (*General Definitions*) of the 2009 International Building Code, as published.

**STRUCTURAL FRAME.** The structural frame shall be considered to be the columns and the girders, beams, trusses and spandrels having direct connections to the columns and bracing members designed to carry gravity loads. The members of the floor or roof panels which have no connection to the columns shall be considered secondary members and not part of the structural frame.

**BALCONY, EXTERIOR.** An exterior floor projected from and supported by a structure without additional independent supports.

**DECK.** An exterior floor supported on at least two opposing sides by an adjacent structure, and/or post, piers or other independent supports.

**305.2 Day care.** The use of a building or structure, or portion thereof, for educational, supervision or personal care services for more than six children older than 2 ½ years of age, shall be classified as a Group E occupancy.

**308.2 Group I-1.** This occupancy shall include buildings, structures or parts thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living facilities
- Congregate care facilities
- Convalescent facilities
- Group homes
- Halfway houses

Residential board and care facilities

Social rehabilitation facilities

A facility such as the above with five or fewer persons shall be classified as a Group R-3 in accordance with this code. A facility such as above, housing at least six and not more than 16 persons, shall be classified as Group R-4.

**308.5.2 Child care facility.** A facility that provides supervision and personal care on less than a 24-hour basis for more than six children 2 ½ years of age or less shall be classified as Group I-4.

**Exception:** A child day care facility that provides care for more than six but no more than 100 children 2 ½ years or less of age, when the rooms in which the children are cared for are located on the level of exit discharge and each of these child care rooms has an exit door directly to the exterior, shall be classified as Group E.

**310.1 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 (*Scope*). Residential occupancies shall include the following:

**R-1** Residential occupancies containing sleeping units where the occupants are primarily transient in nature, including:

Boarding houses (transient)

Hotels (transient)

Motels (transient)

Bed and Breakfasts

Congregate living facilities (transient) with 10 or fewer occupants are permitted as an alternate method of compliance to comply with the construction requirements for Group R-3 including Section 903.2.8 (*Group R*).

**R-2** Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses

Boarding houses (nontransient)

Convents

Dormitories

Fraternalities and sororities

Hotels (nontransient)

Live/work units

Monasteries

Motels (nontransient)

Vacation timeshare properties

Congregate living facilities with 16 or fewer occupants are permitted as an alternate method of compliance to comply with the construction requirements for Group R-3 including Section 903.2.8 (*Group R*).

**R-3** Residential 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.

Adult care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

Congregate living facilities with 16 or fewer persons.

Adult care and child care facilities that are within a single-family home are permitted as an alternate method of compliance to comply with the International Residential Code provided the building is protected by an automatic sprinkler system in accordance with Section 903.2.8 (*Group R*).

**Exception:** Compliance with Section 903.2.8 (*Group R*) is not required for adult care and child care facilities that are within the proprietor's single-family home provided that the home was constructed and occupied as a residence prior to the adoption of this code.

**R-4** Residential occupancies shall include buildings arranged for occupancy as residential care/assisted living facilities including more than five but not more than 16 occupants, excluding staff.

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code, or, as an alternate method of compliance, shall comply with the International Residential Code provided the building is protected by an automatic sprinkler system installed in accordance with 903.2.8 (*Group R*).

**403.2.1 Reduction in fire-resistance rating.** The fire-resistance- rating reductions listed in Section 403.2.1.1 (*Type of construction*) shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

**403.2.1.1 Type of construction.** The following reductions in the minimum construction type allowed in Table 601 shall be allowed as provided in Section 403.2.1 (*Reduction in fire-resistance rating*):

1. Type 1A construction shall be allowed to be reduced to Type IB, except in buildings over 12 stories or over 160 feet high.
2. In other than Groups F-1, M, and S-1, Type IB construction shall be allowed to be reduced to Type IIA.
3. The height and area limitations of the reduced construction type shall be allowed to be the same as for the original construction type.

**403.5.3.1 Stairway communications system.** A telephone or other two-way communications system connected to an approved constantly attended station shall be provided at not less than every floor in each required stairway if the doors to the stairway are capable of being locked.

**Exception:** The stairway communication system is not required in high rise buildings when all the following conditions are met;

1. Area of refuge communication system terminal, installed and maintained per International Building Code Sec. 1007.6.3 (*Two-way communication*), is located immediately adjacent to each floor level landing.
2. The area of refuge communication terminal is connected to an approved constantly attended station.
3. The door between the stair and the vestibule (area of refuge) cannot be locked.
4. An approved sign is provided at each floor level landing inside the stairwell.

**403.7 Fire department communication systems.** A two-way fire department communications system connected to an approved constantly attended station shall be provided at no less than every floor in each required stairway where the door to the stairway is locked.

**406.2.5 Ramps.** Vehicle ramps shall not serve as an exit element. Vehicle ramps that serve as part of an accessible route shall not exceed a slope of 1:20 (5% percent).

**406.3.8 Means of egress.** Where persons other than parking attendants are permitted, open parking garages shall meet the means of egress requirements of Chapter 10 (*Means of Egress*). Lifts shall be permitted to be installed for use of employees only, provided they are completely enclosed by noncombustible materials.

**414.1.3 Information required.** Separate floor plans shall be submitted for buildings and structures with an occupancy in Group H, identifying the locations of anticipated contents and processes, so as to reflect the nature of each occupied portion of every building and structure. The floor plan shall identify the hazards associated with the contents and processes. A report identifying hazardous materials including, but not limited to, materials representing hazards that are classified in Group H to be stored or used, shall be submitted and the methods of protection from such hazards shall be indicated on the construction documents. The building official or fire marshal may also require a technical opinion that addresses the adequacy of the protective measures provided. The opinion and report shall be prepared by a qualified individual, firm or corporation approved by the building official and fire marshal, and shall be provided without charge to the City of Austin.

**501.2 Premises identification.** Approved numbers or addresses shall be provided on new buildings in such a position as to be clearly visible and legible from the street or roadway fronting the property. Letters or numbers shall comply with the requirements set out in the Fire Code and in the Fire Protection Criteria Manual.

**503.1.1 Special industrial occupancies.** In other than H occupancies, buildings and structures designed to house special industrial processes that require large areas and unusual building heights to accommodate craneways or special machinery and equipment, including, among others, rolling mills; structural metal fabrication shops and foundries; or the production and distribution of electric, gas or steam power, shall be exempt from the height and area limitations of Table 503.

**504.2 Automatic sprinkler system increase.** Where a building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*), the value specified in Table 503 for maximum building height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one. These increases are permitted in addition to the building area increase in accordance with Sections 506.2 (*Frontage increase*) and 506.3. (*Automatic sprinkler system increase*). For Group R buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 (*NFPA 13R sprinkler systems*), the value specified in Table 503 for maximum height is increased by 20 feet (6096 mm) and the maximum number of stories is increased by one, but shall not exceed 60 feet (18 288 mm) or four stories, respectively.

**Exceptions:**

1. Fire areas with an occupancy in Group I-2 of Type IIB, III, IV or V construction.
2. Buildings with an occupancy in Group H-1, H-2, H-3 or H-5.
3. Fire-resistance rating substitution in accordance with Table 601, Note d.

**507.3 Sprinklered, one story.** The area of a one-story, Group B, F, M or S building no more than one story above grade plane, or a Group A-4 building no more than one story above grade plane of other than Type V construction shall not be limited when the building is provided with an automatic sprinkler system throughout in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*), and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width.

**Exceptions:**

1. Buildings and structures of Type I and II construction for rack storage facilities which do not have access by the public shall not be limited in height provided that such buildings conform to the requirements of Sections 507.3 (*Sprinklered, one story*), 903.3.1.1 (*NFPA 13 sprinkler systems*) and Chapter 23 (*High-Piled Combustion Storage*) of the International Fire Code.
2. The automatic sprinkler system shall not be required in the areas occupied for indoor participant sports, such as tennis, skating, swimming, and equestrian activities in occupancies in Group A-4 provided that:
  - 2.1. Exit doors directly to the outside are provided for occupants of the participant sports areas;
  - 2.2. The building is equipped with a fire alarm system with manual fire alarm boxes installed in accordance with Section 907 (*Fire Alarm and Detection Systems*); and
  - 2.3. Accessory and ancillary spaces shall be fully protected in accordance with NFPA 13.

**507.3.1 Mixed occupancy buildings with Groups A-1 and A-2.** Group A-1 and A-2 occupancies of other than Type V construction shall be permitted within mixed occupancy buildings of unlimited area complying with Section 507.3 (*Sprinklered, one story*), provided that each of the following requirements are met:

1. Group A-1 and A-2 occupancies are separated from other occupancies as required for separated occupancies in Section 508.4.4 (*Separation*) with no reduction allowed in the fire-resistance rating of the separation based upon the installation of an automatic sprinkler system.
2. Each area of the portions of the building used for Group A-1 or A-2 occupancies shall not exceed the maximum allowable area permitted for such occupancies in Section 503.1 (*General*).
3. All exit doors from Group A-1 and A-2 occupancies shall discharge directly to the exterior of the building.
4. The assembly floor shall be located at or within 21 inches (533 mm) of street or grade level and all exits are provided with ramps complying with Section 1010.1 (*Scope*) to the street or grade level.

**509.4 Parking beneath Group R.** Where a maximum one-story above grade plane Group S-2 parking garage, enclosed or open or combination thereof, of Type I construction, with grade entrance, is provided under a building of Group R, the number of stories to be used in determining the minimum type of construction shall be measured from the floor above such a parking area. The floor assembly between the parking garage and the Group R above shall comply with the type of construction required for the parking garage and shall also provide a fire-resistance rating not less than 3 hours.

**708.14.1 Elevator lobby.** An enclosed elevator lobby shall be provided at each floor where an elevator shaft enclosure connects more than three stories. The lobby enclosure shall separate the elevator shaft enclosure doors from each floor by fire partitions. In addition to the requirements in Section 709 (*Fire Partitions*) for fire partitions, doors protecting openings in the elevator lobby enclosure walls shall also comply with Section 715.4.3 (*Door assemblies in corridors and smoke barriers*) as required for corridor walls and penetrations of the elevator lobby enclosure by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 716.5.4.1 (*Corridors*). Elevator lobbies shall have at least one means of egress complying with Chapter 10 (*Means of Egress*) and other provisions within this code.

**Exceptions:**

1. Enclosed elevator lobbies are not required at the street floor, provided the entire street floor is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*).
2. Elevators not required to be located in a shaft in accordance with Section 708.2 (*Shaft enclosure required*) are not required to have enclosed elevator lobbies.

3. Enclosed elevator lobbies are not required where additional doors are provided at the hoistway opening in accordance with Section 3002.6 (*Prohibited doors*). Such door shall be tested in accordance with UL 1784 without an artificial bottom seal.
4. Enclosed elevator lobbies are not required where the building is protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*). This exception shall not apply to the following:
  - 4.1. Group I-2 occupancies;
  - 4.2. Group I-3 occupancies; and
  - 4.3. High-rise buildings.

**Exception:** Elevator lobbies shall be required for Occupant Evacuation Elevators.

5. Smoke partitions shall be permitted in lieu of fire partitions to separate the elevator lobby at each floor where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*). In addition to the requirements in Section 711 (*Smoke Partitions*) for smoke partitions, doors protecting openings in the smoke partitions shall also comply with Sections 711.5.2 (*Smoke and draft control doors*), 711.5.3 (*Self- or automatic-closing doors*), and 715.4.8 (*Door closing*) and duct penetrations of the smoke partitions shall be protected as required for corridors in accordance with Section 716.5.4.1 (*Corridors*).

**Exception:** Elevator lobbies shall be required for Occupant Evacuation Elevators and Fire Service Access Elevators.

6. Enclosed elevator lobbies are not required where the elevator hoistway is pressurized in accordance with Section 708.14.2 (*Enclosed elevator lobby*).

**Exception:** Elevator lobbies shall be required for Occupant Evacuation Elevators and Fire Service Access Elevators.

7. Enclosed elevator lobbies are not required where the elevator serves only open parking garages in accordance with Section 406.3 (*Open parking garages*).

**712.3.3 Unusable space.** In 1-hour fire-resistance-rated floor construction, the ceiling membrane is not required to be installed over enclosed unusable floor spaces. In 1-hour fire-resistance-rated roof construction, the floor membrane is not required to be installed where unusable attic space occurs above.

**713.3.1 Through penetrations.** Through penetrations of fire-resistance-rated walls shall comply with Section 713.3.1.1 (*Fire-resistant rated assemblies*) or 713.3.1.2 (*Through-penetration firestop systems*).

**Exception:** Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall is permitted to be protected as follows:

1. In concrete or masonry walls where the penetrating item is a maximum 6-inch (152 mm) nominal diameter and the area of the opening through the wall does not exceed 144 square inches (0.0929m<sup>2</sup>), concrete, grout or mortar is permitted where it is installed the full thickness of the wall or the thickness required to maintain the fire-resistance rating.

**713.4.1.2 Membrane penetrations.** Penetrations of membranes that are part of horizontal assembly shall comply with Section 713.4.1.1.1 (*Installation*) or 713.4.1.1.2 (*Through-penetration firestop system*). Where floor/ceiling assemblies are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

**Exceptions:**

1. Ceiling membrane penetrations of maximum 2-hour horizontal assemblies by steel electrical boxes that do not exceed 16 square inches (10 323 mm<sup>2</sup>) in area, provided the aggregate area of such penetrations does not exceed 100 square inches (64 500 mm<sup>2</sup>) in any 100 square feet (9.3 m<sup>2</sup>) of ceiling area, and the annular space between the ceiling membrane and the box does not exceed 1/8 inch (3.2 mm).
2. Membrane penetrations by electrical boxes of any size or type, which have been listed as part of an opening protective material system for use in horizontal assemblies and are installed in accordance with the instructions included in the listing.
3. Membrane penetrations by listed electrical boxes of any material, provided such boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing. The annular space between the ceiling

membrane and the box shall not exceed 1/8 inch (3.2 mm) unless listed otherwise.

4. The annular space created by the penetration of a fire sprinkler, provided it is covered by a metal eschutcheon plate.

**714.2 Installation.** Fire-resistant joint systems shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to resist the passage of fire and hot gasses. A fire-resistant joint system shall be installed in accordance with manufacturer's recommendations and test criteria.

**717.5 Combustible materials in concealed spaces in Type I or II construction.** Combustible materials shall not be permitted in concealed spaces of buildings of Type I or II construction.

