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2009

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2009 International Building Code®

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PREFACE

Introduction

Internationally, code officials recognize the need for a modern, up-to-date building code addressing the design and installation of building systems through requirements emphasizing performance. The *International Building Code*®, in this 2009 edition, is designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small.

This comprehensive building code establishes minimum regulations for building systems using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new building designs. This 2009 edition is fully compatible with all the *International Codes*® (I-Codes®) published by the International Code Council (ICC)®, including the *International Energy Conservation Code*®, *International Existing Building Code*®, *International Fire Code*®, *International Fuel Gas Code*®, *International Mechanical Code*®, *ICC Performance Code*®, *International Plumbing Code*®, *International Private Sewage Disposal Code*®, *International Property Maintenance Code*®, *International Residential Code*®, *International Wildland-Urban Interface Code*™ and *International Zoning Code*®.

The *International Building Code* provisions provide many benefits, among which is the model code development process that offers an international forum for building professionals to discuss performance and prescriptive code requirements. This forum provides an excellent arena to debate proposed revisions. This model code also encourages international consistency in the application of provisions.

Development

The first edition of the *International Building Code* (2000) was the culmination of an effort initiated in 1997 by the ICC. This included five drafting subcommittees appointed by ICC and consisting of representatives of the three statutory members of the International Code Council at that time, including: Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI). The intent was to draft a comprehensive set of regulations for building systems consistent with and inclusive of the scope of the existing model codes. Technical content of the latest model codes promulgated by BOCA, ICBO and SBCCI was utilized as the basis for the development, followed by public hearings in 1997, 1998 and 1999 to consider proposed changes. This 2009 edition presents the code as originally issued, with changes reflected in the 2003 and 2006 editions and further changes approved through the ICC Code Development Process through 2008. A new edition such as this is promulgated every 3 years.

This code is founded on principles intended to establish provisions consistent with the scope of a building code that adequately protects public health, safety and welfare; provisions that do not unnecessarily increase construction costs; provisions that do not restrict the use of new materials, products or methods of construction; and provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction.

Adoption

The *International Building Code* is available for adoption and use by jurisdictions internationally. Its use within a governmental jurisdiction is intended to be accomplished through adoption by reference in accordance with proceedings establishing the jurisdiction's laws. At the time of adoption, jurisdictions should insert the appropriate information in provisions requiring specific local information, such as the name of the adopting jurisdiction. These locations are shown in bracketed words in small capital letters in the code and in the sample ordinance. The sample adoption ordinance on page xv addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

Maintenance

The *International Building Code* is kept up to date through the review of proposed changes submitted by code enforcing officials, industry representatives, design professionals and other interested parties. Proposed changes are carefully considered through an open code development process in which all interested and affected parties may participate.

The contents of this work are subject to change both through the Code Development Cycles and the governmental body that enacts the code into law. For more information regarding the code development process, contact the Code and Standard Development Department of the International Code Council.

While the development procedure of the *International Building Code* assures the highest degree of care, ICC, its members and those participating in the development of this code do not accept any liability resulting from compliance or noncompliance with the provisions because ICC does not have the power or authority to police or enforce compliance with the contents of this code. Only the governmental body that enacts the code into law has such authority.

Letter Designations in Front of Section Numbers

In each code development cycle, proposed changes to the code are considered at the Code Development Hearings by the applicable ICC Code Development Committee, whose action constitutes a recommendation to the voting membership for final action on the proposed change. Proposed changes to a code section that has a number beginning with a letter in brackets are considered by a different code development committee. For example, proposed changes to code sections that have [F] in front of them (e.g., [F] 903.1.1.1) are considered by the ICC Fire Code Development Committee at the code development hearings.

The content of sections in this code that begin with a letter designation are maintained by another code development committee in accordance with the following:

[E] = International Energy Conservation Code Development Committee;

[EB] = International Existing Building Code Development Committee;

[F] = International Fire Code Development Committee;

[FG] = International Fuel Gas Code Development Committee;

[M] = International Mechanical Code Development Committee; and

[P] = International Plumbing Code Development Committee.

Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2006 edition. Deletion indicators in the form of an arrow (➡) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.

Chapter 7 user note: Chapter 7 of the code has been reorganized from the 2006 edition as a result of an approved code change proposal. This proposal renumbered what was Section 714 in the 2006 edition to Section 704 in this edition, which in turn resulted in renumbering Sections 704 through 713 in the 2006 edition to Sections 705 through 714 in this edition. Marginal markings are included at each section number but have not been included to reflect the subsection renumbering.

Coordination between the International Building and Fire Codes

Because the coordination of technical provisions is one of the benefits of adopting the ICC family of model codes, users will find the ICC codes to be a very flexible set of model documents. To accomplish this flexibility some technical provisions are duplicated in some of the model code documents. While the International Codes are provided as a comprehensive set of model codes for the built environment, documents are occasionally adopted as a stand-alone regulation. When one of the model documents is adopted as the basis of a stand-alone code, that code should provide a complete package of requirements with enforcement assigned to the entity for which the adoption is being made.

The model codes can also be adopted as a family of complimentary codes. When adopted together there should be no conflict of any of the technical provisions. When multiple model codes are adopted in a jurisdiction it is important for the adopting authority to evaluate the provisions in each code document and determine how and by which agency(ies) they will be enforced. It is important, therefore, to understand that where technical provisions are duplicated in multiple model documents that enforcement duties must be clearly assigned by the local adopting jurisdiction. ICC remains committed to providing state-of-the-art model code documents that, when adopted locally, will reduce the cost to government of code adoption and enforcement and protect the public health, safety and welfare.

Italicized Terms

Selected terms set forth in Chapter 2, Definitions, are italicized where they appear in code text (except those in Sections 1903 through 1908 where italics indicate provisions that differ from ACI 318). Such terms are not italicized where the definition set forth in Chapter 2 does not impart the intended meaning in the use of the term. The terms selected have definitions which the user should read carefully to facilitate better understanding of the code.

Effective Use of the International Building Code

The *International Building Code*® (IBC®) is a model code that provides minimum requirements to safeguard the public health, safety and general welfare of the occupants of new and existing buildings and structures. The IBC is fully compatible with the ICC family of codes, including: *International Energy Conservation Code*® (IECC®), *International Existing Building Code*® (IEBC®), *International Fire Code*® (IFC®), *International Fuel Gas Code*® (IFGC®), *International Mechanical Code*® (IMC®), *ICC Performance Code*® (ICCPC®), *International Plumbing Code*® (IPC®), *International Private Sewage Disposal Code*® (IPSDC®), *International Property Maintenance Code*® (IPMC®), *International Residential Code*® (IRC®), *International Wildland-Urban Interface Code*™ (IWUIC®) and *International Zoning Code*® (IZC®).

The IBC addresses structural strength, means of egress, sanitation, adequate lighting and ventilation, accessibility, energy conservation and life safety in regards to new and existing buildings, facilities and systems. The codes are promulgated on a 3-year cycle to allow for new construction methods and technologies to be incorporated into the codes. Alternative materials, designs and methods not specifically addressed in the code can be approved by the code official where the proposed materials, designs or methods comply with the intent of the provisions of the code (see Section 104.11).

The IBC applies to all occupancies, including one- and two-family dwellings and townhouses that are not within the scope of the IRC. The IRC is referenced for coverage of detached one- and two-family dwellings and townhouses as defined in the Exception to Section 101.2 and the definition for “townhouse” in Chapter 2. The IBC applies to all types of buildings and structures unless exempted. Work exempted from permits is listed in Section 105.2.