**Exceptions:**

1. Combustible materials in accordance with Section 603 (*Combustible Material in Type I and II Construction*).
2. Combustible materials exposed within plenums complying with Section 602 (*Plenums*) of the International Mechanical Code.
3. Class A interior finish materials classified in accordance with Section 803 (*Wall and Ceiling Finishes*).
4. Combustible piping within partitions or shaft enclosures installed in accordance with the provisions of this code.
5. Combustible piping within concealed ceiling spaces installed in accordance with the International Mechanical Code and the International Plumbing Code.

**901.5 Installation acceptance testing.** Fire detection and alarm 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 department. The fire department emergency prevention division shall be notified before any required acceptance testing. The conditions of approval of all Halon automatic fire-extinguishing systems shall include (i) a demonstration of need acceptable to the fire chief detailing a critical need for the system such as a direct effect on life safety that can not be adequately addressed by other types of suppression systems, and (ii) an approved method of testing that does not include the intentional release of Halon gas.

**903.2.6. Group I.** An automatic sprinkler system shall be provided throughout buildings with a Group I fire area.

**Exception:** An automatic sprinkler system installed in accordance with Section 903.3.1.2(*NFPA 13R sprinkler systems*) shall be allowed in Group I-1 facilities.

**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. Where a Group M fire area exceeds 12,000 square feet (1115 m<sup>2</sup>);
2. Where a Group M fire area is located more than three stories above grade plane; or
3. Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m<sup>2</sup>).

**903.2.9.3 High piled storage.** An automatic sprinkler system shall be provided in accordance with the International Fire Code in a building in Group S occupancy where storage of merchandise is in high-piled or rack storage arrays.

**903.3.1.2.1 Balconies and decks.** Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units where the building is of Type V construction, or of Type III construction if the balcony or deck is framed with wood, provided there is a roof or deck 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 Balcony closets.** Sprinkler protection shall be provided for all balcony closets.

**903.3.5.2 Secondary water supply.** Water supplies designed for automatic sprinkler systems shall provide a safety factor of ten (10) pounds per square inch gauge (PSIG) or ten (10) percent of the minimum required residual pressure, whichever is greater. The safety factor shall be based on the calculated system design flow and pressure.

**Exception:** A safety factor less than those defined in this Section may be approved by the fire chief only if historical water supply data is available to demonstrate that reasonable expected fluctuations will not cause the water supply to fall below the system demand.

**903.3.5.3 Hose Stream Demand.** The minimum calculated hose stream demand for Type V-B and Type V-A construction, as defined in the Building Code, shall be a minimum of 250 Gallons Per Minute (GPM).

**903.3.6 Hose threads.** Fire hose threads and fittings used in connection with automatic sprinkler systems shall be approved and shall be National Standard Hose Thread.

**903.3.7 Sprinkler System Flex Piping.** Flex piping used in automatic sprinkler systems shall be limited in length to a maximum of 6 feet. The extinguishing agent shall pass through a maximum of one 6 foot section before discharging from the sprinkler orifice (head). Approval of shop drawing submittals shall be required for all uses of flex sprinkler piping and where more than one (1) flex piping sprinkler drop is used in a remodel application the adequacy of the water supply shall be verified by hydraulic calculations.

**904.9 Halon systems.** Halogenated extinguishing systems shall be installed, maintained, and periodically inspected and tested in accordance with NFPA 12A and their listing. The conditions of approval of all Halon automatic fire-extinguishing systems shall include (i) a demonstration of need acceptable to the fire chief detailing a critical need for the system such as a direct effect on life safety that can not be adequately addressed by other types of suppression systems, and (ii) an approved method of testing that does not include the intentional release of Halon gas.

**904.11 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. Each pre-engineered automatic dry- and wet-chemical extinguishing system shall be tested in accordance with UL 300 and listed and labeled for its intended application. Other types of 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, its listing and the manufacturer's installation instructions. Automatic fire suppression systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon-dioxide extinguishing systems, NFPA 12.
2. Automatic sprinkler system, NFPA 13.
3. Foam-water sprinkler system or foam-water spray systems, NFPA 16.
4. Dry-chemical extinguishing systems, NFPA 17.
5. Wet-chemical extinguishing systems, NFPA 17A.

**Exception 1:** Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B, and listed and installed in accordance with Section 304.1 (*General*) of the International Mechanical Code.

**Exception 2:** With the concurrence of the Building Official, commercial cooking equipment used intermittently for periods which total less than 6 hours per week

may be served by a Type II ventilation hood without fixed fire suppression. A portable fire extinguisher rated for commercial cooking applications shall be provided.

**905.1 General.** Standpipe systems shall be provided in new buildings and structures in accordance with this section. Fire hose threads used in connection with new fire standpipe systems shall be approved and shall be National Standard Hose Thread. Except as otherwise approved by the fire chief, existing standpipe fire hose threads shall be national standard hose thread. The location of fire department hose connections shall be approved. In buildings used for high-piled combustible storage, fire protection shall be in accordance with Chapter 23 of the *International Fire Code*.

**905.1.1 Hose.** With the concurrence of the Building Official, hoses need not be installed or maintained on standpipes of any class when the occupancy does not provide training in the use of standpipe hose and the employees, residents, or other regular occupants of the occupancy are trained/instructed to evacuate and evacuation drills are conducted at intervals agreed on by the owner/agent and the Fire Department.

**905.3.1 Building height.** Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144mm) 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 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).
2. Class I manual standpipes are allowed in open parking garages where the highest floor is located not more than 150 feet (45 720 mm) above the lowest level of fire department vehicle access.
3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that additional hose connections are located as required for Class II standpipes in accordance with Section 905.5 (*Location of Class II standpipe hose connections*).
4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.
5. In determining the lowest level of fire department vehicle access, it shall not be required to consider:
  - 5.1. Recessed loading docks for four vehicles or less, and

- 5.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

**905.3.4.1 Hose and cabinet.** If hose is installed, the 1½-inch (38 mm) hose connections shall be equipped with sufficient lengths of 1½-inch (38 mm) hose to provide fire protection for the stage area. Hose connections shall be equipped with an approved adjustable fog nozzle and be mounted in a cabinet or on a rack.

**905.5.3 Class II system hose.** If installed, the minimum diameter for standpipe hose shall be 1½-inch (38 mm) and such hose shall be listed for this service.

**906.1 Where required.** Portable fire extinguishers shall be installed in the following locations. Before the installation of Halon fire extinguishers in new occupancies or processes, the applicant must submit a demonstration of need acceptable to the chief detailing a critical need for this type of extinguisher such as a direct effect on life safety that cannot be adequately addressed by other types of extinguishing agents.

1. In all Group A, B, E, F, H, I, M, R-1, R-2, R-4 and S occupancies.

**Exception:** In all Group E occupancies equipped throughout with quick-response sprinklers, portable fire extinguishers shall be required only in locations specified in Items 2 through 6.

2. Within 30 feet (9144 mm) of commercial cooking equipment.
3. In areas where flammable or combustible liquids are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 1415.1 of the *International Fire Code*.
5. 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 chief.

**907.2 Where required—new buildings and structures.** An approved manual, automatic or manual and automatic 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 (*Group A*) through 907.2.23 (*Battery rooms*) and provide occupant notification in accordance with Section 907.5 (*Occupant notification systems*), unless other requirements are provided by another section of this code.

A minimum of 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

water-flow 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 required to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. The manual fire alarm box may be located in an area that is accessible to the public.
3. Where automatic sprinkler protection installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13 R sprinkler systems*) is provided and connected to the building fire alarm system, automatic heat detection required by this section shall not be required.
4. The automatic fire detectors shall be smoke detectors. Where ambient conditions prohibit installation of automatic smoke detection, other automatic fire detection shall be allowed.
5. The fire alarm control panel or a full function remote annunciator shall be installed at the main entrance for use by fire department personnel.

**907.2.1.2 Electrical Shunt for Amplified Sound Conditions.** For venues with amplified music or sound systems, in Group A occupancies having an occupant load of 300 or more, electrical shunts shall be provided to de-energize the music or sound systems upon alarm activation as necessary to demonstrate compliance with the audibility requirements of NFPA 72.

**907.2.6.4 Common Areas Within Day Care Occupancies.** Day care occupancies shall be protected by a fire alarm system which monitors smoke detectors installed in accordance with this section, the listing of the detectors and NFPA 72. Detectors must be placed on each story in front of doors to the stairways and at no greater spacing than the detector's listed spacing in the corridors of all floors containing the day care facility. Detectors must also be installed in lounges, recreation areas and sleeping rooms in the day care occupancy and as required by the Building Code. Alarms shall be visible and audible throughout the day care facility.

**Exceptions:**

1. Day cares housed within a single room.

2. A Group E day care housed within and serving the students of an E occupancy, such as an after school program, summer program, or similar function, are permitted to comply with the alarm and detection requirements of section 907.2.3 (*Group E*).
3. Day cares serving less than 12 children when operated within the single family residence of the day care operator, provided that the dwelling is protected with interconnected hard wired smoke alarms located as required by this section and powered as required for a new home in accordance with the International Residential Code and NFPA 72. When such residential day cares serve hearing impaired children, parents, or guardians, the interconnected single station smoke alarms shall be listed for visual alarm service.
4. Single story day care occupancies serving 30 or fewer children with multiple remote at grade exits as defined by the Building Code may be provided with a smoke detection system complying with the State of Texas licensing standards provided that the operation of any detection device will cause the operation of an alarm device within every area listed above. When such small day cares serve hearing impaired children, parents, or guardians, the alarm signals shall be produced by devices listed for visual alarm service.

**907.2.7 Group M.** A manual fire alarm system shall be installed in Group M occupancies having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge. The initiation of a signal from a manual fire alarm box shall initiate alarm notification appliances as required by Section 907.5.2 (*Alarm and notification appliances*).

**Exceptions:**

1. A manual fire alarm system is required in covered mall buildings complying with Section 402 (*Covered Mall and Open Mall Buildings*) of the International Building Code.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system and the alarm notification appliances will automatically activate upon sprinkler water flow.
3. Duct smoke detectors installed in separate lease spaces of large shell buildings need not be connected to monitoring panels where the only fire alarm system installed in the building is the required monitoring for a fire sprinkler system and the sprinkler monitoring system is located inside a different lease space.

**907.2.8.1 Manual fire alarm system.** A manual fire alarm system 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 individual sleeping units and contiguous attic and crawl spaces are separated from each other and public or common areas by at least 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, exit 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 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*);
  - 2.2. The notification appliances will activate upon sprinkler water flow; and
  - 2.3. At least one manual fire alarm box is installed at an approved location.
3. Audibility requirements shall not be applicable on balconies less than 100 square feet in area, or on balconies where the least dimension is less than 5' (wide balconies).

**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 (*Occupant notification systems*) shall be installed throughout all group R-1 occupancies. Listed system-type automatic detectors shall be installed within interior corridors serving sleeping units and within common areas such as, recreational rooms, laundry rooms, furnace rooms, and similar areas served by such interior corridors providing access to and egress from sleeping units.

**Exception:** An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units, 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, and where recreational rooms, laundry rooms, furnace rooms, and similar areas are not located within or along the egress paths from sleeping units.

**907.2.9 Group R-2.** Fire alarm systems and smoke alarms shall be installed in Group R-2 occupancies as required in Section 907.2.9.1 (*Manual and automatic fire alarm systems*) and 907.2.9.2 (*Smoke alarms*).

**907.2.9.1 Manual and automatic fire alarm systems.** A manual and automatic fire alarm system that activates the occupant notification system in accordance with Sections 907.5 (*Occupant notification systems*) shall be installed in Group R-2 occupancies where:

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; or
3. The building contains more than 16 dwelling units or sleeping units.

Listed system-type automatic detectors shall be installed within common areas such as recreational rooms, laundry rooms, furnace rooms, interior corridors serving as the primary access and egress for dwelling units, and similar areas.

**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 at least 1-hour fire partitions and each dwelling unit or sleeping unit has an exit directly to a public way, exit court or yard.
2. Manual fire alarm boxes are not required throughout the building when all 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 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*);
  - 2.2. The notification appliances will automatically activate throughout the notification zones upon a sprinkler waterflow; and
  - 2.3. At least one manual fire alarm box is installed at an approved location.
3. A separate 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 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*), provided that sprinkler system activation results in a local alarm designed to notify all occupants and, 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 1026.6 (*Exterior ramps and stairway protection*), exception 4.

4. Audibility requirements shall not be applicable on balconies less than 100 square feet in area, or on balconies where the least dimension is 5' or less (narrow balconies).

**907.2.13.2 Fire department wired communication system.** An approved two-way, fire department communication system designed and installed in accordance with NFPA 72 shall be provided for fire department use. It shall operate between a fire command center complying with Section 911 (*Fire Command Center*) and elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside enclosed exit stairways. The fire department communication device shall be provided at each floor level within the enclosed stairway.

**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.

**Exceptions:**

1. Where ambient conditions prohibit installation of automatic smoke detection, a heat detector shall be permitted.
2. The smoke detector shall not be required at the location of notification appliance circuit power extenders where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).

**907.5.2.3.4 Group R-2.** In Group R-2 occupancies required by Section 907 (*Fire Alarm and Detection Systems*) to have a fire alarm system, alarm signals shall be audible throughout the dwelling units and sleeping units, including on exterior balconies where the area of the balcony exceeds 100 sq ft or the least dimension of the balcony exceeds 5 feet. Dwelling units and sleeping units shall be provided with visible alarm notification appliances or the capability to support such appliances in accordance with ICC A117.1 as required by Federal and State laws and regulations.

**907.6.5 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, or by a local alarm which gives audible and visual signals at a constantly attended location. Reporting procedures and personnel training records for local alarm systems monitored at a constantly attended location shall be maintained for review and approval by the Fire Department.

**Exception:** Supervisory service is not required for:

1. Single- and multiple-station smoke alarms required by Section 907.2.11 (*Single- and multiple-station smoke alarms*).
2. Automatic sprinkler systems in one- and two-family dwellings.

**907.6.6 Annunciation and control.** The main fire alarm control panel or full function remote annunciator shall be installed at the main entrance or at an approved location near the main entrance of buildings with fire alarm systems.

## **SECTION 909 SMOKE CONTROL SYSTEMS**

**909.1 Scope and purpose.** This section applies to mechanical or passive smoke control systems when they are required by other provisions of 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 (*Smoke and heat vents*). Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 (*Exhaust systems*) of the International Mechanical Code.

**909.2 General design requirements.** Buildings, structures or parts thereof required by this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 (*Smoke Control Systems*) and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to adequately describe the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied by 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 which buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 (*Smoke Control Systems*) 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 in Section 1704 (*Special Inspections*).

**909.4 Analysis.** A rational analysis supporting the types of smoke control systems to be employed, their methods of operation, the systems supporting them and the methods of construction to be utilized shall accompany the submitted construction documents and shall include, but not be limited to, the items indicated in Sections 909.4.1 (*Stack effect*) through 909.4.6 (*Duration of operation*).

**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 (*Design fire*) 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 Chapter 16 (*Structural Design*).

**909.4.4 HVAC 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 HVAC 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 passive smoke control systems shall be capable of continued operation after detection of the fire event for not less than 20 minutes.

**909.5 Smoke barrier construction.** Smoke barriers shall comply with Section 710 (*Smoke Barriers*), and shall be constructed and sealed to limit leakage areas exclusive of protected openings. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls:  $A/A_w = 0.00100$

2. Exit enclosures:  $A/A_w = 0.00035$
3. All other shafts:  $A/A_w = 0.00150$
4. Floors and roofs:  $A/AF = 0.00050$   
where:

$A$  = Total leakage area, square feet (m<sup>2</sup>).

$AF$  = Unit floor or roof area of barrier, square feet (m<sup>2</sup>).

$A_w$  = Unit wall area of barrier, square feet (m<sup>2</sup>).

The leakage area ratios shown do not include openings due to doors, operable windows or similar gaps. These shall be included in calculating the total leakage area.

**909.5.1 Leakage area.** The total leakage area of the barrier is the product of the smoke barrier gross area monitored by the allowable leakage area ratio, plus the area of other openings such as gaps and operable windows. Compliance 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 building official.

**909.5.2 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 door assemblies complying with Section 715.4.3 (*Door assemblies in corridors and smoke barriers*).

**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 907.3.1 (*Duct smoke detectors*).
2. Fixed openings between smoke zones which are protected utilizing the airflow method.
3. In Group I-2, where such doors are installed across corridors, a pair of opposite-swinging doors without a center mullion shall be installed having vision panels with approved fire-rated glazing materials in approved fire-rated frames, the area of which shall not exceed that tested. The doors shall be close fitting within operational tolerances and shall not have undercuts, louvers or grilles. The doors shall have head and jamb stops, astragals or rabbets at meeting edges, and automatic-closing devices. Positive-latching devices are not required.
4. Group I-3.

5. 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.

**909.5.2.1 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 716 (*Ducts and Air Transfer Openings*).

**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 permitted to be other than fully sprinklered, the smoke control system shall be designed to achieve pressure differences at least 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 1008.1.3 (*Door opening force*). 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:

$$F = Fdc + K(WA \square P) / 2(W - d) \quad \text{(Equation 9-1)}$$

where:

$A$  = Door area, square feet (m<sup>2</sup>).

$d$  = Distance from door handle to latch edge of door, feet (m).

$F$  = Total door opening force, pounds (N).

$Fdc$  = Force required to overcome closing device, pounds (N).

$K$  = Coefficient 5.2 (1.0).

$W$  = Door width, feet (m).

$\square P$  = Design pressure difference, inches of water (Pa).

**909.7 Airflow design method.** When approved by the building 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.

**909.7.1 Velocity.** The minimum average velocity through a fixed opening shall not be less than:

$$v = 217.2 [h (T_f - T_o)/(T_f + 460)]^{1/2} \quad \text{(Equation 9-2)}$$

$$\text{For SI: } v = 119.9 [h (T_f - T_o)/T_f]^{1/2}$$

where:

$h$  = Height of opening, feet (m).

$T_f$  = Temperature of smoke, °F (°K).

$T_o$  = Temperature of ambient air, °F (°K).

$v$  = Air velocity, feet per minute (m/minute).

**909.7.2 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 the formula in Section 909.7.1 (*Velocity*) requires airflow to exceed this limit, the airflow method shall not be used.

**909.8 Exhaust method.** When approved by the building official, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. The design exhaust volumes shall be in accordance with this section.

**909.8.1 Exhaust rate.** The height of the lowest horizontal surface of the accumulating smoke layer shall be maintained at least 10 feet (3048 mm) above any walking surface which forms a portion of a required egress system within the smoke zone. The required exhaust rate for the zone shall be the largest of the calculated plume mass flow rates for the possible plume configurations. Provisions shall be made for natural or mechanical supply of air from outside or adjacent smoke zones to make up for the air exhausted. Makeup airflow rates, when measured at the potential fire location, shall not exceed 200 feet per minute (60 960 mm per minute) toward the fire. The temperature of the makeup air shall be such that it does not expose temperature-sensitive fire protection systems beyond their limits.

**909.8.2 Axisymmetric plumes.** The plume mass flow rate ( $mp$ ), in pounds per second (kg/s), shall be determined by placing the design fire center on the axis of the space being analyzed. The limiting flame height shall be determined by:

$$z_l = 0.533 Q_c^{2/5} \quad \text{(Equation 9-3)}$$

For SI:  $z_l = 0.166Q_c^{2/5}$

where:

$mp$  = Plume mass flow rate, pounds per second (kg/s).

$Q$  = Total heat output.

$Q_c$  = Convective heat output, British thermal units per second (kW). (The value of  $Q_c$  shall not be taken as less than  $0.70Q$ ).

$z$  = Height from top of fuel surface to bottom of smoke layer, feet (m).

$z_l$  = Limiting flame height, feet (m). The  $z_l$  value must be greater than the fuel equivalent diameter (see Section 909.9).

for  $z > z_l$

$$mp = 0.022Q_c^{1/3} z^{5/3} + 0.0042Q_c$$

For SI:  $mp = 0.071 Q_c^{1/3} z^{5/3} + 0.0018Q_c$

for  $z = z_l$

$$mp = 0.011 Q_c$$

For SI:  $mp = 0.035Q_c$

for  $z < z_l$

$$mp = 0.0208Q_c^{3/5} z$$

For SI:  $mp = 0.032Q_c^{3/5} z$

To convert  $mp$  from pounds per second of mass flow to a volumetric rate, the following equation shall be used:

$$V = 60mp / \rho \quad \text{(Equation 9-4)}$$

where:

$V$  = Volumetric flow rate, cubic feet per minute (m<sup>3</sup>/s).

$\rho$  = Density of air at the temperature of the smoke layer, pounds per cubic feet ( $T$ : in °F) [kg/m<sup>3</sup> ( $T$ : in °C)].

**909.8.3 Balcony spill plumes.** The plume mass flow rate ( $mp$ ) for spill plumes shall be determined using the geometrically probable width based on architectural elements and projections in the following equation:

$$mp = 0.124(QW^2)^{1/3} (zb + 0.25H) \quad \text{(Equation 9-5)}$$

For SI:  $mp = 0.36(QW^2)^{1/3} (zb + 0.25H)$

where:

$H$  = Height above fire to underside of balcony, feet (m).

$mp$  = Plume mass flow rate, pounds per second (kg/s).

$Q$  = Total heat output.

$W$  = Plume width at point of spill, feet (m).

$zb$  = Height from balcony, feet (m).

**909.8.4 Window plumes.** The plume mass flow rate ( $mp$ ) shall be determined from:

$$mp = 0.077(A_w H_w^{1/2})^{1/3} (z_w + a)^{5/3} + 0.18A_w H_w^{1/2} \quad \text{(Equation 9-6)}$$

$$\text{For SI: } mp = 0.68(A_w H_w^{1/2})^{1/3} (z_w + a)^{5/3} + 1.5A_w H_w^{1/2}$$

where:

$A_w$  = Area of the opening, square feet (m<sup>2</sup>).

$H_w$  = Height of the opening, feet (m).

$mp$  = plume mass flow rate, pounds per second (kg/s).

$z_w$  = Height from the top of the window or opening to the bottom of the smoke layer, feet (m).

$$a = 2.4A_w^{2/5} H_w^{1/5} - 2.1H_w.$$

**909.8.5 Plume contact with walls.** When a plume contacts one or more of the surrounding walls, the mass flow rate shall be adjusted for the reduced entrainment resulting from the contact provided that the contact remains constant. Use of this provision requires calculation of the plume diameter, that shall be calculated by:

$$d = 0.48 [(T_c + 460)/(T_a + 460)]^{1/2} z \quad \text{(Equation 9-7)}$$

$$\text{For SI: } d = 0.48 (T_c/T_a)^{1/2} z$$

where:

$d$  = Plume diameter, feet (m).

$T_a$  = Ambient air temperature, °F (°K).

$T_c$  = Plume centerline temperature, °F (°K).

$$= 0.60 (T_a + 460) Q_c^{2/3} z^{-5/3} + T_a$$

$z$  = Height at which  $T_c$  is determined, feet (m).

For SI:  $T_c = 0.08 T_a Q_c^{2/3} z^{-5/3} + T_a$

**909.9 Design fire.** The design fire shall be based on a  $Q$  of not less than 5,000 Btu/s (5275 kW) unless a rational analysis is performed by the registered design professional and approved by the building official. The design fire shall be based on the analysis in accordance with Section 909.4 (*Analysis*) 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 Separation distance.** Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration. The ratio of the separation distance to the fuel equivalent radius shall not be less than 4. The fuel equivalent radius shall be the radius of a circle of equal area to floor area of the fuel package. The design fire shall be increased if other combustibles are within the separation distance as determined by:

$$R = [Q / (12 \cdot q'')]^{1/2} \quad \text{(Equation 9-8)}$$

where:

$q''$  = Incident radiant heat flux required for non-piloted ignition, Btu/ft<sup>2</sup>·s (W/m<sup>2</sup>).

$Q$  = Heat release from fire, Btu/s (kW).

$R$  = Separation distance from target to center of fuel package, feet (m).

**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 such as, but not limited to, fans, ducts, automatic dampers and balance dampers, shall be suitable for its intended use, suitable for the probable exposure temperatures that the rational analysis indicates, and as approved by the building 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:

$$T_s = (Q_c / mc) + (T_a) \quad \text{(Equation 9-9)}$$

where:

$c$  = Specific heat of smoke at smoke layer temperature, Btu/lb °F (kJ/kg K).

$m$  = 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 (*Exhaust fans*). 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, that 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 requirements of Chapter 16 (*Structural Design*). 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 Power systems.** The smoke control system shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an approved standby source complying with the National Electrical Code. The standby power source and its transfer switches shall be in a separate room from the normal power transformers and switch gear and shall be enclosed in a room constructed of not less than 1-hour fire-resistance-rated fire barriers ventilated directly to and from the exterior. Power distribution from the two sources shall be by independent routes. Transfer to full standby power shall be automatic and within 60 seconds of failure of the primary power. The systems shall comply with the National Electrical Code.

**909.11.1 Power sources and power surges.** Elements of the smoke management system relying on volatile memories or the like shall be supplied with uninterruptible power sources of sufficient duration to span a 15-minute primary power interruption. Elements of the smoke management 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 (*Fire Alarm and Detection Systems*). Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment. 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 and, through a preprogrammed weekly test sequence report, abnormal conditions audibly, visually and by printed report.

**909.12.1 Wiring.** In addition to meeting requirements of the National Electrical Code, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.

**909.12.2 Activation.** Smoke control systems shall be activated in accordance with this section.

**909.12.2.1 Pressurization, airflow or exhaust method.** Mechanical smoke control systems using the pressurization, airflow or exhaust method shall have completely automatic control.

**909.12.2.2 Passive method.** Passive smoke control systems actuated by approved spot-type detectors listed for releasing service shall be permitted.

**909.12.3 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 (*NFPA 13 sprinkler systems*), manual controls that are readily accessible to the fire department and any smoke detectors required by 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 B 16.22. 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 solidus above 1,100°F (593°C) and liquids 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, providing all of the following conditions are met:

1. Tubing shall be listed by an approved agency for flame and smoke characteristics.
2. Tubing and connected devices shall be completely enclosed within galvanized or paint-grade steel enclosure of not less than 0.030 inch (0.76 cm) (No. 22 galvanized sheet gage) thickness. 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 building official, the fire department and in the fire command center in 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 911 (*Fire Command Center*), and shall comply with Sections 909.16.1 (*Smoke control systems*) through 909.16.3 (*Control action and priorities*).

**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, 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, non-emergency equipment operation or produce a specific result to safeguard the building or equipment (i.e., duct freeze-stats, 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 the National Electrical Code.

2. Only the AUTO position of each three-position fire-fighter'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, non-emergency, 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 above. When 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. In no case shall control actions 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 (*Fire Protection Systems*) in their installed condition. When 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 (rpm) 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 Special inspections for smoke control.** Smoke control systems shall be tested by a special inspector.

**909.18.8.1 Scope of testing.** Special inspections 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.** Special inspection agencies for smoke control 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 special inspector 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 seal, sign and date the report.

**909.18.8.3.1 Report filing.** A copy of the final report shall be filed with the building 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 its 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 (*Reports*). 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 building 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.

**Exception:** In buildings of phased construction, a temporary certificate of occupancy, as approved by the building official, shall be permitted 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 Smokeproof enclosures.** Where required by Section 1022.9 (*Smokeproof enclosures and pressurized stairways*), a smokeproof enclosure shall be constructed in accordance with this section. A smokeproof enclosure shall consist of a pressurized enclosed exit stairway that conforms to Section 1022.1 (*Enclosures required*) and a

pressurized vestibule meeting the requirements of this section. Design of pressurization systems shall be in accordance with Section 909 (*Smoke Control Systems*).

**909.20.1 Access.** Access to the stair shall be by way of a vestibule. The minimum dimension of the vestibule shall not be less than the required width of the corridor leading to the vestibule but shall not have a width of less than 44 inches and shall not have a length of less than 72 inches in the direction of egress travel. Refer to Section 1007.6 (*Area of refuge*) for area of rescue assistance.

**909.20.2 Construction.** The smokeproof enclosure shall be separated from the remainder of the building by not less than a 2-hour fire-resistance-rated fire barrier without openings other than the required means of egress doors. The vestibule shall be separated from the stairway by not less than a 2-hour fire-resistance-rated fire barrier. The open exterior balcony shall be constructed in accordance with the fire-resistance-rating requirements for floor construction.

**909.20.2.1 Door closers.** Doors in smokeproof enclosures shall be self-closing.

**909.20.3.1 Vestibule doors.** The door assembly from the building into the vestibule shall be a fire door complying with Section 715.4 (*Fire door and shutter assemblies*). The door assembly from the vestibule to the stairway shall have not less than a 90-minute fire protection rating in accordance with Section 715.4 (*Fire door and shutter assemblies*). The door from the building into the vestibule shall be provided with gaskets or other provisions to minimize air leakage.

**909.20.3.2 Vestibules.** The minimum pressure differences within the vestibule with the doors closed shall be 0.05 inch water gage positive pressure relative to the fire floor and 0.05 inch water gage negative relative to the exit enclosure. No pressure difference is required relative to a non-fire floor.