Arrangement and Format of the 2009 IBC

Before applying the requirements of the IBC, it is beneficial to understand its arrangement and format. The IBC, like other codes published by ICC, is arranged and organized to follow sequential steps that generally occur during a plan review or inspection.

Chapters	Subjects
1–2	Administration and definitions
3	Use and occupancy classifications
4, 31	Special requirements for specific occupancies or elements
5–6	Height and area limitations based on type of construction
7–9	Fire resistance and protection requirements
10	Requirements for evacuation
11	Specific requirements to allow use and access to a building for persons with disabilities
12–13, 27–30	Building systems, such as lighting, HVAC, plumbing fixtures, elevators
14–26	Structural components—performance and stability
32	Encroachment outside of property lines
33	Safeguards during construction
34	Existing building allowances
35	Referenced standards
Appendices A–K	Appendices

The IBC requirements for high hazard, fire-resistance-rated construction, interior finish, fire protection systems, means of egress, emergency and standby power, and temporary structures are directly correlated with the requirements of the IFC. The following chapters/sections of the IBC are correlated to the IFC:

IBC Chapter/Section	IFC Chapter/Section	Subject
Sections 307, 414, 415	Chapters 27–44	High-hazard requirements
Chapter 7	Chapter 7	Fire-resistance-rated construction
Chapter 8	Chapter 8	Interior finish, decorative materials and furnishings
Chapter 9	Chapter 9	Fire protection systems
Chapter 10	Chapter 10	Means of egress
Chapter 27	Section 604	Standby and emergency power
Section 3103	Chapter 24	Temporary structures

The IBC requirements for smoke control systems, and smoke and fire dampers are directly correlated to the requirements of the IMC. IBC Chapter 28 is a reference to the IMC and the IFGC for chimney, fireplaces and barbeques, and all aspects of mechanical systems. The following chapters/sections of the IBC are correlated with the IMC:

IBC Chapter/Section	IMC Chapter/Section	Subject
Section 716	Section 607	Smoke and fire dampers
Section 909	Section 513	Smoke control

The IBC requirements for plumbing fixtures and toilet rooms are directly correlated to the requirements of the IPC. The following chapters/sections of the IBC are correlated with the IPC:

IBC Chapter/Section	IPC Chapter/Section	Subject
Chapter 29	Chapters 3 & 4	Plumbing fixtures and facilities

The following is a chapter-by-chapter synopsis of the scope and intent of the provisions of the *International Building Code*.

Chapter 1 Scope and Administration. Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts, Part 1—Scope and Application (Sections 101–102) and Part 2—Administration and Enforcement (Sections 103–116). Section 101 identifies which buildings and structures come under its purview and references other ICC codes as applicable. Standards and codes are scoped to the extent referenced (see Section 102.4).

The building code is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the jurisdiction having authority and also establish the rights and privileges of the design professional, contractor and property owner.

Chapter 2 Definitions. All terms that are defined in the code are listed alphabetically in Chapter 2. Terms are defined in Chapter 2 or there is a reference to the section where the definition is located. While a defined term may be listed in one chapter or another, the meaning is applicable throughout the code.

Codes are technical documents and every word, term and punctuation mark can impact the meaning of the code text and the intended results. The code often uses terms that have a unique meaning in the code and the code meaning can differ substantially from the ordinarily understood meaning of the term as used outside of the code. Where understanding of a term’s definition is especially key to or necessary for understanding a particular code provision, the term is shown in *italics* wherever it appears in the code.

This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Definitions are deemed to be of prime importance in establishing the meaning and intent of the code text that uses the terms. The user of the code should be familiar with and consult this chapter because the definitions are essential to the correct interpretation of the code and because the user may not be aware that a term is defined.

Chapter 3 Use and Occupancy Classification. Chapter 3 provides for the classification of buildings, structures and parts thereof based on the purpose or purposes for which they are used. Section 302 identifies the groups into which all buildings, structures and parts thereof must be classified. Sections 303 through 312 identify the occupancy characteristics of each group classification. In some sections, specific group classifications having requirements in common are collectively organized such that one term applies to all. For example, Groups A-1, A-2, A-3, A-4 and A-5 are individual groups for assembly-type buildings. The general term “Group A,” however, includes each of these individual groups. Other groups include Business (B), Educational (E), Factory (F-1, F-2), High Hazard (H-1, H-2, H-3, H-4, H-5), Institutional (I-1, I-2, I-3, I-4), Mercantile (M), Residential (R-1, R-2, R-3, R-4), Storage (S-1, S-2) and Utility (U). In some occupancies, the smaller number means a higher hazard, but that is not always the case.

Defining the use of the buildings is very important as it sets the tone for the remaining chapters of the code. Occupancy works with the height, area and construction type requirements in Chapters 5 and 6, as well as the special provisions in Chapter 4, to determine “equivalent risk,” or providing a reasonable level of protection or life safety for building occupants. The determination of equivalent risk involves three interdependent considerations: (1) the level of fire hazard associated with the specific occupancy of the facility; (2) the reduction of fire hazard by limiting the floor area(s) and the height of the building based on the fuel load (combustible contents and burnable building components) and (3) the level of overall fire resistance provided by the type of construction used for the building. The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type.

Occupancy classification also plays a key part in organizing and prescribing the appropriate protection measures. As such, threshold requirements for fire protection and means of egress systems are based on occupancy classification (see Chapters 9 and 10). Other sections of the code also contain requirements respective to the classification of building groups. For example, Section 706 deals with requirements for fire wall fire-resistance ratings that are tied to the occupancy classification of a building and Section 803.9 contains interior finish requirements that are dependent upon the occupancy classification. The use of the space, rather than the occupancy of the building is utilized for determining occupant loading (Section 1004) and live loading (Section 1607).

Chapter 4 Special Detailed Requirements Based On Use and Occupancy. Chapter 4 contains the requirements for protecting special uses and occupancies, which are supplemental to the remainder of the code. Chapter 4 contains provisions that may alter requirements found elsewhere in the code; however, the general requirements of the code still apply unless modified within the chapter. For example, the height and area limitations established in Chapter 5 apply to all special occupancies unless Chapter 4 contains height and area limitations. In this case, the limitations in Chapter 4 supersede those in other sections. An example of this is the height and area limitations for open parking garages given in Section 406.3.5, which supersede the limitations given in Section 503.

In some instances, it may not be necessary to apply the provisions of Chapter 4. For example, if a covered mall building complies with the provisions of the code for Group M, Section 402 does not apply; however, other sections that deal with a use, process or operation must be applied to that specific occupancy, such as stages and platforms, special amusement buildings and hazardous materials (Sections 410, 411 and 414).

The chapter includes requirements for buildings and conditions that apply to one or more groups, such as high-rise buildings, underground buildings or atriums. Special uses may also imply specific occupancies and operations, such as for Group H, hazardous materials, application of flammable finishes, drying rooms, organic coatings and combustible storage or hydrogen cutoff rooms, all of which are coordinated with the IFC. Unique consideration is taken for special use areas, such as covered mall buildings, motor-vehicle-related occupancies, special amusement buildings and aircraft-related occupancies. Special facilities within other occupancies are considered, such as stages and platforms, motion picture projection rooms and storm shelters. Finally, in order that the overall package of protection features can be easily understood, unique considerations for specific occupancies are addressed: Groups I-1, I-2, I-3, R-1, R-2, R-3 (by definition R-4), ambulatory care facilities and live/work units.