**909.20.3.3 Stair pressurization system.** The stair shaft shall be provided with a dampered relief opening capable of discharging a minimum of 2,500 cubic feet per minute of air at the design pressure difference of 0.05 inch water gage positive pressure relative to a pressurized stair vestibule. Stair pressurization fans shall be sized to compensate for the stair shaft ground floor exterior doors being open in addition to a minimum of three openings between the stair shaft and the building (fire floor, floor above, and floor below).

**909.21 Underground building smoke exhaust system.** Where required in accordance with Section 405.5 (*Smoke control system*) for underground buildings, a smoke exhaust system shall be provided in accordance with this section.

**909.21.1 Exhaust capability.** Where compartmentation is required, each compartment shall have an independent, automatically activated smoke exhaust system capable of

manual operation. The system shall have an air supply and smoke exhaust capability that will provide a minimum of six air changes per hour.

**909.21.2 Operation.** The smoke exhaust system shall be operated in the compartment of origin by the following, independently of each other:

1. Two cross-zoned smoke detectors within a single protected area of a single smoke detector monitored by an alarm verification zone or an approved equivalent method.
2. The automatic sprinkler system.
3. Manual controls that are readily accessible to the fire department.

**909.21.3 Alarm required.** Activation of the smoke exhaust system shall activate an audible alarm at a constantly attended location.

**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. 1 (*Installation*) through 912.5 (*Backflow protection*).

**912.1.1 Number of Hose Connections.** Fire department connections (FDC's) shall include a minimum of two (2) 2½ inch (63.5 mm) female National Standard Hose Thread (NST) inlet connections. Where system design flow rates exceed 500 gpm (1,893 lpm), a minimum of one FDC inlet connection shall be installed for each 250 gpm (946 lpm) or portion thereof.

**Exception:** Where permitted by other sections of this code or associated standards, a single 1½ inch or 2½ inch FDC inlet is acceptable for residential fire sprinkler systems installed in accordance with NFPA 13R. When an FDC is installed, a single 1½ inch inlet is acceptable for residential system installed in accordance with NFPA 13D.

**912.3 Access.** Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object for a minimum of 3 feet (914 mm). Access to fire department connections shall be approved by the fire chief.

**Exception:** Fences, where provided with an access gate equipped with a sign complying with the legend requirements of Section 912.4 (*Signs*) and a means of emergency operation. Locks, if installed shall be openable by use of a fire department Knox Key. The gate and means of emergency operation shall be approved by the fire chief and maintained operational at all times.

**912.3.1 Locking fire department connection caps.** The fire code official is authorized to require locking caps on fire department connections for water-based fire protection

systems. The locking caps shall be manufactured by an approved manufacturer and used and maintained as designed.

**912.3.1.2 Locking fire department connection caps in existing buildings or structures.** The fire code official is authorized to require locking caps on fire department connections (FDC) for water-based fire protection systems serving existing buildings where the fire department has observed obstructions placed in the FDC or where the FDC is missing caps. The locking caps shall be manufactured by an approved manufacturer and used and maintained as designed.

**912.4.1 Fire Department Connection Placard – for existing structures.** In addition to the signage required in 912.4 (*Signs*), an all weather, permanent, system placard shall be placed in a visible location adjacent to the fire department connection on all structures over 10 floors in height and/or structures with a fire department connection requiring pressures exceeding 150psi. The placard text shall be white reflective letters, 1 ½ inch minimum height, on either a red or black background. The placard shall contain the following information.

1. Required system pressure at FDC inlet.
2. Area of building served by FDC
3. System PRV locations

**TABLE 1004.1.1  
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT**

OCCUPANCY	FLOOR AREA IN SQ. FT. PER OCCUPANT
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport Terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Assembly with fixed seats	See Section 1004.7
Assembly without fixed seats	
Concentrated	7 net
Standing space or queuing space	7 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms—other than fixed seating areas	40 net

Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
H-5 Fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mercantile	
Areas on other floors	60 gross
Basement and grade floor areas	30 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m<sup>2</sup>.

**1007.3 Stairways.** In order to be considered part of an accessible means of egress, an exit access stairway as permitted by Section 1016.1 (*Travel distance limitations*) or exit stairway shall have a clear width of 48 inches (1219 mm) minimum between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 (*Areas of refuge*) or a horizontal exit.

**Exceptions:**

1. The area of refuge is not required at open exit access or exit stairways as permitted by Sections 1016.1 (*Travel distance limitations*) and 1022.1 (*Enclosures required*) (in buildings that are equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*)).
2. The clear width of 48 inches (1219 mm) between handrails is not required at exit access stairway as permitted by Section 1016.1 (*Travel distance limitations*) or exit stairways in buildings equipped throughout with an automatic sprinkler system installed in accordance

with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).

3. Except for a building governed by Section 403 (*High-Rise Buildings*) or 405 (*Underground Buildings*), the clear width of 48 inches (1219 mm) between handrails and the area of refuge is not required at exit stairways in buildings or facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*).
4. The clear width of 48 inches (1219 mm) between handrails is not required for exit stairways accessed from a horizontal exit.
5. Areas of refuge are not required at exit stairways serving open parking garages.
6. Areas of refuge are not required for smoke protected seating areas complying with Section 1028.6.2 (*Smoke-protected seating*).
7. The areas of refuge are not required in Group R-2 occupancies.

**1007.5 Platform lifts.** Platform (wheelchair) lifts shall not serve as part of an accessible means of egress, except where allowed as part of an accessible route in Section 1109.7 (*Lifts*), or the accessibility standards adopted by the State of Texas. Standby power shall be provided in accordance with Chapter 27 (*Electrical*) for platform lifts permitted to serve as part of a means of egress.

**1008.1.2 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. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single dwelling unit in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1008.1.4.1 (*Revolving doors*).
6. In other than Group H-1, H-2, H-3 and H-4 occupancies, horizontal sliding doors complying with Section 1008.1.4.3 (*Horizontal sliding doors*) are permitted in a means of egress.

7. Power-operated doors in accordance with Section 1008.1.4.2 (*Power-operated doors*).
8. Doors serving a bathroom within an individual sleeping unit in Group R-1.
9. 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.

Doors shall swing in the direction of egress travel where serving an *occupant load* of 50 or more persons or a Group H occupancy.

**1008.1.4.3. Horizontal sliding doors.** In other than H-1, H-2, H-3 and H-4 occupancies, horizontal sliding doors permitted to be a component of a means of egress in accordance with Exception 6 to Section 1008.1.2 (*Door swing*) 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.
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 715.4.8.3 (*Smoke-activated doors*), shall be installed in accordance with NFPA80 and shall comply with Section 715 (*Opening Protectives*).
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.

**1008.1.9.7 Delayed egress locks.** Approved, listed, delayed egress locks shall be permitted to be installed on doors serving any occupancy except Group A, E and H occupancies in buildings that are equipped throughout with an automatic sprinkler system

in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or an approved automatic smoke or heat detection system installed in accordance with Section 907 (*Fire Alarm and Detection Systems*), provided that the doors unlock in accordance with Items 1 through 6 below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an exit.

1. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
2. The doors unlock upon loss of power controlling the lock or lock mechanism.
3. The door locks shall have the capability of being unlocked by a signal from the fire command center.
4. The initiation of an irreversible process which will release the latch in not more than 15 seconds when a force of not more than 15 pounds (67 N) is applied for 1 second to the release device. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.

**Exception:** Where approved, a delay of not more than 30 seconds is permitted.

5. A sign shall be provided on the door located above and within 12 inches (305 mm) of the release device reading: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 (30) SECONDS. The letters on the sign shall be 1 inch (25 mm) high and shall be on a contrasting background.
6. Emergency lighting shall be provided at the door.

**1012.3.1 Type I.** Handrails with a circular cross section shall have an outside diameter of at least 1.25 inches (32 mm) and not greater than 1.75 inches (44 mm) or shall provide equivalent graspability. If the handrail is not circular, it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than 5.5 inches (140 mm) with a maximum cross-section dimension of 2 inches (51mm). Edges shall have a minimum radius of 0.01 inch (0.25mm).

**1013.1 Where required.** Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, stairs, ramps, occupied roofs and landings that are located more than 30 inches (762 mm) measured vertically to the floor, roof 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 1607.7 (*Loads on handrails, guards, grab bars, seats and vehicle barrier systems.*).

**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 steps 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 where guards in accordance with Section 1028.14 (*Assembly guards*) are permitted and provided.

**1015.2.1. Two exits or exit access doorways.** Where two exits or exit access doorways are required from any portion of the exit access, the exit doors or exit access doorways shall be placed at 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 exit doors or exit access doorways. Interlocking or scissor stairs shall be counted as one exit stairway.

**Exceptions:**

1. Where exit enclosures are provided as a portion of the required exit and are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1018 (*Corridors*), the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. For an exit and exit access doorway that is not the primary exit access into a required fire stair and that is located in a building that is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 (*NFPA 13 sprinkler systems*) or 903.3.1.2 (*NFPA 13R sprinkler systems*), the separation distance of the exit door or exit access doorway shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

**1018.4 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 Occupancy Condition 2, 3 or 4 (see Section 308.4 (*Group I-3*)), the dead end in a corridor shall not exceed 30 feet (9144 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 (*NFPA 13 sprinkler systems*), the length of the dead-end corridors shall not exceed 30 feet (9144 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.

**1021.2 Single exits.** An occupant in a basement and on a story above the first story shall have access to not less than two separate exits from the basement or story.

**Exceptions:**

1. A second story having an occupancy load of less than 10 may be provided with only one exit.
2. Two or more dwelling units on the second story or in a basement may have access to only one common exit when the total occupant load served by that exit does not exceed 10.
3. Except as provided elsewhere in this code only one exit need be provided from the second floor or basement within an individual dwelling unit or a Group R-2 dwelling unit.
4. If the third floor within an individual dwelling unit or Group R-2 dwelling unit does not exceed 500 square feet (46.45m<sup>2</sup>), then only one exit may be provided from that floor.
5. A floor or basement used exclusively for service of the building may have one exit. For this exception, a storage room, laundry room, maintenance office, or other similar use is not considered as providing service to the building.
6. A storage room, laundry room, or maintenance office not exceeding 300 square feet (27.45 m<sup>2</sup>) in floor area may be provided with only one exit.
7. An elevator lobby may have one exit if the use of the exit does not require keys, tools, special knowledge or effort.

**1021.5 Exit enclosure arrangement.** Where exit enclosures are required, they shall be separated from each other at their closest point by no less than 30 feet (9144 mm) or 25% percent of the largest building diagonal, whichever is less.

**1022.1 Enclosures required.** Interior exit stairways and interior exit ramps shall be enclosed with fire barriers constructed in accordance with Section 707 (*Fire Barriers*) or horizontal assemblies constructed in accordance with Section 712 (*Horizontal Assemblies*), or both. Exit 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 exit enclosure shall include any basements but not any mezzanines. Exit enclosures shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours. Exit enclosures shall 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 1023 (*Exit Passageways*), except as permitted in Section 1027.1 (*General*). An exit enclosure shall not be used for any purpose other than means of egress.

**Exceptions:**

1. In all occupancies, other than Group H and I occupancies, a stairway is not required to be enclosed when the stairway complies with either Item 1.1 or 1.2. In all cases, the maximum number of connecting open stories shall not exceed two.
  - 1.1. The stairway is open to not more than one story above its level of exit discharge; or
  - 1.2. The stairway is open to not more than one story below its level of exit discharge.
2. Exits in buildings of Group A-5 where all portions of the means of egress are essentially open to the outside need not be enclosed.
3. Stairways serving and contained within a single residential dwelling unit or sleeping unit in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
4. Stairways in open parking structures that serve only the parking structure are not required to be enclosed.
5. Stairways in Group I-3 occupancies, as provided for in Section 408.3.8 (*Exit enclosures*), are not required to be enclosed.
6. Means of egress stairways as required by Section 410.5.3 (*Stage exits*) and 1015.6.1 (*Gallery, gridiron and catwalk means of egress*) are not required to be enclosed.

7. Means of egress stairways from balconies, galleries or press boxes as provided for in Section 1028.5.1 (*Enclosure of openings*) are not required to be enclosed.

**1026.3 Open side.** Exterior exit ramps and stairways serving as an element of a required means of egress shall be open on at least two adjacent sides. A side is open if at least 75 percent of the area is free of any obstructions, including, but not limited to columns, beams, walls, handrails and guards.

**1101.1 Scope.** The provisions of this chapter shall control the design and construction of facilities for accessibility to physically disabled persons that are not included in the scope of the Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes, as amended. Existing buildings and facilities shall comply with the International Existing Building Code as adopted and incorporated into this code.

**1101.2 Design.** Buildings and facilities containing dwelling or sleeping units as defined in Section 1107 (*Dwelling Units and Sleeping Units*) of this code that are not included in the scope of TAS shall be designed and constructed to be accessible in accordance with this code and ICC/ANSI A117.1. Buildings and facilities not covered by TAS shall be designed and constructed to be accessible in accordance with this chapter. Buildings and facilities covered by TAS shall be designed and constructed to be accessible in accordance with applicable TAS requirements under state law, as provided in Section 1101.1 (*Scope*) of this code.

**1104.1 Site arrival points.** Accessible routes within the site shall be provided from public transportation stops, accessible parking and accessible passenger loading zones and public streets or sidewalks to the accessible building entrance served. An accessible route shall be located so that a person using the route is not required to travel in a traffic lane or behind a parked vehicle (except the vehicle the person operates or in which the person is a passenger).

**Exception:** Other than in buildings or facilities containing or serving Type A or Type B units, an accessible route shall not be required between site arrival points and the building or facility entrance if the only means of access between them is a vehicular way not providing for pedestrian access.

**1104.3.1 Employee work areas.** Common use circulation paths within employee work areas shall be accessible routes.

**Exceptions:**

1. Common use circulation paths, located within employee work areas that are less than 300 square feet (27.9 m<sup>2</sup>) in size and defined by counters, casework or furnishings, shall not be required to be accessible routes.

2. Common use circulation paths, located within employee work areas, that are an integral component of equipment, shall not be required to be accessible routes.
3. Common use circulation paths, located within exterior employee work areas that are fully exposed to the weather, shall not be required to be accessible routes.

**1104.4 Multilevel buildings and facilities.** At least one accessible route shall connect each accessible level, including mezzanines, in multilevel buildings and facilities.

**Exceptions:**

1. An accessible route is not required to stories and mezzanines above and below accessible levels that have an aggregate area of not more than 2,000 square feet (185.9 m<sup>2</sup>). This exception shall not apply to:
  - 1.1. Multiple tenant facilities of Group M occupancies.
  - 1.2. Levels containing offices of health care providers (Group B or I); or
  - 1.3. Passenger transportation facilities and airports (Group A-3 or B).

**1105.1 Public entrances.** In addition to accessible entrances required by Sections 1105.1.1 (*Parking garage entrances*) through 1105.1.6 (*Tenant spaces, dwelling units and sleeping units*), at least 50 percent of all public entrances shall be accessible.

**Exceptions:**

1. An accessible entrance is not required to areas not required to be accessible.
2. Loading and service entrances that are not the only entrance to a tenant space.

**1106.5 Van spaces.** For every eight or fraction of eight accessible parking spaces, at least one shall be a van-accessible parking space.

**1106.6 Location.** Accessible parking spaces shall be located on the shortest accessible route of travel from adjacent parking to an accessible building entrance. An accessible route shall be located so that a person using the route is not required to travel in a traffic lane or behind a parked vehicle (except the vehicle the person operates or in which the person is a passenger). Accessible parking spaces shall be dispersed among the various types of parking facilities provided. In parking facilities that do not serve a particular building, accessible parking spaces shall be located on the shortest route to an accessible pedestrian entrance to the parking facility. Where buildings have multiple accessible

entrances with adjacent parking, accessible parking spaces shall be dispersed and located near the accessible entrances.

**Exception:** In multilevel parking structures, van-accessible parking spaces are permitted on one level.

**1108.2.2 Wheelchair spaces.** In theaters, bleachers, grandstands, stadiums, arenas and other fixed seating assembly areas, accessible wheelchair spaces complying with ICC A117.1 shall be provided in accordance with Sections 1108.2.2.1 (*General seating*) through 1108.2.2.4 (*Team or player seating*). Vertical viewing angles from wheelchair spaces to the top and bottom of the element being viewed shall not exceed 35 degrees above or below the horizontal plane. Lateral viewing angles from wheelchair spaces to the centerline of the element being viewed shall not exceed 15 degrees measured perpendicular to the seating position. All measurements are to be made from the standard line of sight. Viewing angle criteria do not apply to sporting event facilities or specialty auditoriums designed to show OMNI or IMAX type film presentations.

**1109.2.1.6 Clear floor space.** Where doors swing into a unisex toilet or bathing room, a clear floor space not less than 30 inches by 48 inches (762mm by 1219 mm) shall be provided, within the room, beyond the area of the door swing. The clear floor space shall be located so that the occupant can open and close the door.

**1109.7 Lifts.** Where subject to regulation by the Texas Department of Licensing and Regulation (TDLR), an approved variance is required from TDLR prior to issuance of the building permit.

**1109.14 Recreational and sport facilities.** Recreational and sport facilities shall be provided with accessible features in accordance with Sections 1109.14.1(*Facilities serving a single building*) through 1109.14.4 (*Recreational and sports facilities exceptions*). Elements of recreational and sport facilities not covered by the design standards in Section 1101.2 (*Design*) shall be designed in accordance with the *ADA and ABA Accessibility Guidelines for Buildings and Facilities, Chapter 10: Recreational Facilities*, published by the United States Access Board.

**1110.1 Signs.** Required accessible elements shall be identified by the International Symbol of Accessibility at the following locations:

1. Accessible parking spaces required by Section 1106.1(*Required*).
2. Accessible passenger loading zones.
3. Accessible rooms where multiple single-user toilet or bathing rooms are clustered at a single location.
4. Accessible entrances where not all entrances are accessible.

5. Accessible check-out aisles where not all aisles are accessible. The sign, where provided, shall be above the check-out aisle in the same location as the check-out aisle number or type of check-out identification.
6. Unisex toilet and bathing rooms.
7. Accessible dressing, fitting and locker rooms where not all such rooms are accessible.
8. Accessible areas of refuge in accordance with Section 1007.9 (*Signage*).
9. Exterior areas for assisted rescue in accordance with Section 1007.9 (*Signage*).

**1301 Energy Efficiency.** Buildings shall be designed and constructed in accordance with the Energy Code, adopted by Chapter 25-12, Article 12 (*Energy Code*).

## **SECTION 1511 OCCUPIED ROOFTOPS**

**1511.1 Construction requirements.** Roofs approved for rooftop occupancy shall have a minimum fire resistance of one-hour or the fire resistance required for the building, which ever is greater. Occupied roofs shall be treated as a floor for the following construction related purposes.

1. For determining the required construction type and minimum fire resistance rating for the roof structure.
2. For calculating occupant load and building height as they relate to exiting requirements of Chapter 10 and thresholds for fire safety features required by Sections 903 (*Automatic Sprinkler Systems*), Section 905 (*Standpipe Systems*), and 907 (*Fire Alarm and Detection Systems*).

**Exception:** The occupant load of an occupied roof that complies with this section shall not contribute to the occupant load of the fire area below for the purposes of requiring automatic sprinkler and/or fire alarm protection provided that: 1) all openings from below are protected with fire resistive assemblies, and 2) the occupied roof has code compliant exits independent of the building or buildings below.

3. For the location and installation of toilet facilities.

**1511.2 Fall protection.** Occupied rooftops shall be provided with guards compliant with Section 1013 (*Guards*).

**1511.3 Interstitial spaces.** When decks or other walking surfaces are constructed above a roof to facilitate rooftop occupancy, the space between the roof/ceiling assembly and the deck or surface shall be constructed in a manner that precludes the accumulation of

material between the roof/ceiling assembly and the deck or walking surface and that prevents the introduction of ignition sources to the space.

**1511.4 Coverings above or around the occupants of an occupied rooftop.** A rooftop equipped with a horizontal or vertical covering or coverings, including weather protection, such as a roof or a tent or membrane structure that exceeds the limitations of Chapter 24 of the Fire Code shall be considered an additional story and shall comply with the construction and occupancy requirements of this code as a floor.

**Exceptions:**

1. Small roof coverings may be approved for weather protection of restrooms and beverage preparation areas such as bars without requiring the rooftop to comply with all of the requirements of this code for a story or floor. Such coverings shall comply with this code as to construction materials and fire resistance. The area of such coverings shall be limited to the minimum area required to comply with sanitation and health safety regulations.
2. An open noncombustible trellis or similar overhead shading device complying with the structural requirements of this code shall not be considered as a covering or roof provided that the trellis or shade has an evenly distributed net free area of 50% or greater.

**1603.1.3 Roof snow load.** The ground snow load,  $P_g$ , shall be indicated. In areas where the ground snow load,  $P_g$ , exceeds 10 pounds per square foot (psf) (0.479 kN/m<sup>2</sup>), the following additional information shall also be provided, regardless of whether snow loads govern the design of the roof:

1. Flat-roof snow load,  $P_f$ .
2. Snow exposure factor,  $C_e$ .
3. Snow load importance factor,  $I_s$ .
4. Thermal factor,  $C_t$ .

**Exception:** Snow load information is only required when applicable.

**1603.1.4 Wind design data.** The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral-force-resisting system of the building:

1. Basic wind speed (3-second gust), miles per hour (km/hr).
2. Wind importance factor,  $IW$ , and building category.

3. Where more than one wind exposure is utilized, the wind exposure and applicable wind direction shall be indicated.
4. The applicable internal pressure coefficient.
5. Components and cladding. The design wind pressures in terms of psf (kN/m<sup>2</sup>) to be used for the design of exterior component and cladding materials not specifically designed by the registered design professional.

**Exception:** A note indicating that the engineer of record has reviewed and included wind design data in accordance with this section in his design analysis may be included in lieu of notes 1 through 5.

#### **1607.4.1 Additional requirements.**

1. Garage loadings shall not include an impact factor for floors or roofs.
2. Ramp loadings shall be the same as floors.
3. Garage roofs used for passenger vehicles or trucks and bus parking shall be designed for a non-reducible live load of 55 psf., which includes snow and snow removal equipment. Garage roofs that provide access for fire trucks shall be designed for the required fire truck loads.
4. Dining rooms and restaurants. A nonresidential kitchen shall be designed for the same design load as the occupancy served. Use the weight of actual equipment or stored materials when greater than the design load established in ASCE7.

**1607.7.1 Handrails and guards.** Handrail assemblies and guards shall be designed to resist a load of 50 per linear foot (plf) (0.73 kN/m) applied in any direction at the top and to transfer this load through the supports to the structure.

**1607.9.2 Alternate floor live load reduction.** As an alternative to Section 1607.9.1 (*General*), floor live loads are permitted to be reduced in accordance with the following provisions. Such reductions shall apply to slab systems, beams, girders, columns, piers, walls and foundations.

1. A reduction shall not be permitted in Group A occupancies.
2. A reduction shall not be permitted where the live load exceeds 100 psf (4.79 kN/m<sup>2</sup>) except that the design live load for members supporting two or more floors is permitted to be reduced by 20 percent.

**Exception:** For uses other than storage, where approved, additional live load reductions shall be permitted where shown by the registered design professional that a rational approach has been used and that such reductions are warranted.

3. A reduction shall not be permitted in passenger vehicle parking garages except that the live loads for members supporting two or more floors are permitted to be reduced by a maximum of 20 percent.
4. For live loads not exceeding 100 psf (4.79 kN/m<sup>2</sup>), the design live load for any structural member supporting 150 square feet (13.94 m<sup>2</sup>) or more is permitted to be reduced in accordance with Equation 16-23.
5. For one way slabs, the area, A, for use in Equation 16-23 shall not exceed the product of the slab span and a width normal to the span of 0.5 times the slab span.
6. For structural members supporting more than 150 square feet in garages used for the storage of passenger vehicles, the reduced live load shall not be less than 30 pounds per square foot.

$$R = 0.08 (A - 150) \quad \text{(Equation 16-23)}$$

$$\text{For SI: } R = 0.861 (A - 13.94)$$

Such reduction shall not exceed the smallest of:

1. 40 percent for horizontal members;
2. 60 percent for vertical members; or
3. R as determined by the following equation.

$$R = 23.1 (1 + D/L_o) \quad \text{(Equation 16-24)}$$

where:

A = Area of floor supported by the member, square feet (m<sup>2</sup>).

D = Dead load per square foot (m<sup>2</sup>) of area supported.

L<sub>o</sub> = Unreduced live load per square foot (m<sup>2</sup>) of area supported.

R = Reduction in percent.

**1607.14 Fire truck loading.** If fire department access requires travel over a structure or loading of a structure by fire department vehicles, the structure shall be analyzed for the three load cases indicated below. Structural members shall be designed for the most severe case. The fire vehicle geometry is shown in Figure 1607.14.

1. Basic Load Case. The front axle load shall be 21,130 pounds (10,565 pounds per tire) with a tire contact area of 12 in. x 13 in. The load on each rear axle shall be 25,700 pounds (12,850 pounds per tire) with a tire contact

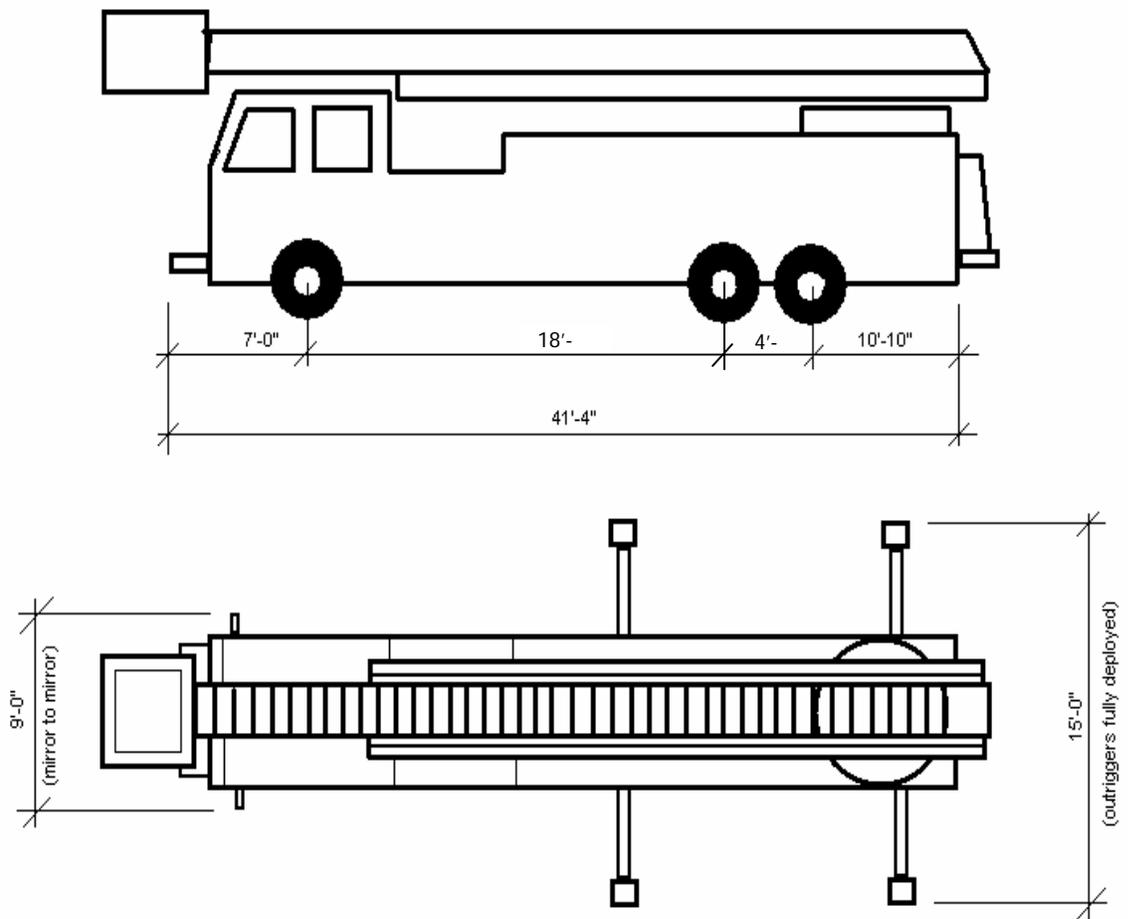
area of 14 in. x 16 in. Impact and longitudinal forces imparted by the vehicle loads shall be in accordance with the latest edition of AASHTO standards.