Chapter 5 General Building Heights and Areas. Chapter 5 contains the provisions that regulate the minimum type of construction for area limits and height limits based on the occupancy of the building. Height and area increases (including allowances for basements, mezzanines and equipment platforms) are permitted based on open frontage for fire department access, and the type of sprinkler protection provided and separation (Sections 503–506, 509). These thresholds are reduced for buildings over three stories in height in accordance with Section 506.4.1. Provisions include the protection and/or separation of incidental accessory occupancies (Table 508.2.5), accessory occupancies (Sections 508.2) and mixed uses in the same building (Sections 506.5, 508.3, 508.4 and 509). Unlimited area buildings are permitted in certain occupancies when they meet special provisions (Section 507).

Table 503 is the keystone in setting thresholds for building size based on the building's use and the materials with which it is constructed. If one then looks at Table 503, the relationship among group classification, allowable heights and areas and types of construction becomes apparent. Respective to each group classification, the greater the fire-resistance rating of structural elements, as represented by the type of construction, the greater the floor area and height allowances. The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type.

Chapter 6 Types of Construction. The interdependence of these fire safety considerations can be seen by first looking at Tables 601 and 602, which show the fire-resistance ratings of the principal structural elements comprising a building in relation to the five classifications for types of construction. Type I construction is the classification that generally requires the highest fire-resistance ratings for structural elements, whereas Type V construction, which is designated as a combustible type of construction, generally requires the least amount of fire-resistance-rated structural elements. The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type. Section 603 includes a list of combustible elements that can be part of a noncombustible building (Types I and II construction).

Chapter 7 Fire and Smoke Protection Features. The provisions of Chapter 7 present the fundamental concepts of fire performance that all buildings are expected to achieve in some form. This chapter identifies the acceptable materials, techniques and methods which proposed construction can be designed and evaluated against to determine a building's ability to limit the impact of fire. The fire-resistance-rated construction requirements within Chapter 7 provide passive resistance to the spread and effects of fire. Types of separations addressed include fire walls, fire barriers, fire partitions, horizontal assemblies, smoke barriers and smoke partitions. A fire produces heat that can weaken structural components and smoke products that cause property damage and place occupants at risk. The requirements of Chapter 7 work in unison with height and area requirements (Chapter 5), active fire detection and suppression systems (Chapter 9) and occupant egress requirements (Chapter 10) to contain a fire should it occur while helping ensure occupants are able to safely exit.

Chapter 8 Interior Finishes. This chapter contains the performance requirements for controlling fire growth within buildings by restricting interior finish and decorative materials. Past fire experience has shown that interior finish and decorative materials are key elements in the development and spread of fire. The provisions of Chapter 8 require materials used as interior finishes and decorations to meet certain flame-spread index or flame-propagation criteria based on the relative fire hazard associated with the occupancy. As smoke is also a hazard associated with fire, this chapter contains limits on the smoke development characteristics of interior finishes. The performance of the material is evaluated based on test standards.

Chapter 9 Fire Protection Systems. Chapter 9 prescribes the minimum requirements for active systems of fire protection equipment to perform the following functions: detect a fire; alert the occupants or fire department of a fire emergency; and control smoke and control or extinguish the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the *International Fire Code* (IFC); however, the IFC Chapter 9 also contains periodic testing criteria that are not contained in the IBC. In addition, the special fire protection system requirements based on use and occupancy found in IBC Chapter 4 are duplicated in IFC Chapter 9 as a user convenience.

Chapter 10 Means of Egress. The general criteria set forth in Chapter 10 regulating the design of the means of egress are established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. It addresses all portions of the egress system (i.e., exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics also are specified for the components that will permit their safe use without special knowledge or effort. The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Chapter 10 of the IBC is duplicated in Chapter 10 of the IFC; however, the IFC contains two additional sections on the means of egress system in existing buildings.

Chapter 11 Accessibility. Chapter 11 contains provisions that set forth requirements for accessibility of buildings and their associated sites and facilities for people with physical disabilities. The fundamental philosophy of the code on the subject of accessibility is that everything is required to be accessible. This is reflected in the basic applicability requirement (see Section 1103.1). The code's scoping requirements then address the conditions under which accessibility is not required in terms of exceptions to this general mandate. While the IBC contains scoping provisions for accessibility (e.g., what, where and how many), ICC/ANSI A117.1, *Accessible and Usable Buildings and Facilities*, is the referenced standard for the technical provisions (i.e., how).

There are many accessibility issues that not only benefit people with disabilities, but also provide a tangible benefit to people without disabilities. This type of requirement can be set forth in the code as generally applicable without necessarily identifying it

specifically as an accessibility-related issue. Such a requirement would then be considered as having been “mainstreamed.” For example, visible alarms are located in Chapter 9 and ramp requirements are addressed in Chapter 10.

Accessibility criteria for existing buildings are addressed in Section 3411. Appendix E is supplemental information included in the code to address accessibility for items in the new Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (ADA/ABA) that were not typically enforceable through the standard traditional building code enforcement approach system (e.g., beds, room signage). The *International Residential Code* (IRC) references Chapter 11 for accessibility provisions; therefore, this chapter may be applicable to housing covered under the IRC.

Chapter 12 Interior Environment. Chapter 12 provides minimum standards for the interior environment of a building. The standards address the minimum sizes of spaces, minimum temperature levels, and minimum light and ventilation levels. The collection of requirements addresses limiting sound transmission through walls, ventilation of attic spaces and under floor spaces (crawl spaces). Finally, the chapter provides minimum standards for walls, partitions and floors to resist water intrusion and damage in rooms such as toilet and shower facilities, where water is frequently in use.

Chapter 13 Energy Efficiency. The purpose of Chapter 13 is to provide minimum design requirements that will promote efficient utilization of energy in buildings. The requirements are directed toward the design of building envelopes with adequate thermal resistance and low air leakage, and toward the design and selection of mechanical, water heating, electrical and illumination systems that promote effective use of depletable energy resources. For the specifics of these criteria, Chapter 13 requires design and construction in compliance with the *International Energy Conservation Code* (IECC).

Chapter 14 Exterior Walls. This chapter addresses requirements for exterior walls of buildings. Minimum standards for wall covering materials, installation of wall coverings and the ability of the wall to provide weather protection are provided. This chapter also requires exterior walls that are close to lot lines, or that are bearing walls for certain types of construction, to comply with the minimum fire-resistance ratings specified in Chapters 6 and 7. The installation of each type of wall covering, be it wood, masonry, vinyl, metal composite material or an exterior insulation and finish system, is critical to its long-term performance in protecting the interior of the building from the elements and the spread of fire. Special attention to the use of combustible materials on the exterior of the building such as balconies, eaves, decks and architectural trim is the focus of Section 1406.

Chapter 15 Roof Assemblies and Rooftop Structures. Chapter 15 provides standards for both roof assemblies as well as structures which sit on top of the roof of buildings. The criteria address roof construction and covering which includes the weather-protective barrier at the roof and, in most circumstances, a fire-resistant barrier. The chapter is prescriptive in nature and is based on decades of experience with various traditional materials. These prescriptive rules are very important for satisfying performance of one type of roof covering or another. Section 1509 addresses rooftop structures including penthouses, tanks, towers and spires. Rooftop penthouses larger than prescribed in this chapter must be treated as a story under Chapter 5.

Chapter 16 Structural Design. Chapter 16 prescribes minimum structural loading requirements for use in the design and construction of buildings and structural components. It includes minimum design loads, as well as permitted design methodologies. Standards are provided for minimum design loads (live, dead, snow, wind, rain, flood and earthquake as well as load combinations). The application of these loads and adherence to the serviceability criteria will enhance the protection of life and property. The chapter references and relies on many nationally recognized design standards. A key standard is the American Society of Civil Engineer’s *Minimum Design Loads for Buildings and Other Structures* (ASCE 7). Structural design needs to address the conditions of the site and location. Therefore maps of rainfall, seismic, snow and wind criteria in different regions are provided.