2. Static Load Case A. A load of 43,200 pounds on one outrigger. The contact area of each outrigger is 24 in. x 24 in. The load is to be located so as to produce the maximum stress in the member(s) being analyzed when applied according to the geometry of Figure 1607.14.
3. Static Load Case B. A load of 28,600 pounds on each of two adjacent outriggers (total load is 57,200 pounds). The contact area of each outrigger is 24 in. x 24 in. The load is to be located so as to produce the maximum stress in the member(s) being analyzed when applied according to the geometry of Figure 1607.14.

The Fire Prevention Bureau shall determine the area around any building or structure for which fire access is required and the provisions of this section are applicable.

**Figure 1607.14**

2001 Pierce, Ladder 1 and Ladder 8



## SECTION 1612 FLOOD LOADS

**1612.1 General.** Within flood hazard areas as established in Section 1612.3, (*Establishment of flood hazard areas*) all new construction of buildings, and alterations to buildings and structures, structures and portions of buildings and structures, including substantial improvements and restoration of substantial damage to buildings and structures, shall be designed and constructed to resist the effects of flood hazards and flood loads. All elevation requirements noted in this ordinance shall be documented using the Elevation Certificate, FEMA 81-31, and shall be certified by a registered professional engineer, surveyor, or architect, and shall be submitted to the Floodplain Administrator.

**1612.2 Definitions.** The following words and terms shall, for the purposes of this section, have the meanings shown herein.

**BASE FLOOD.** A flood having a 1-percent chance of being equaled or exceeded in any given year (100-year flood).

**BASE FLOOD ELEVATION.** The elevation of the base flood, including wave height, relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM).

**BASEMENT.** The portion of a building having its floor subgrade (below ground level) on all sides.

**DESIGN FLOOD.** The flood associated with an area with a flood plain subject to a 1-percent or greater chance of flooding in any year (100-year flood) based on projected full development in accordance with the City of Austin Drainage Criteria Manual.

**DESIGN FLOOD ELEVATION.** The elevation of the “design flood” relative to the City of Austin vertical datum standard.

**DRY FLOODPROOFING.** A combination of design modifications that results in a building or structure, including the attendant utility and sanitary facilities, being water tight with walls substantially impermeable to the passage of water and with structural components having the capacity to resist loads as identified in ASCE 7.

**EXISTING CONSTRUCTION.** Any buildings and structures for which the “start of construction” commenced before September 2, 1981. “Existing construction” is also referred to as “existing structures.”

**EXISTING STRUCTURE.** See “Existing construction.”

**FLOOD or FLOODING.** A general and temporary condition of partial or complete inundation of normally dry land from:

1. the overflow of inland waters; or

2. the unusual and rapid accumulation or runoff of surface waters from any source.

**FLOOD DAMAGE-RESISTANT MATERIALS.** Any construction material capable of withstanding direct and prolonged contact with floodwaters without sustaining any damage that requires more than cosmetic repair.

**FLOOD HAZARD AREA.** The greater of the following two areas:

1. an area within a flood plain subject to a 1-percent or greater chance of flooding in any year (100-year flood); or
2. an area with a flood plain subject to a 1-percent or greater chance of flooding in any year (100-year flood) based on projected full development in accordance with the City of Austin Drainage Criteria Manual.

**FLOOD INSURANCE RATE MAP (FIRM).** An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

**FLOOD INSURANCE STUDY.** The official report provided by the Federal Emergency Management Agency containing the Flood Insurance Rate Map (FIRM), the Flood Boundary Map, the water surface elevation of the base flood and supporting technical data.

**FLOODWAY.** The channel of the river, creek or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. An area with a flood plain subject to a 4-percent or greater chance of flooding in any year (25-year flood) based on projected full development in accordance with the City of Austin Drainage Criteria Manual.

**LOWEST FLOOR.** The floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the structure in violation of this section.

**NEW CONSTRUCTION.** Structures for which the start of construction commenced on or after September 2, 1981, and includes any subsequent improvements to such structures and improvements to all existing construction.

**REGULATORY FLOOD DATUM** means an established plane of reference from which elevations and depth of flooding may be determined for specific locations of the floodplain. It is the water level of the design flood plus a freeboard factor of one foot. Design flood plus freeboard equals Regulatory Flood Datum.

**SPECIAL FLOOD HAZARD AREA.** The land area subject to flood hazards and shown on a Flood Insurance Rate Map or other flood hazard map as Zone A, AE, A1-30, A99, AR, AO, AH, V, VO, VE or V1-30.

**START OF CONSTRUCTION.** The date of permit issuance for new construction and substantial improvements to existing structures, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvement is within 180 days after the date of issuance. The actual start of construction means the first placement of permanent construction of a building (including a manufactured home) on a site, such as the pouring of a slab or footings, installation of pilings or construction of columns. Permanent construction does not include land preparation (such as clearing, excavation, grading or filling), the installation of streets or walkways, excavation for a basement, footings, piers or foundations, the erection of temporary forms or the installation of accessory buildings such as garages or sheds not occupied as dwelling units or not part of the main building. For a substantial improvement, the actual “start of construction” means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

**SUBSTANTIAL DAMAGE.** Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

**SUBSTANTIAL IMPROVEMENT.** For the purpose of determining compliance with the flood hazard management provisions of this code, substantial improvement means any repair, alteration, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the current market value of the structure before the improvement or repair is started or, if the structure has been damaged and is being restored, before the damage occurred. The cost used in the substantial improvement determination shall be cumulative cost of all previous additions or improvements for a specific building or structure occurring during the immediate 10-year period. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:

1. any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions;
2. any alteration of a historic structure provided that the alteration will not preclude the structure’s continued designation as a historic structure; or
3. an aesthetic improvement if the value of the improvement does not exceed 10 percent of the current market value of the building or structure.

**1612.3 Establishment of flood hazard areas.** Flood hazard areas are established to include the following:

1. the flood hazard areas identified by the Federal Emergency Management Agency in a scientific and engineering report entitled, "The Flood Insurance Study for Austin, Texas," dated September 26, 2008, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps (FIRM and FBFM) and related supporting data along with any amendments or revisions thereto are hereby adopted by reference and declared to be a part of this section; and
2. the 100-year and 25-year floodplains based on projected full development as specified in the Austin City Code and Drainage Criteria Manual are adopted by reference and declared to be part of this section.

**1612.4 Design and construction.** The design and construction of buildings and structures, and additions and alterations to buildings and structures located in flood hazard areas, shall be in accordance with ASCE 24, Flood Resistant Design and Construction.

**1612.4.1 Freeboard.** A minimum freeboard of one (1) foot shall be added where the design flood elevation or other elevation requirements are specified.

**1612.4.2 Provisions of Safe Refuge.**

1. Buildings or structures constructed in the flood hazard area where the ground surface is below the design flood elevation, or where flood water velocities at the building may exceed five feet per second, shall be provided with an enclosed refuge space one (1) foot or more above the design flood elevation of sufficient area to provide for the occupancy load with a minimum of 12 square feet per person. The refuge space shall be provided to an exterior platform and stairway not less than three feet wide.
2. Existing buildings and structures in flood hazard areas which are enlarged, extended, or altered, or where a change of use or occupancy is made, shall conform to the requirements of Subsection 1.
3. No floor level or portion of a building or structure that is lower than one (1) foot above the design flood elevation, regardless of the structure or space classification, shall be used residentially, or for storage of any property, materials, or equipment that might constitute a safety hazard when contacted by flood waters.

**1612.4.3 Means of Egress.** Normal access to the building shall be by direct connection with an area that is a minimum of one (1) foot above the design flood elevation, unless otherwise approved by the building official.

**1612.5 Flood hazard documentation.** The following documentation shall be prepared and sealed by a registered design professional and submitted to the building official:

1. for construction in flood hazard areas:
  - 1.1. the elevation of the lowest floor, including basement, as required by the lowest floor elevation inspection in Section 110.3.5 (*Lowest floor elevation*);
  - 1.2. for fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.6.1.1, ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.6.2, ASCE 24; and
  - 1.3. for dry flood-proofed nonresidential buildings, construction documents shall include a statement that the dry floodproofing is designed in accordance with ASCE 24.

**1704.1.1 Statement of special inspections.** The permit applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge in accordance with Section 107.1 (*General*) as a condition for permit issuance. This statement shall include a complete list of materials and work requiring special inspections by this section and the inspections to be performed. The owner or owner's agent shall submit, for the building official's review, a list of the individuals, agencies, or firms intended to be retained for conducting such inspections.

## **SECTION 1717 REGISTERED INDUSTRIAL PLANT**

**Section 1717.1 Definition.** A registered industrial plant is one or more buildings registered with the building official under Section 1717.3 (*Application and fee*) used for manufacturing, processing, research and development, education, health care or service that requires specialized buildings, utilities, and equipment.

**Section 1717.2 Requirements.** The following requirements apply to a registered industrial plant:

1. A registered industrial plant may not have less than 100,000 square feet of floor area in a building or buildings at locations within the city limits and used for manufacturing, processing, research and development, or service that requires specialized building, utilities, and equipment and where no fewer than 200 persons are employed.

2. A registered industrial plant must employ full time personnel for the operation and maintenance of buildings, utilities, and equipment; and must comply with all requirements of this code.
3. The owner of a registered industrial plant must designate a full time employee (the "responsible official") who is responsible for ensuring compliance with all code provisions enforced by the building official. The responsible official must be an engineer registered in the State of Texas or a person approved by the building official.

**Section 1717.3 Application and fee.** An applicant for registration under this section must file an application on a form required by the building official. The application fee is refunded if the application is denied. The application must include both the name of the person with the authority to act for and on behalf of the owner of the plant, and the name of the person proposed by the applicant to be the responsible official under this section.

**Exception:** A registered industrial plant may include leased buildings if both the entire building is leased by the owner of the plant and the maintenance and operation of the leased building is under the control of the responsible official.

The building official shall provide written notice to the applicant if the application is denied or disapproved pending receipt of additional information. The notice must include a statement of the building official's reasons for denying or disapproving the application under this section.

A registration under this section expires on December 31 of the year it is approved. The registration may be renewed on or before December 31 for a one year period by payment of a renewal fee at a rate of \$550 per 100,000 square feet of floor area of buildings registered under this section.

**Section 1717.4 Exemption from plan review and permit fees.** The owner of a registered industrial plant is not required to obtain a permit otherwise required by this code if the owner complies with Section 1717.5 (*Work reports and inspections*) and the work:

1. does not alter a bearing wall or other structural elements;
2. does not require a change to an exit system;
3. does not alter fire-resistive construction;
4. is performed on a building or structure for which a certificate of occupancy for the existing occupancy had been issued by the building official;
5. does not alter natural gas piping or medical gas piping systems;

6. does not alter hazardous production material (HPM) supply or waste piping in areas of the building not currently classified as an H occupancy;
7. does not remove, relocate, replace, or install a backflow prevention device;
8. does not increase the existing square footage of a building;
9. otherwise complies with all other applicable provisions of this title; and
10. is performed by licensed contractors under the registered industrial plant provisions of the Plumbing Code, Electrical Code or Mechanical Code.

**Section 1717.5 Work reports and inspections.** A brief description of all work performed under this section must be maintained by the responsible official and must be available to the building official during periodic inspections. The building official shall inspect work performed under this section at least every six months.

**Section 1717.6 Change of responsible official.** If the responsible official leaves the full-time employment of the registrant, an acting responsible official who is qualified under Section 1717.2 (*Requirements*) shall be designated by the registrant not later than seven days after the employee leaves full-time employment fewer than seven days notice to the building official. An acting responsible official may serve for a period not to exceed 45 days. If a new responsible official is not designated within the 45 day period, registration under this section will be suspended until a new responsible official is designated.

**Section 1717.7 Revocation or termination of registration.** The building official may suspend or revoke a registration under this section if the registrant fails to comply with any of the requirements of Section 1717 (*Registered Industrial Plant*) or with any requirement of an applicable code with respect to work performed under these sections. A suspension or revocation is not effective until the building official has provided written notice to the registrant of the suspension or revocation. The notice shall include a statement of the building official's reasons for the action. A registrant may terminate its registration by delivering written notice of termination to the building official.

## **SECTION 1811 EARTH RETENTION SYSTEMS**

**1811.1 Tieback anchors and soil and rock nails.** Tieback anchors and soil and rock nails that are allowed in the public right-of-way as components of earth retention systems as provided in Section 3202.1.4 (*Earth retention system components*) shall comply with Sections 1813.1.1 (*Depth of tiebacks anchors and soil and rock nails*) through 1813.1.3 (*Length of tiebacks anchors and soil and rock nails*).

**1811.1.1 Depth of tieback anchors and soil and rock nails.** At the right-of-way line, tieback anchors and soil and rock anchors must be at least 6 feet (1829 mm) below the elevation of the adjacent street curb.

**1811.1.2 Separation distance from buried utilities.** Tieback anchors and soil and rock nails must be below and at least five feet (1524 mm) away from the nearest outside surface of any existing or planned buried utility in the public right-of-way.

**1811.1.3 Length of tieback anchors and soil and rock nails.** Tieback anchors and soil and rock nails that extend beyond the center of the public right-of-way are prohibited.

**2108.4 ACI 530/ASCE 5/TMS402, Section 3.1.7.2.2.** Modify Section 3.1.7.2.2 as follows:

**3.1.7.2.2 In plane bending** – For masonry subjected to in-plane loads, the modulus of rupture,  $f_r$ , normal and parallel to the bed joints shall be taken from Table 3.1.7.2.1. For grouted stack bond masonry, tension parallel to the bed joints shall be assumed to be resisted only by the continuous horizontal grout section.

**3102.1 General.** The provisions of this section shall apply to air-supported, air-inflated, membrane-covered cable and membrane-covered frame structures, collectively known as membrane structures separated by at least 20 feet (6096 mm) from any building as specified in International Fire Code (IFC) Section 2403.8.2 (*Location*) and erected for a period of 180 days or longer. The provisions of this section also apply to membrane structures separated by less than 20 feet from any building and erected for a period of 90 days or longer. Those erected for a shorter period of time shall comply with the International Fire Code. Membrane structures covering water storage facilities, water clarifiers, water treatment plants, sewage treatment plants, greenhouses and similar facilities not used for human occupancy, are required to meet only the requirements of Sections 3102.3.1 (*Membrane and interior liner material*) and 3102.7 (*Engineering design*). Membrane structures erected on a building, balcony, deck or other structure for any period of time shall comply with this section.

**3103.5 Portable classrooms.** Portable classroom buildings may be moved into or within this jurisdiction or within a public school district without conforming to the currently adopted Energy Code.

**3103.6 Moved residential buildings.** Residential buildings or structures moved into or within the City's zoning jurisdiction shall be sited in compliance with applicable provisions of Title 25 of the City Code. Foundations of relocated residential buildings or structures must comply with the provisions of this code for new buildings or structures. All other building elements must comply with the requirements of the International Residential Code.