Chapter 17 Structural Tests and Special Inspections. Chapter 17 provides a variety of procedures and criteria for testing materials and assemblies, for labeling materials and assemblies, and for special inspection of structural assemblies. This chapter expands on the requirements of Chapter 1 regarding the roles and responsibilities of the building official regarding approval of building components. It also provides additional duties and responsibilities for the owner, contractor, design professionals and special inspectors. Proper assembly of structural components, proper quality of materials used, and proper application of materials are essential to ensuring that a building, once constructed, complies with the structural and fire-resistance minimums of the code and the approved design. To determine this compliance often requires continuous or frequent inspection and testing. Chapter 17 establishes these special inspection and testing standards as well as reporting of the work to the building official.

Chapter 18 Soils and Foundations. Chapter 18 contains minimum requirements for design, construction and resistance to water intrusion of foundation systems for buildings and other structures. It provides criteria for the geotechnical and structural considerations in the selection and installation of adequate support for the loads transferred from the structure above. The uncertainties of foundation construction make it extremely difficult to address every potential failure within the text of the code. The chapter includes requirements for soils investigation and site preparation for receiving a foundation including the allowed load-bearing values for soils and for protecting the foundation from water intrusion. Section 1808 addresses the basic requirements for all foundation types. Later sections address foundation requirements that are specific to shallow foundations and deep foundations. Due care

must be exercised in the planning and design of foundation systems based on obtaining sufficient soils information, the use of accepted engineering procedures, experience and good technical judgment.

Chapter 19 Concrete. This chapter provides minimum accepted practices to the design and construction of buildings and structural components using concrete—both plain and reinforced. Chapter 19 is formatted to parallel American Concrete Institute (ACI) 318, *Building Code Requirements for Structural Concrete*. The chapter also includes references to additional standards. Structural concrete must be designed and constructed to comply with this code and all listed standards. There are specific sections of the chapter addressing concrete slabs, anchorage to concrete, shotcrete, reinforced gypsum concrete and concrete-filled pipe columns. Because of the variable properties of material and numerous design and construction options available in the uses of concrete, due care and control throughout the construction process is necessary.

Chapter 20 Aluminum. Chapter 20 contains standards for the use of aluminum in building construction. Only the structural applications of aluminum are addressed. The chapter does not address the use of aluminum in specialty products such as storefront or window framing or architectural hardware. The use of aluminum in heating, ventilating or air-conditioning systems is addressed in the *International Mechanical Code* (IMC). The chapter references national standards from the Aluminum Association for use of aluminum in building construction, AA ASM 35, *Aluminum Sheet Metal Work in Building Construction*, and AA ADM 1, *Aluminum Design Manual*. By utilizing the standards set forth, a proper application of this material can be obtained.

Chapter 21 Masonry. This chapter provides comprehensive and practical requirements for masonry construction. The provisions of Chapter 21 require minimum accepted practices and the use of standards for the design and construction of masonry structures. The provisions address: material specifications and test methods; types of wall construction; criteria for engineered and empirical designs; required details of construction including the execution of construction. Masonry design methodologies including allowable stress design, strength design and empirical design are covered by provisions of the chapter. Also addressed are masonry fireplaces and chimneys, masonry heaters and glass unit masonry. Fire-resistant construction using masonry is also required to comply with Chapter 7. Masonry foundations are also subject to the requirements of Chapter 18.

Chapter 22 Steel. Chapter 22 provides the requirements necessary for the design and construction of structural steel (including composite construction), cold-formed steel, steel joists, steel cable structures and steel storage racks. The chapter specifies appropriate design and construction standards for these types of structures. It also provides a road map of the applicable technical requirements for steel structures. Steel is a noncombustible building material commonly associated with Types I and II construction; however, it is permitted to be used in all types of construction. The code requires that materials used in the design of structural steel members conform to designated national standards. Chapter 22 is involved with the design and use of steel materials using the specifications and standards of the American Institute for Steel Construction, the American Iron and Steel Institute, the Steel Joist Institute and the American Society of Civil Engineers.

Chapter 23 Wood. This chapter provides minimum guidance for the design of buildings and structures that use wood and wood-based products in their framing and fabrication. The chapter is organized around three design methodologies: allowable stress design (ASD), load and resistance-factor design (LRFD) and conventional light-frame construction. Included in the chapter are references to design and manufacturing standards for various wood and wood-based products; general construction requirements; design criteria for lateral-force-resisting systems and specific requirements for the application of the three design methods. In general, only Type III, IV or V buildings may be constructed of wood. Accordingly Chapter 23 is referenced when the combination of the occupancy (determined in Chapter 3) and the height and area of the building (determined in Chapter 5) indicate that construction can be Type III, IV or V.

Chapter 24 Glass and Glazing. This chapter establishes regulations for glass and glazing used in buildings and structures that, when installed, are subjected to wind, snow and dead loads. Engineering and design requirements are included in the chapter. Additional structural requirements are found in Chapter 16. A second concern of this chapter is glass and glazing used in areas where it is likely to have an impact on the occupants. Section 2406 identifies hazardous locations where glazing installed must either be safety glazing or blocked to prevent human impact. Safety glazing must meet stringent standards and be appropriately marked or identified. Additional standards for glass and glazing in guards, handrails, elevator hoistways and elevator cars, and in athletic facilities are provided.

Chapter 25 Gypsum Board and Plaster. Chapter 25 contains the provisions and referenced standards that regulate the design, construction and quality of gypsum board and plaster. These represent the most common interior and exterior finish materials in the building industry. This chapter primarily addresses quality-control-related issues with regard to material specifications and installation requirements. Most products are manufactured under the control of industry standards. The building official or inspector primarily needs to verify that the appropriate product is used and properly installed for the intended use and location. While often simply used as wall and ceiling coverings, proper design and application are necessary to provide weather resistance and required fire protection for both structural and nonstructural building components.

Chapter 26 Plastic. The use of plastics in building construction and components is addressed in Chapter 26. This chapter provides standards addressing foam plastic insulation, foam plastics used as interior finish and trim, and other plastic veneers used on the

inside or outside of a building. Plastic siding is regulated by Chapter 14. Sections 2606 through 2611 address the use of light-transmitting plastics in various configurations such as walls, roof panels, skylights, signs and as glazing. Requirements for the use of fiber reinforced polymers, fiberglass reinforced polymers and reflective plastic core insulation are also contained in this chapter. Some plastics exhibit rapid flame spread and heavy smoke density characteristics when exposed to fire. Additionally, exposure to the heat generated by a fire can cause some plastics to deform, which can affect their performance. The requirements and limitations of this chapter are necessary to control the use of plastic and foam plastic products such that they do not compromise the safety of building occupants.

Chapter 27 Electrical. Since electrical systems and components are an integral part of almost all structures, it is necessary for the code to address the installation of such systems. For this purpose, Chapter 27 references the *National Electrical Code* (NEC). In addition, Section 2702 addresses emergency and standby power requirements. Such systems must comply with the *International Fire Code* (IFC) and referenced standards. This section also provides references to the various code sections requiring emergency and standby power, such as high-rise buildings and buildings containing hazardous materials.

Chapter 28 Mechanical Systems. Nearly all buildings will include mechanical systems. This chapter provides references to the *International Mechanical Code* (IMC) and the *International Fuel Gas Code* (IFGC) for the design and installation of mechanical systems. In addition, the chapter references Chapter 21 of the IBC for masonry chimneys, fireplaces and barbecues.

Chapter 29 Plumbing Systems. Chapter 29 regulates the minimum number of plumbing fixtures that must be provided for every type of building. This chapter also regulates the location of the required fixtures in various types of buildings and the construction of toilet rooms. This section requires separate facilities for males and females except for certain types of small occupancies. The regulations in this chapter come directly from Chapters 3 and 4 of the *International Plumbing Code* (IPC).

Chapter 30 Elevators and Conveying Systems. Chapter 30 provides standards for the installation of elevators into buildings. Referenced standards provide the requirements for the elevator system and mechanisms. Detailed standards are provided in the chapter for hoistway enclosures, hoistway venting and machine rooms. New provisions are added in the 2009 IBC for Fire Service Access Elevators required in high-rise buildings and for the optional choice of Occupant Evacuation Elevators (see Section 403).

Chapter 31 Special Construction. Chapter 31 contains a collection of regulations for a variety of unique structures and architectural features. Pedestrian walkways and tunnels connecting two buildings are addressed in Section 3104. Membrane and air-supported structures are addressed by Section 3102. Safeguards for swimming pool safety are found in Section 3109. Standards for temporary structures, including permit requirements are provided in Section 3103. Structures as varied as awnings, marquees, signs, telecommunication and broadcast towers and automatic vehicular gates are also addressed (see Sections 3105 through 3108 and 3110).

Chapter 32 Encroachments into the Public Right-of-way. Buildings and structures from time to time are designed to extend over a property line and into the public right-of-way. Local regulations outside of the building code usually set limits to such encroachments, and such regulations take precedence over the provisions of this chapter. Standards are provided for encroachments below grade for structural support, vaults and areaways. Encroachments above grade are divided into below 8 feet, 8 feet to 15 feet, and above 15 feet, because of headroom and vehicular height issues. This includes steps, columns, awnings, canopies, marquees, signs, windows, balconies. Similar architectural features above grade are also addressed. Pedestrian walkways must also comply with Chapter 31.

Chapter 33 Safeguards During Construction. Chapter 33 provides safety requirements during construction and demolition of buildings and structures. These requirements are intended to protect the public from injury and adjoining property from damage. In addition the chapter provides for the progressive installation and operation of exit stairways and standpipe systems during construction.

Chapter 34 Existing Structures. The provisions in Chapter 34 deal with alternative methods or reduced compliance requirements when dealing with existing building constraints. This chapter allows for a controlled departure from full compliance with the technical codes, without compromising the minimum standards for fire prevention and life safety features of the rehabilitated building. Provisions are divided by addition, alterations, repairs, change of occupancy and moved structures. There are further allowances for registered historic buildings. There are also special allowances for replacement of existing stairways, replacement of glass and accessibility requirements. The fire escape requirements in Section 3406 are consistent with the fire escape requirements in Section 1030 of the *International Fire Code* (IFC).

Section 3412, *Compliance Alternatives*, allows for existing buildings to be evaluated so as to show that alterations, while not meeting new construction requirements, will improve the current existing situation. Provisions are based on a numerical scoring system involving 18 various safety parameters and the degree of code compliance for each issue.

Chapter 34 is repeated in the *International Existing Building Code* (IEBC). Sections 3402 through 3409 are repeated as IEBC Chapter 3 and Section 3410 as Chapter 13.

Chapter 35 Referenced Standards. The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 35 contains a comprehensive list of all standards that are referenced in the code, including the appendices. The standards are part of the code to the extent of the reference to the standard (see Section 102.4). Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the building code official, contractor, designer and owner.

Chapter 35 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard. Each agency's standards are then listed in either alphabetical or numeric order based upon the standard identification. The list also contains the title of the standard; the edition (date) of the standard referenced; any addenda included as part of the ICC adoption; and the section or sections of this code that reference the standard.

Appendices. Appendices are provided in the IBC to offer optional or supplemental criteria to the provisions in the main chapters of the code. Appendices provide additional information for administration of the Department of Building Safety as well as standards not typically administered by all building departments. Appendices have the same force and effect as the first 35 chapters of the IBC only when explicitly adopted by the jurisdiction.

Appendix A Employee Qualifications. Effective administration and enforcement of the family of *International Codes* depends on the training and expertise of the personnel employed by the jurisdiction and his or her knowledge of the codes. Section 103 of the code establishes the Department of Building Safety and calls for the appointment of a building official and deputies such as plans examiners and inspectors. Appendix A provides standards for experience, training and certification for the building official and the other staff mentioned in Chapter 1.

Appendix B Board of Appeals. Section 112 of Chapter 1 requires the establishment of a board of appeals to hear appeals regarding determinations made by the building official. Appendix B provides qualification standards for members of the board as well as operational procedures of such board.

Appendix C Group U—Agricultural Buildings. Appendix C provides a more liberal set of standards for the construction of agricultural buildings, rather than strictly following the Utility building provision, reflective of their specific usage and limited occupant load. The provisions of the appendix, when adopted, allow reasonable heights and areas commensurate with the risk of agricultural buildings.

Appendix D Fire Districts. Fire districts have been a tool used to limit conflagration hazards in areas of a city with intense and concentrated development. More frequently used under the model codes which preceded the *International Building Code* (IBC), the appendix is provided to allow jurisdictions to continue the designation and use of fire districts. Fire District standards restrict certain occupancies within the district, as well as setting higher minimum construction standards.

Appendix E Supplemental Accessibility Requirements. The Architectural and Transportation Barriers Compliance Board (U.S. Access Board) has revised and updated its accessibility guidelines for buildings and facilities covered by the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA). Appendix E includes scoping requirements contained in the new ADA/ABA Accessibility Guidelines that are not in Chapter 11 and not otherwise mentioned or mainstreamed throughout the code. Items in the appendix deal with subjects not typically addressed in building codes (e.g., beds, room signage, transportation facilities).

Appendix F Rodentproofing. The provisions of this appendix are minimum mechanical methods to prevent the entry of rodents into a building. These standards, when used in conjunction with cleanliness and maintenance programs, can significantly reduce the potential of rodents invading a building.

Appendix G Flood-resistant Construction. Appendix G is intended to fulfill the flood-plain management and administrative requirements of the National Flood Insurance Program (NFIP) that are not included in the code. Communities that adopt the *International Building Code* (IBC) and Appendix G will meet the minimum requirements of NFIP as set forth in Title 44 of the Code of Federal Regulations.

Appendix H Signs. Appendix H gathers in one place the various code standards that regulate the construction and protection of outdoor signs. Whenever possible, the appendix provides standards in performance language, thus allowing the widest possible application.

Appendix I Patio Covers. Appendix I provides standards applicable to the construction and use of patio covers. It is limited in application to patio covers accessory to dwelling units. Covers of patios and other outdoor areas associated with restaurants, mercantile buildings, offices, nursing homes or other nondwelling occupancies would be subject to standards in the main code and not this appendix.

Appendix J Grading. Appendix J provides standards for the grading of properties. The appendix also provides standards for administration and enforcement of a grading program including permit and inspection requirements. Appendix J was originally

developed in the 1960s and used for many years in jurisdictions throughout the western states. It is intended to provide consistent and uniform code requirements anywhere grading is considered an issue.