**3103.7 Moved non-residential buildings.** Non-residential buildings moved into or within the City's zoning jurisdiction must comply with the provisions of this code for new buildings or structures.

**3109.3 Public swimming pools.** Public swimming pools shall be enclosed as per the Texas Department of State Health Services for Public Swimming Pools and Spas.

### **3111 AERIAL PASSAGEWAYS**

**3111.1 Defined.** An aerial passageway is a structure located over an alley or street connecting two buildings on opposite sides of the alley or street.

**3111.2 Requirements.** An aerial passageway shall comply with this section.

1. The structure shall be used for access only and not for storage or occupancy.
2. The structure shall be constructed entirely of non-combustible materials.
3. Self closing Class A doors shall be placed at each end of the passageway.
4. If the structure interferes with any public utility facilities, all costs associated with relocation and remediation shall be borne by the Owner.
5. No electric, gas, or water shall be attached to or be permitted to cross on or in the aerial passageway. Telephone and other communication utilities may be allowed subject to the execution of a license a license agreement.
6. Except as otherwise provided in the section, a minimum clearance of 17.5 feet above the surface of the alley or street is required. The building official may allow a height that is less than 17.5 feet but not less than 16.5 feet if he determines that the lower height will result in an equivalent installation.
7. A license agreement required by Chapter 14-11 is executed.

**3201.1 Scope.** The provisions of this chapter shall govern the encroachment of structures into the public right-of-way, including components of earth retention systems used to facilitate below-grade construction of a building or structure.

**3202.1 Encroachments below grade.** Encroachments below grade shall comply with Sections 3202.1.1 (*Structural support*) through 3202.1.4 (*Earth retention system components*).

**3202.1.4 Earth retention system components.** Components of earth retention systems that are required for structural support of a building or structure are prohibited in the public right-of-way. Components of earth retention systems that are needed only during construction of the below-grade portion of a building or structure are subject to the following conditions:

1. Approval of the Director of the Public Works Department is required before construction of earth retention system components in public right-of-way commences.
2. All components of an earth retention system are prohibited in the public right-of-way except for (1) tieback anchors that are part of a soldier pile and lagging system; (2) tieback anchors that are part of a diaphragm or slurry wall system; (3) tieback anchors that are part of a sheet pile wall system; (4) tieback anchors that are part of a secant wall system; and (5) soil or rock nails that are part of a nail wall.
3. Tieback anchors or soil or rock nails that are necessary as functional components of the earth retention system for longer than 12 months are prohibited in the public right-of-way.
4. Tieback anchors and soil and rock nails allowed in the public right-of-way must be designed according to the criteria in Section 1813 (*Earth Retention Systems*).

## CHAPTER 34 EXISTING STRUCTURES

(A) The International Existing Building Code, 2009 edition, published by the International Code Council is adopted and incorporated into this section with deletions and amendments in Subsections (B) and (C).

(B) The following provisions of the 2009 International Existing Building Code are deleted:

Sec. 103	Sec. 105.1.1	Sec. 105.1.2	Sec. 105.3
Sec. 105.3.2	Sec. 105.5	Sec. 106.2.3	Sec. 106.2.5
Sec. 109.3	Sec. 109.3.1	Sec. 109.3.2	Sec. 109.3.3
Sec. 109.3.4	Sec. 109.3.5	Sec. 109.3.6	Sec. 109.3.7
Sec. 109.3.8	Sec. 109.3.9	Sec. 111.3	Sec. 112

(C) The following provisions are local amendments to the 2009 International Existing Building Code. Each provision in this section is substitute for the identically numbered provision deleted by Section (B) or is an addition to the 2009 International Existing Building Code.

**103 Code official.** The City Manager shall appoint a code official to administer and interpret this code. The code official may appoint one or more deputy code officials.

**105.3 Application for permit.** To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the department of building safety for that purpose. Such application shall:

1. Identify and describe the work to be covered by the permit for which the application is made.
2. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
3. Indicate the use and occupancy for which the proposed work is intended.
4. Be accompanied by construction documents and other information as required in Section 106.3 (*Examination of documents*).
5. State the valuation of the proposed work.
6. Be signed by the applicant, or the applicant's authorized agent.
7. Give such other data and information as required by the code official.
8. Trench protection. An application must include certification by a registered professional engineer that trench safety systems have been designed in accordance with state law and OSHA standards.

**105.5 Time Limitation on Application; Permit Expiration and Reactivation.** Time limits on permit applications and requirements for permit expiration and reactivation, including a review fee for expired permits, are set forth in Chapter 25-12, Article 13 (*Administration of Technical Codes*).

**105.8 Transfer of permit.** The code official is authorized to establish a building permit transfer policy.

**106.2.2.1 Fire protection at penetrations.** Deferred submittal shop drawings and schedules that are submitted shall indicate the fire protective assemblies proposed for installation at all penetrations through fire and smoke construction in accordance with Sections 712 (*Penetrations*) and 713 (*Fire-Resistant Joint Systems*) of the 2009 International Building Code.

**106.2.3 Means of Egress.** The construction documents shall show in sufficient detail the location, construction, size and character of all portions of means of egress in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, as applicable in Section 101.2 (*Scope*) of the 2009 International Building Code and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in every room or space that is part of an assembly occupancy.

**106.2.5 Site plan.** The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. For a building or structure involving below-grade construction, the site plan shall show the location of proposed earth retention system components allowed under Section 3202.1.4 (*Earth Retention System Components*) of the 2009 International Building Code. The code official is authorized to waive or modify the requirement of the site plan when the application for permit is for alteration or repair or when otherwise warranted.

**107.5 Temporary earth retention systems.** Temporary earth retention system components used to facilitate below-grade construction of a building or structure shall conform to Sections 1813 (*Earth Retention Systems*) and Section 3202.1.4 (*Earth retention system components*) of the 2009 International Building Code.

**108.7 Plan review fees.** An applicant must pay a plan review fee, adopted by separate ordinance when plans and specifications are submitted for review under Section 106 (*Construction Documents*). The code official shall compute the building plan review fees using the total value of all construction work for which the permit is issued as well as the value of all finish work, painting, roofing, electrical, plumbing, heating, air conditioning, elevators, fire-extinguishing systems, and other permanent equipment. The code official shall charge an additional plan review fee if plans are incomplete or changed so as to require additional plan review. The plan review fees referenced in this section are in addition to the permit fees referenced in Section 108.1 (*Payment of fees*).

**109.3 Required inspections.** The code official, upon notification, shall make the inspections set forth in Sections 109.3.1 (*Building pre-construction inspection*) through 109.3.12 (*Final inspection*).

**109.3.1 Building pre-construction inspection.** This is the first inspection conducted. The inspector verifies the permits that were issued for work at a site and meets with the contractor or owner at the site to review plans and identify potential issues. The inspector notifies the contractor of the inspector's work hours, identifies required inspections, and leaves a green sign-off tag for future inspections.

**109.3.2 Layout Inspection.** A layout inspection shall be made after all foundation forms have been erected and are in place, but before any concrete is placed.

**109.3.3 Footing and foundation inspection.** Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in

place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C 94, the concrete need not be on the job.

**109.3.4 Concrete slab and under-floor inspection.** Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

**109.3.5 Lowest floor elevation.** In flood hazard areas, upon placement of the lowest floor, including the basement, and prior to further vertical construction, the elevation certification required in Section 1612.5 (*Flood hazard documentation*) of the 2009 International Building Code shall be submitted to the code official.

**109.3.6 Frame inspection.** Framing inspections shall be made after the roof deck or sheathing, all framing, fireblocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are approved.

**109.3.7 Lath and gypsum board inspection.** Lath and gypsum board inspections shall be made after lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or gypsum board joints and fasteners are taped and finished.

**109.3.8 Fire-resistant penetrations.** Protection of joints and penetrations in fire-resistance-rated assemblies shall not be concealed from view until inspected and approved.

**109.3.9 Energy efficiency inspections.** Inspections shall be made to determine compliance with the energy efficiency requirements of the Energy Code, as adopted by Chapter 25-12, Article 12 (*Energy Code*), and shall include, but not be limited to, inspections for: envelope insulation R and U values, fenestration U value, duct system R value, and HVAC and water-heating equipment efficiency.

**109.3.10 Other inspections.** In addition to the inspections specified above, the building official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the code official.

**109.3.11 Special inspections.** For special inspections, see Section 1704 (*Special Inspections*) of the 2009 International Building Code.

**109.3.12 Final inspection.** The final inspection shall be made after all work required by the building permit is completed.

**110.5 Maintenance of records.** The building owner, or his authorized agent, must maintain a copy of the certificate of occupancy on the premises and provide it to an authorized official on request.

**111.3 Authority to disconnect service utilities.** The code official shall have the authority to authorize disconnection of utility service to the building, structure, or service system regulated by this code and the codes referenced under this section.

**111.3.1 Circumstances for which utilities may be disconnected.** The code official may disconnect utilities if the code official determines that:

1. disconnection is necessary to eliminate an immediate hazard to life or property;
2. an owner or occupant is in violation of a stop work order;
3. electrical work has been installed without a permit;
4. plumbing or gas piping has been installed without a permit; or
5. development does not comply with the land development regulations.

**111.3.2 Notice.** This section prescribes notice requirements for disconnection of utilities.

**111.3.2.1 Disconnection because of an immediate threat to life or property.** If disconnection of utilities is necessary to eliminate an immediate hazard to life, the code official shall notify the serving utility and whenever possible, the owner and occupant of the building, structure, or service system of the decision prior to taking any action. If not notified prior to disconnecting, the owner or occupant of the building, structure or service system shall be notified in writing, by certified mail, return receipt requested, as soon as practical thereafter.

**111.3.2.2 Disconnection for a reason other than an immediate threat to life or property.** If the disconnection of utilities is for a reason other than to eliminate an immediate hazard to life, the code official shall give notice according to this section. Notice shall first be provided for the violation in accordance with the applicable section of Title 25 (*Land Development*). The notice of violation shall include a statement that the code official may authorize the disconnection of utilities if the violation is not cured within the timeframe established in the notice of violation. If the owner or occupant fails to comply with the notice of violation, the code official may issue a notice to the owner and occupant stating that utilities to the property will be disconnected not less than one week after the date that the notice is mailed. The notice must identify each utility that will be disconnected.

## **SECTION 112 BUILDING AND FIRE CODE BOARD OF APPEALS**

Regulations regarding the Building and Fire Code Board of Appeals are found in Chapter 2-1 of the City Code.

## **APPENDIX G FLOOD-RESISTANT CONSTRUCTION**

The provisions contained in this appendix are mandatory.

### **SECTION G100 STATUTORY AUTHORIZATION**

As a home-rule city, the City of Austin has the responsibility and power to adopt regulations designed to minimize flood losses. The Legislature of the State of Texas has in Sections 16.3145 and 16.315 of the Texas Water Code authorized local government units to adopt regulations designed to minimize flood losses.

### **SECTION G101 ADMINISTRATION**

**G101.1 Purpose.** The purpose of this appendix is to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific flood hazard areas through the establishment of comprehensive regulations for management of flood hazard areas designed to:

1. Prevent unnecessary disruption of commerce, access and public service during times of flooding.
2. Manage the alteration of natural flood plains, stream channels and shorelines.
3. Manage filling, grading, dredging and other development which may increase flood damage or erosion potential.
4. Prevent or regulate the construction of flood barriers which will divert floodwaters or which can increase flood hazards.
5. Contribute to improved construction techniques in the flood plain.
6. Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities.
7. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction.

**G101.2 Objectives.** The objectives of this appendix are to protect human life, minimize the expenditure of public money for flood control projects, minimize the need for rescue and relief efforts associated with flooding, minimize prolonged business interruption, minimize damage to public facilities and utilities, help maintain a stable tax base by providing for the sound use and development of flood-prone areas, contribute to

improved construction techniques in the flood plain and ensure that potential owners and occupants are notified that property is within flood hazard areas.

**G101.3 Scope.** The provisions of this appendix shall apply to all proposed development in a flood hazard area established in Section 1612 (*Flood Loads*) of this code.

**G101.4 Violations.** Any violation of a provision of this appendix, or failure to comply with a permit or variance issued pursuant to this appendix or any requirement of this appendix, shall be handled in accordance with Section 114 (*Violations*).

## **SECTION G102 APPLICABILITY**

**G102.1 General.** This appendix, in conjunction with the Building Code, provides minimum requirements for development located in flood hazard areas, including the subdivision of land, installation of utilities, placement and replacement of manufactured homes, new construction and repair, reconstruction, rehabilitation, or additions to new construction and substantial improvement of existing buildings and structures, including restoration after damage.

**G102.1.1 Abrogation and greater restrictions.** This appendix is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this appendix and another city code provision, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

**G102.2 Establishment of flood hazard areas.** Flood hazard areas are established in Section 1612.3 (*Establishment of flood hazard areas*).

### **G102.3. Nonconforming Uses.**

A structure, or the use of a structure or premises, which was lawful before the adoption of the Building Code, but which does not conform with the requirements of these regulations, may be continued subject to the following conditions:

1. No such use shall be expanded, changed, enlarged, or altered in a way which increases its nonconformity.
2. No substantial improvement of the structure shall be made unless the structure is changed to conform to these regulations.
3. If a nonconforming use is discontinued for a period of 90 days, any future use of the building or premises shall conform to these regulations.
4. Any nonconforming use or structure which is destroyed by means, including floods, to an extent of 50 percent or more of its market value, shall not be reconstructed except in conformance with the provisions of these regulations.

## **SECTION G103 POWERS AND DUTIES**

**G103.1 Permit applications.** The building official shall review all permit applications to determine whether proposed development sites will be reasonably safe from flooding. If a proposed development site is in a flood hazard area, all site development activities, including grading, filling, utility installation and drainage modification, and all new construction and substantial improvements (including the placement of prefabricated buildings and manufactured homes) shall, at a minimum, be designed and constructed with methods, practices and materials that minimize flood damage and that are in accordance with this code and ASCE 24.

**G103.2 Other permits.** It shall be the responsibility of the building official to assure that approval of a proposed development shall not be given until proof that necessary permits have been granted by federal or state agencies having jurisdiction over such development.

**G103.3 Determination of design flood elevations.** If design flood elevations are not specified, the building official is authorized to require the applicant to:

1. Obtain, review and reasonably utilize data available from a federal, state or other source, or
2. Determine the design flood elevation in accordance with the 100-year floodplain based on projected full development in accordance with the City of Austin Drainage Criteria Manual. Such analyses shall be performed and sealed by a Professional Engineer licensed by the State of Texas. Studies, analyses and computations shall be submitted in sufficient detail to allow review and approval by the building official. The accuracy of data submitted for such determination shall be the responsibility of the applicant.