Appendix K Administrative Provisions. Appendix K primarily provides administrative provisions for jurisdictions adopting and enforcing NFPA 70—the *National Electrical Code* (NEC). The provisions contained in this appendix are compatible with administrative and enforcement provisions contained in Chapter 1 of the IBC and the other *International Codes*. Annex H of NFPA 70 also contains administrative provisions for the NEC; however, some of its provisions are not compatible with IBC Chapter 1. Section K110 also contains technical provisions that are unique to this appendix and are in addition to technical standards of NFPA 70.

ORDINANCE

The *International Codes* are designed and promulgated to be adopted by reference by ordinance. Jurisdictions wishing to adopt the 2009 *International Building Code* as an enforceable regulation governing structures and premises should ensure that certain factual information is included in the adopting ordinance at the time adoption is being considered by the appropriate governmental body. The following sample adoption ordinance addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

SAMPLE ORDINANCE FOR ADOPTION OF THE INTERNATIONAL BUILDING CODE ORDINANCE NO. _____

An ordinance of the [JURISDICTION] adopting the 2009 edition of the *International Building Code*, regulating and governing the conditions and maintenance of all property, buildings and structures; by providing the standards for supplied utilities and facilities and other physical things and conditions essential to ensure that structures are safe, sanitary and fit for occupation and use; and the condemnation of buildings and structures unfit for human occupancy and use and the demolition of such structures in the [JURISDICTION]; providing for the issuance of permits and collection of fees therefor; repealing Ordinance No. _____ of the [JURISDICTION] and all other ordinances and parts of the ordinances in conflict therewith.

The [GOVERNING BODY] of the [JURISDICTION] does ordain as follows:

Section 1. That a certain document, three (3) copies of which are on file in the office of the [TITLE OF JURISDICTION'S KEEPER OF RECORDS] of [NAME OF JURISDICTION], being marked and designated as the *International Building Code*, 2009 edition, including Appendix Chapters [FILL IN THE APPENDIX CHAPTERS BEING ADOPTED] (see *International Building Code* Section 101.2.1, 2009 edition), as published by the International Code Council, be and is hereby adopted as the Building Code of the [JURISDICTION], in the State of [STATE NAME] for regulating and governing the conditions and maintenance of all property, buildings and structures; by providing the standards for supplied utilities and facilities and other physical things and conditions essential to ensure that structures are safe, sanitary and fit for occupation and use; and the condemnation of buildings and structures unfit for human occupancy and use and the demolition of such structures as herein provided; providing for the issuance of permits and collection of fees therefor; and each and all of the regulations, provisions, penalties, conditions and terms of said Building Code on file in the office of the [JURISDICTION] are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any, prescribed in Section 2 of this ordinance.

Section 2. The following sections are hereby revised:

Section 101.1. Insert: [NAME OF JURISDICTION]

Section 1612.3. Insert: [NAME OF JURISDICTION]

Section 1612.3. Insert: [DATE OF ISSUANCE]

Section 3412.2. Insert: [DATE IN ONE LOCATION]

Section 3. That Ordinance No. _____ of [JURISDICTION] entitled [FILL IN HERE THE COMPLETE TITLE OF THE ORDINANCE OR ORDINANCES IN EFFECT AT THE PRESENT TIME SO THAT THEY WILL BE REPEALED BY DEFINITE MENTION] and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

Section 4. That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The [GOVERNING BODY] hereby declares that it would have passed this ordinance, and each section, subsection, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

Section 5. That nothing in this ordinance or in the Building Code hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any cause or causes of action acquired or existing, under any act or ordinance hereby repealed as cited in Section 3 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

Section 6. That the [JURISDICTION'S KEEPER OF RECORDS] is hereby ordered and directed to cause this ordinance to be published. (An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.)

Section 7. That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect [TIME PERIOD] from and after the date of its final passage and adoption.

TABLE OF CONTENTS

<p>CHAPTER 1 SCOPE AND ADMINISTRATION..... 1</p> <p>PART 1—SCOPE AND APPLICATION..... 1</p> <p>Section</p> <p>101 General..... 1</p> <p>102 Applicability..... 1</p> <p>PART 2—ADMINISTRATION AND ENFORCEMENT..... 2</p> <p>103 Department of Building Safety..... 2</p> <p>104 Duties and Powers of Building Official..... 2</p> <p>105 Permits..... 3</p> <p>106 Floor and Roof Design Loads..... 5</p> <p>107 Submittal Documents..... 5</p> <p>108 Temporary Structures and Uses..... 6</p> <p>109 Fees..... 6</p> <p>110 Inspections..... 7</p> <p>111 Certificate of Occupancy..... 8</p> <p>112 Service Utilities..... 8</p> <p>113 Board of Appeals..... 8</p> <p>114 Violations..... 9</p> <p>115 Stop Work Order..... 9</p> <p>116 Unsafe Structures and Equipment..... 9</p> <p>CHAPTER 2 DEFINITIONS..... 11</p> <p>Section</p> <p>201 General..... 11</p> <p>202 Definitions..... 11</p> <p>CHAPTER 3 USE AND OCCUPANCY CLASSIFICATION..... 23</p> <p>Section</p> <p>301 General..... 23</p> <p>302 Classification..... 23</p> <p>303 Assembly Group A..... 23</p> <p>304 Business Group B..... 24</p> <p>305 Educational Group E..... 24</p> <p>306 Factory Group F..... 24</p> <p>307 High-hazard Group H..... 25</p> <p>308 Institutional Group I..... 33</p> <p>309 Mercantile Group M..... 34</p> <p>310 Residential Group R..... 35</p> <p>311 Storage Group S..... 35</p>	<p>312 Utility and Miscellaneous Group U..... 36</p> <p>CHAPTER 4 SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY..... 37</p> <p>Section</p> <p>401 Scope..... 37</p> <p>402 Covered Mall and Open Mall Buildings..... 37</p> <p>403 High-rise Buildings..... 40</p> <p>404 Atriums..... 43</p> <p>405 Underground Buildings..... 44</p> <p>406 Motor-vehicle-related Occupancies..... 45</p> <p>407 Group I-2..... 49</p> <p>408 Group I-3..... 50</p> <p>409 Motion Picture Projection Rooms..... 52</p> <p>410 Stages and Platforms..... 53</p> <p>411 Special Amusement Buildings..... 54</p> <p>412 Aircraft-related Occupancies..... 55</p> <p>413 Combustible Storage..... 58</p> <p>414 Hazardous Materials..... 58</p> <p>415 Groups H-1, H-2, H-3, H-4 and H-5..... 62</p> <p>416 Application of Flammable Finishes..... 74</p> <p>417 Drying Rooms..... 75</p> <p>418 Organic Coatings..... 75</p> <p>419 Live/work Units..... 75</p> <p>420 Groups I-1, R-1, R-2, R-3..... 76</p> <p>421 Hydrogen Cutoff Rooms..... 76</p> <p>422 Ambulatory Health Care Facilities..... 77</p> <p>423 Storm Shelters..... 77</p> <p>CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS..... 79</p> <p>Section</p> <p>501 General..... 79</p> <p>502 Definitions..... 79</p> <p>503 General Building Height and Area Limitations..... 79</p> <p>504 Building Height..... 79</p> <p>505 Mezzanines..... 81</p> <p>506 Building Area Modifications..... 82</p> <p>507 Unlimited Area Buildings..... 83</p> <p>508 Mixed Use and Occupancy..... 84</p> <p>509 Special Provisions..... 87</p>
--	--

TABLE OF CONTENTS

CHAPTER 6 TYPES OF CONSTRUCTION..... 89

Section

601 General 89
 602 Construction Classification 89
 603 Combustible Material in
 Type I and II Construction 91

CHAPTER 7 FIRE AND SMOKE PROTECTION FEATURES 93

Section

701 General 93
 702 Definitions 93
 703 Fire-resistance Ratings and Fire Tests 94
 704 Fire-resistance Rating of
 Structural Members 95
 705 Exterior Walls 97
 706 Fire Walls 101
 707 Fire Barriers 103
 708 Shaft Enclosures 104
 709 Fire Partitions 107
 710 Smoke Barriers 108
 711 Smoke Partitions 109
 712 Horizontal Assemblies 109
 713 Penetrations 110
 714 Fire-resistant Joint Systems 113
 715 Opening Protectives 113
 716 Ducts and Air Transfer Openings 117
 717 Concealed Spaces 121
 718 Fire-resistance Requirements for Plaster 124
 719 Thermal- and Sound-insulating Materials 124
 720 Prescriptive Fire Resistance 125
 721 Calculated Fire Resistance 125

CHAPTER 8 INTERIOR FINISHES 175

Section

801 General 175
 802 Definitions 175
 803 Wall and Ceiling Finishes 175
 804 Interior Floor Finish 178
 805 Combustible Materials in Type I
 and II Construction 178
 806 Decorative Materials and Trim 178
 807 Insulation 179
 808 Acoustical Ceiling Systems 179

CHAPTER 9 FIRE PROTECTION SYSTEMS... 181

Section

901 General 181
 902 Definitions 181
 903 Automatic Sprinkler Systems 184
 904 Alternative Automatic
 Fire-extinguishing Systems 188
 905 Standpipe Systems 190
 906 Portable Fire Extinguishers 192
 907 Fire Alarm and Detection Systems 194
 908 Emergency Alarm Systems 204
 909 Smoke Control Systems 204
 910 Smoke and Heat Vents 211
 911 Fire Command Center 213
 912 Fire Department Connections 214
 913 Fire Pumps 214
 914 Emergency Responder Safety Features 215
 915 Emergency Responder Radio Coverage 215

CHAPTER 10 MEANS OF EGRESS 217

Section

1001 Administration 217
 1002 Definitions 217
 1003 General Means of Egress 218
 1004 Occupant Load 219
 1005 Egress Width 221
 1006 Means of Egress Illumination 221
 1007 Accessible Means of Egress 222
 1008 Doors, Gates and Turnstiles 224
 1009 Stairways 230
 1010 Ramps 233
 1011 Exit Signs 234
 1012 Handrails 235
 1013 Guards 236
 1014 Exit Access 237
 1015 Exit and Exit Access Doorways 238
 1016 Exit Access Travel Distance 240
 1017 Aisles 240
 1018 Corridors 241
 1019 Egress Balconies 242
 1020 Exits 243
 1021 Number of Exits and Continuity 243
 1022 Exit Enclosures 244
 1023 Exit Passageways 245
 1024 Luminous Egress Path Markings 246

1025 Horizontal Exits 247
 1026 Exterior Exit Ramps and Stairways 248
 1027 Exit Discharge 249
 1028 Assembly 250
 1029 Emergency Escape and Rescue 254

CHAPTER 11 ACCESSIBILITY 257

Section

1101 General 257
 1102 Definitions 257
 1103 Scoping Requirements 257
 1104 Accessible Route 258
 1105 Accessible Entrances 259
 1106 Parking and Passenger Loading Facilities 260
 1107 Dwelling Units and Sleeping Units 260
 1108 Special Occupancies 264
 1109 Other Features and Facilities 266
 1110 Signage 269

CHAPTER 12 INTERIOR ENVIRONMENT 271

Section

1201 General 271
 1202 Definitions 271
 1203 Ventilation 271
 1204 Temperature Control 272
 1205 Lighting 272
 1206 Yards or Courts 273
 1207 Sound Transmission 273
 1208 Interior Space Dimensions 273
 1209 Access to Unoccupied Spaces 274
 1210 Surrounding Materials 274

CHAPTER 13 ENERGY EFFICIENCY 275

Section

1301 General 275

CHAPTER 14 EXTERIOR WALLS 277

Section

1401 General 277
 1402 Definitions 277
 1403 Performance Requirements 277
 1404 Materials 278
 1405 Installation of Wall Coverings 279
 1406 Combustible Materials on the
 Exterior Side of Exterior Walls 283
 1407 Metal Composite Materials (MCM) 284

1408 Exterior Insulation and
 Finish Systems (EIFS) 285

**CHAPTER 15 ROOF ASSEMBLIES AND
 ROOFTOP STRUCTURES 287**

Section

1501 General 287
 1502 Definitions 287
 1503 Weather Protection 287
 1504 Performance Requirements 288
 1505 Fire Classification 289
 1506 Materials 289
 1507 Requirements for Roof Coverings 290
 1508 Roof Insulation 299
 1509 Rooftop Structures 300
 1510 Reroofing 301

CHAPTER 16 STRUCTURAL DESIGN 303

Section

1601 General 303
 1602 Definitions and Notations 303
 1603 Construction Documents 304
 1604 General Design Requirements 305
 1605 Load Combinations 308
 1606 Dead Loads 309
 1607 Live Loads 309
 1608 Snow Loads 315
 1609 Wind Loads 315
 1610 Soil Lateral Loads 331
 1611 Rain Loads 332
 1612 Flood Loads 338
 1613 Earthquake Loads 340
 1614 Structural Integrity 345

**CHAPTER 17 STRUCTURAL TESTS AND
 SPECIAL INSPECTIONS 367**

Section

1701 General 367
 1702 Definitions 367
 1703 Approvals 367
 1704 Special Inspections 368
 1705 Statement of Special Inspections 379
 1706 Special Inspections for Wind Requirements 381
 1707 Special Inspections for Seismic Resistance 381
 1708 Structural Testing for Seismic Resistance 382
 1709 Contractor Responsibility 383

TABLE OF CONTENTS

1710	Structural Observations	383	CHAPTER 21 MASONRY	429
1711	Design Strengths of Materials	383	Section	
1712	Alternative Test Procedure	383	2101	General 429
1713	Test Safe Load	384	2102	Definitions and Notations 429
1714	In-situ Load Tests	384	2103	Masonry Construction Materials 432
1715	Preconstruction Load Tests	384	2104	Construction 433
1716	Material and Test Standards	385	2105	Quality Assurance 434
			2106	Seismic Design 435
			2107	Allowable Stress Design 435
			2108	Strength Design of Masonry 436
			2109	Empirical Design of Masonry 436
			2110	Glass Unit Masonry 438
			2111	Masonry Fireplaces 438
			2112	Masonry Heaters 440
			2113	Masonry Chimneys 441
			CHAPTER 22 STEEL	447
			Section	
			2201	General 447
			2202	Definitions 447
			2203	Identification and Protection of Steel for Structural Purposes 447
			2204	Connections 447
			2205	Structural Steel 447
			2206	Steel Joists 448
			2207	Steel Cable Structures 449
			2208	Steel Storage Racks 449
			2209	Cold-formed Steel 449
			2210	Cold-formed Steel Light-frame Construction . . 449
			CHAPTER 23 WOOD	451
			Section	
			2301	General 451
			2302	Definitions 451
			2303	Minimum Standards and Quality 452
			2304	General Construction Requirements 456
			2305	General Design Requirements for Lateral-force-resisting Systems 466
			2306	Allowable Stress Design 468
			2307	Load and Resistance Factor Design 469
			2308	Conventional Light-frame Construction 469
			CHAPTER 24 GLASS AND GLAZING	521
			Section	
			2401	General 521
			2402	Definitions 521
CHAPTER 18 SOILS AND FOUNDATIONS		387		
Section				
1801	General	387		
1802	Definitions	387		
1803	Geotechnical Investigations	387		
1804	Excavation, Grading and Fill	389		
1805	Dampproofing and Waterproofing	390		
1806	Presumptive Load-bearing Values of Soils	391		
1807	Foundation Walls, Retaining Walls and Embedded Posts and Poles	392		
1808	Foundations	398		
1809	Shallow Foundations	402		
1810	Deep Foundations	403		
CHAPTER 19 CONCRETE		417		
Section				
1901	General	417		
1902	Definitions	417		
1903	Specifications for Tests and Materials	417		
1904	Durability Requirements	417		
1905	Concrete Quality, Mixing and Placing	419		
1906	Formwork, Embedded Pipes and Construction Joints	420		
1907	Details of Reinforcement	420		
1908	Modifications to ACI 318	420		
1909	Structural Plain Concrete	423		
1910	Minimum Slab Provisions	423		
1911	Anchorage to Concrete—Allowable Stress Design	424		
1912	Anchorage to Concrete—Strength Design	424		
1913	Shotcrete	425		
1914	Reinforced Gypsum Concrete	426		
1915	Concrete-filled Pipe Columns	426		
CHAPTER 20 ALUMINUM		427		
Section				
2001	General	427		
2002	Materials	427		