**G103.4 Activities in riverine flood hazard areas.** In riverine situations, the building official shall not permit any new construction, substantial improvement or other development, including fill, unless the applicant demonstrates that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the design flood elevation at any point that results in additional adverse flooding on other property.

**G103.5 Floodway encroachment.** Prior to issuing a permit for any floodway encroachment, including fill, new construction, substantial improvements and other development or land-disturbing activity, the building official shall require submission of a certification by a Professional Engineer licensed by the State of Texas, along with supporting technical data in accordance with the City of Austin Drainage Criteria Manual, that demonstrates that such development will not cause any increase of the level of the design flood.

**G103.5.1 Floodway revisions.** A floodway encroachment that increases the level of the design flood may be considered for a variance only if the applicant has applied for a conditional Flood Insurance Rate Map (FIRM) revision and has received the approval of the Federal Emergency Management Agency (FEMA).

**G103.6 Watercourse alteration.** Prior to issuing a permit for any alteration or relocation of any watercourse, the building official shall require the applicant to provide notification of the proposal to the appropriate authorities of all affected adjacent government jurisdictions, as well as appropriate state agencies. A copy of the notification shall be maintained in the permit records and submitted to FEMA.

**G103.6.1 Engineering analysis.** The building official shall require submission of an engineering analysis in accordance with the City of Austin Drainage Criteria Manual performed and sealed by a Professional Engineer licensed by the State of Texas which demonstrates that the flood-carrying capacity of the altered or relocated portion of the watercourse will not be decreased. Such watercourses shall be maintained in a manner which preserves the channel's flood-carrying capacity.

**G103.8 Records.** The building official shall maintain a permanent record of all permits issued in flood hazard areas, including copies of inspection reports and certifications required in Section 1612 (*Flood Loads*).

## **SECTION G104 PERMITS**

**G104.1 Required.** Any person, owner or authorized agent who intends to conduct any development in a flood hazard area shall first make application to the building official and shall obtain the required permit.

**G104.2 Application for permit.** The applicant shall file an application in writing on a form furnished by the building official. Such application shall:

1. Identify and describe the development to be covered by the permit.
2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitely locate the site.
3. Include a site plan showing the delineation of flood hazard areas, floodway boundaries, flood zones, design flood elevations, ground elevations, proposed lowest floor elevation, proposed fill and excavation and drainage patterns and facilities.
4. Indicate the use and occupancy for which the proposed development is intended.
5. Be accompanied by construction documents, grading and filling plans and other information deemed appropriate by the building official.

6. State the valuation of the proposed work.
7. Be signed by the applicant or the applicant's authorized agent.

**G104.3 Validity of permit.** The issuance of a permit under this appendix shall not be construed to be a permit for, or approval of, any violation of this appendix or any other ordinance of the jurisdiction. The issuance of a permit based on submitted documents and information shall not prevent the building official from requiring the correction of errors. The building official is authorized to prevent occupancy or use of a structure or site which is in violation of this appendix or other ordinances of the City of Austin.

**G104.4 Time Limitation on Application; Permit Expiration and Reactivation.** Time limits on permit applications and requirements for permit expiration and reactivation, including a review fee for expired permits, are set forth in Chapter 25-12, Article 13 (*Administration of Technical Codes*).

**G104.5 Suspension or revocation.** The building official is authorized to suspend or revoke a permit issued under this appendix wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or code of the City of Austin.

## **SECTION G105 VARIANCES**

**G105.1 General.** The City Council shall decide requests for variances from the floodplain regulations in this code and City Code Chapter 25-7 (*Drainage*) after conducting a public hearing. The City Council shall base its determination on technical justifications, and has the right to attach such conditions to variances as it deems necessary to further the purposes and objectives of this appendix and Section 1612 (*Flood Loads*).

**G105.2 Records.** The building official shall maintain a permanent record of all variance actions, including justification for their issuance.

**G105.3 Historic structures.** A variance may be issued for the repair or rehabilitation of a historic structure upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure, and the variance is the minimum necessary to preserve the historic character and design of the structure.

**Exception:** Within flood hazard areas, historic structures that are not:

- a. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places; or
- b. Determined by the Secretary of the U.S. Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district; or

- c. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

**G105.4 Functionally dependent facilities.** A variance may be issued for the construction or substantial improvement of a functionally dependent facility provided the criteria in Section 1612.1 (*General*) are met and the variance is the minimum necessary to allow the construction or substantial improvement, and that all due consideration has been given to methods and materials that minimize flood damages during the design flood and create no additional threats to public safety.

**G105.5 Restrictions.** The City Council shall not issue a variance for any proposed development in a floodway if any increase in flood levels would result during the design flood discharge.

**G105.6 Considerations.** In reviewing applications for variances, the City Council shall consider all relevant factors, including technical evaluations, other portions of this appendix, and each of the following:

1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage.
2. The danger to life and property due to flooding or erosion damage.
3. The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners.
4. The importance of the services provided by the proposed development to the community.
5. The availability of alternate locations for the proposed development that are not subject to flooding or erosion.
6. The compatibility of the proposed development with existing and anticipated development.
7. The relationship of the proposed development to the comprehensive plan and flood plain management program for that area.
8. The safety of access to the property in times of flood for ordinary and emergency vehicles.
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.
10. The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

**G105.7 Conditions for issuance.** Variances shall only be issued by the City Council upon:

1. A technical showing of good and sufficient cause based on the unique characteristics of the size, configuration or topography of the site;
2. A determination that failure to grant the variance would result in exceptional hardship by rendering the lot undevelopable;
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws or ordinances;
4. A determination that the variance is the minimum necessary, considering the flood hazard, to afford relief; and
5. Notification to the applicant in writing over the signature of the building official that the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance, and that such construction below the base flood level increases risks to life and property.

## **SECTION G201 DEFINITIONS**

**G201.1 General.** The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

### **G201.2 Definitions.**

**DEVELOPMENT.** Any man-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, temporary or permanent storage of materials, mining, dredging, filling, grading, paving, excavations, operations and other land disturbing activities.

**FUNCTIONALLY DEPENDENT FACILITY.** A facility which cannot be used for its intended purpose unless it is located or carried out in close proximity to water, such as a docking or port facility necessary for the loading or unloading of cargo or passengers, shipbuilding or ship repair. The term does not include long-term storage, manufacture, sales or service facilities.

**MANUFACTURED HOME.** A structure that is transportable in one or more sections, built on a permanent chassis, designed for use with or without a permanent foundation when attached to the required utilities, and constructed to the Federal Mobile Home Construction and Safety Standards and rules and regulations promulgated by the U.S. Department of Housing and Urban Development. The term also includes mobile homes,

park trailers, travel trailers and similar transportable structures that are placed on a site for 180 consecutive days or longer.

**MANUFACTURED HOME PARK OR SUBDIVISION.** A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

**RECREATIONAL VEHICLE.** A vehicle that is built on a single chassis, 400 square feet (37.16 m<sup>2</sup>) or less when measured at the largest horizontal projection, designed to be self-propelled or permanently towable by a light-duty truck, and designed primarily not for use as a permanent dwelling but, as temporary living quarters for recreational, camping, travel or seasonal use. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect-type utilities and security devices and has no permanently attached additions.

**VARIANCE.** A grant of relief from the requirements of this section which permits construction in a manner otherwise prohibited by this section where specific enforcement would result in unnecessary hardship.

**VIOLATION.** A development that is not fully compliant with this appendix or Section 1612 (*Flood Loads*), as applicable.

## **SECTION G301 SUBDIVISIONS**

**G301.1 General.** Any subdivision proposal, including proposals for manufactured home parks and subdivisions, or other proposed new development in a flood hazard area shall be reviewed to assure that:

1. All such proposals are consistent with the need to minimize flood damage;
2. All public utilities and facilities, such as sewer, gas, electric and water systems are located and constructed to minimize or eliminate flood damage; and
3. Adequate drainage is provided to reduce exposure to flood hazards.

**G301.2 Subdivision requirements.** The following requirements shall apply in the case of any proposed subdivision, including proposals for manufactured home parks and subdivisions, any portion of which lies within a flood hazard area:

1. The flood hazard area, including floodways, as appropriate, shall be delineated on tentative and final subdivision plats;
2. Design flood elevations shall be shown on tentative and final subdivision plats;
3. Residential building lots shall be provided with adequate buildable area outside the floodway; and

4. The design criteria for utilities and facilities set forth in this appendix, Section 1612 of ASCE 24, the City of Austin Drainage Criteria Manual, and applicable FEMA design criteria shall be met.

## **SECTION G401 SITE IMPROVEMENT**

**G401.1 Development in floodways.** Development or land disturbing activity shall not be authorized in the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed and sealed by a Professional Engineer licensed by the State of Texas in accordance with the City of Austin Drainage Criteria Manual that the proposed encroachment will not result in any increase in the level of the design flood.

**G401.2 Sewer facilities.** All new or replaced sanitary sewer facilities, private sewage treatment plants (including all pumping stations and collector systems) and on-site waste disposal systems shall be designed in accordance with Chapter 8, ASCE 24, to minimize or eliminate infiltration of floodwaters into the facilities and discharge from the facilities into floodwaters, or impairment of the facilities and systems.

**G401.3 Water facilities.** All new replacement water facilities shall be designed in accordance with the provisions of Chapter 8, ASCE 24, to minimize or eliminate infiltration of floodwaters into the systems.

**G401.4 Storm drainage.** Storm drainage shall be designed to convey the flow of surface waters to minimize or eliminate damage to persons or property.

**G401.5 Streets and sidewalks.** Streets and sidewalks shall be designed to minimize potential for increasing or aggravating flood levels.

## **SECTION G501 MANUFACTURED HOMES**

**G501.1 Elevation.** All new and replacement manufactured homes to be placed or substantially improved in a flood hazard area shall be elevated such that the lowest floor of the manufactured home is elevated to a minimum of one (1) foot above the design flood elevation. Elevation certification required by Section 1612.5 (*Flood hazard documentation*) shall be submitted to the building official.

**G501.2 Foundations.** All new and replacement manufactured homes, including substantial improvement of existing manufactured homes, shall be placed on permanent, reinforced foundations that are designed in accordance with Section 1612 (*Flood Loads*).

**G501.3 Anchoring.** All new and replacement manufactured homes to be placed or substantially improved in a flood hazard area shall be installed using methods and practices which minimize flood damage. Manufactured homes shall be securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement. Methods of anchoring are authorized to include, but are not limited to, use of

over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces.

## **SECTION G601 RECREATIONAL VEHICLES**

**G601.1 Placement prohibited.** The placement of recreational vehicles shall not be authorized in floodways.

**G601.2 Temporary placement.** Recreational vehicles in flood hazard areas shall be fully licensed and ready for highway use, and shall be placed on a site for less than 180 consecutive days.

**G601.3 Permanent placement.** Recreational vehicles that are not fully licensed and ready for highway use, or that are to be placed on a site for more than 180 consecutive days, shall meet the requirements of Section G501 for manufactured homes.

## **SECTION G701 TANKS**

**G701.1 Underground tanks.** Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

**Above-ground tanks.** Above-ground tanks in flood hazard areas shall be elevated to or above the design flood elevation or shall be anchored or otherwise designed and constructed to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

**Tank inlets and vents.** In flood hazard areas, tank inlets, fill openings, outlets and vents shall be:

1. At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood.
2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

## **SECTION G702 REFERENCED STANDARDS**

ASCE 24–98	Flood Resistance Design And Construction	G103.1 G401.3, G401.4
HUD 24 CFR	Manufactured Home	G201
Part 3280–94	Construction and Safety Standards, 1994	

**PART 2.** City Code Chapter 25-12, Article 13 (*Administration of Technical Codes*) is amended to add new Sections 25-12-266, 25-12-267, 25-12-268, 25-12-269, and 25-12-270 to read as follows:

**§ 25-12-266 TIME LIMITATION OF APPLICATION.**

An application for a permit for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless a permit has been issued; except that the building official is authorized to grant one extension of time for an additional period not to exceed 180 days. The extension shall be requested in writing before the application expires and justifiable cause demonstrated.

**§ 25-12-267 EXPIRATION.**

Except as provided in Section 25-12-268 (*Extension*) and Section 25-12-269 (*Reactivation*), a permit expires on the 181<sup>st</sup> day:

1. after the date that the permit is issued, if the project has received no inspections as required under this code; or
2. after the date of the last inspection obtained for the project.

**§ 25-12-268 EXTENSION.**

Upon written request submitted prior to the expiration date, the building official may grant a one-time extension for a period not to exceed 180 days. Except as provided in Section 25-12-269 (*Reactivation*), a permit expires on the 181<sup>st</sup> after the extension is granted if the project has received no inspections as required under this code.

**§ 25-12-269 REACTIVATION.**

1. The building official may reactivate a permit for a project that has received no inspections for a period of more than 180-days in accordance with the following requirements:
  - a. An application to reactivate a permit must be submitted on a form provided by the building official, along with a reactivation fee established by separate ordinance.
  - b. The application must include evidence demonstrating that substantial work required to complete the project was commenced in the 180-day period prior to the expiration date provided for under Section 25-12-267 (*Expiration*). The evidence, which must be in a form approved by the building official, may include receipts or invoices for work performed on the project,

photographs of work performed on the project, or other evidence acceptable to the building official.

2. A permit that is reactivated in accordance with this section expires on the 181<sup>st</sup> day after the date that the permit is reactivated if the project has received no inspections as required under this code.
3. No more than one reactivation may be approved for projects subject to the requirements of Section 1.2 of Chapter 25-2, Subchapter F (*Residential Design and Compatibility Standards*).

**§ 25-12-270 REVIEW FEE FOR EXPIRED PERMITS.**

An applicant for a permit under this chapter must pay an expired permit review fee, established by separate ordinance, if the applicant has obtained one or more expired permits that have not been either reactivated in accordance with the requirements of Section 25-12-269 (*Reactivation*) or withdrawn by the property owner, in writing, on a form provided by the building official.

**PART 3.** This ordinance takes effect on July 8, 2010.

**PASSED AND APPROVED**

\_\_\_\_\_, 2010      §  
   §  
   §  
\_\_\_\_\_  
Lee Leffingwell  
Mayor

**APPROVED:** \_\_\_\_\_  
David Allan Smith  
City Attorney

**ATTEST:** \_\_\_\_\_  
Shirley A. Gentry  
City Clerk