2403 General Requirements for Glass 521
 2404 Wind, Snow, Seismic and
 Dead Loads on Glass 521
 2405 Sloped Glazing and Skylights 523
 2406 Safety Glazing 524
 2407 Glass in Handrails and Guards 526
 2408 Glazing in Athletic Facilities 526
 2409 Glass in Elevator Hoistways and
 Elevator Cars 527

**CHAPTER 25 GYPSUM BOARD
 AND PLASTER 529**

Section
 2501 General 529
 2502 Definitions 529
 2503 Inspection 529
 2504 Vertical and Horizontal Assemblies 529
 2505 Shear Wall Construction 529
 2506 Gypsum Board Materials 530
 2507 Lathing and Plastering 530
 2508 Gypsum Construction 530
 2509 Gypsum Board in Showers and
 Water Closets 531
 2510 Lathing and Furring for Cement
 Plaster (Stucco) 532
 2511 Interior Plaster 532
 2512 Exterior Plaster 533
 2513 Exposed Aggregate Plaster 533

CHAPTER 26 PLASTIC 535

Section
 2601 General 535
 2602 Definitions 535
 2603 Foam Plastic Insulation 535
 2604 Interior Finish and Trim 538
 2605 Plastic Veneer 539
 2606 Light-transmitting Plastics 539
 2607 Light-transmitting Plastic Wall Panels 540
 2608 Light-transmitting Plastic Glazing 541
 2609 Light-transmitting Plastic Roof Panels 541
 2610 Light-transmitting Plastic Skylight Glazing 542
 2611 Light-transmitting Plastic Interior Signs 542
 2612 Fiber Reinforced Polymer and
 Fiberglass-reinforced Polymer 543
 2613 Reflective Plastic Core Insulation 544

CHAPTER 27 ELECTRICAL 545

Section
 2701 General 545
 2702 Emergency and Standby Power Systems 545

CHAPTER 28 MECHANICAL SYSTEMS 547

Section
 2801 General 547

CHAPTER 29 PLUMBING SYSTEMS 549

Section
 2901 General 549
 2902 Minimum Plumbing Facilities 549
 2903 Toilet Room Requirements 552

**CHAPTER 30 ELEVATORS AND
 CONVEYING SYSTEMS 553**

Section
 3001 General 553
 3002 Hoistway Enclosures 553
 3003 Emergency Operations 553
 3004 Hoistway Venting 554
 3005 Conveying Systems 554
 3006 Machine Rooms 555
 3007 Fire Service Access Elevator 555
 3008 Occupant Evacuation Elevators 556

CHAPTER 31 SPECIAL CONSTRUCTION 559

Section
 3101 General 559
 3102 Membrane Structures 559
 3103 Temporary Structures 560
 3104 Pedestrian Walkways and Tunnels 560
 3105 Awnings and Canopies 561
 3106 Marquees 562
 3107 Signs 562
 3108 Telecommunication and Broadcast Towers 562
 3109 Swimming Pool Enclosures and
 Safety Devices 562
 3110 Automatic Vehicular Gates 563

**CHAPTER 32 ENCROACHMENTS INTO THE
 PUBLIC RIGHT-OF-WAY 565**

Section
 3201 General 565
 3202 Encroachments 565

TABLE OF CONTENTS

CHAPTER 33 SAFEGUARDS DURING CONSTRUCTION 567

Section

3301 General 567
 3302 Construction Safeguards 567
 3303 Demolition 567
 3304 Site Work 567
 3305 Sanitary 567
 3306 Protection of Pedestrians 568
 3307 Protection of Adjoining Property 569
 3308 Temporary Use of Streets, Alleys and Public Property 569
 3309 Fire Extinguishers 569
 3310 Means of Egress 569
 3311 Standpipes 569
 3312 Automatic Sprinkler System 570

CHAPTER 34 EXISTING STRUCTURES 571

Section

3401 General 571
 3402 Definitions 571
 3403 Additions 572
 3404 Alterations 572
 3405 Repairs 573
 3406 Fire Escapes 574
 3407 Glass Replacement 575
 3408 Change of Occupancy 575
 3409 Historic Buildings 575
 3410 Moved Structures 575
 3411 Accessibility for Existing Buildings 575
 3412 Compliance Alternatives 577

CHAPTER 35 REFERENCED STANDARDS 587

APPENDIX A EMPLOYEE QUALIFICATIONS 607

Section

A101 Building Official Qualifications 607
 A102 Referenced Standards 607

APPENDIX B BOARD OF APPEALS 609

Section

B101 General 609

APPENDIX C GROUP U—AGRICULTURAL BUILDINGS 611

Section

C101 General 611
 C102 Allowable Height and Area 611
 C103 Mixed Occupancies 611
 C104 Exits 611

APPENDIX D FIRE DISTRICTS 613

Section

D101 General 613
 D102 Building Restrictions 613
 D103 Changes to Buildings 614
 D104 Buildings Located Partially in the Fire District 614
 D105 Exceptions to Restrictions in Fire District 614
 D106 Referenced Standards 615

APPENDIX E SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS 617

Section

E101 General 617
 E102 Definitions 617
 E103 Accessible Route 617
 E104 Special Occupancies 617
 E105 Other Features and Facilities 618
 E106 Telephones 618
 E107 Signage 619
 E108 Bus Stops 620
 E109 Transportation Facilities and Stations 620
 E110 Airports 621
 E111 Referenced Standards 621

APPENDIX F RODENTPROOFING 623

Section

F101 General 623

APPENDIX G FLOOD-RESISTANT CONSTRUCTION 625

Section

G101 Administration 625
 G102 Applicability 625
 G103 Powers and Duties 625
 G104 Permits 626
 G105 Variances 626

G201 Definitions 627
 G301 Subdivisions 628
 G401 Site Improvement 628
 G501 Manufactured Homes 628
 G601 Recreational Vehicles 628
 G701 Tanks 629
 G801 Other Building Work 629
 G901 Temporary Structures and
 Temporary Storage 629
 G1001 Utility and Miscellaneous Group U 629
 G1101 Referenced Standards 630

APPENDIX H SIGNS 631

Section
 H101 General 631
 H102 Definitions 631
 H103 Location 631
 H104 Identification 631
 H105 Design and Construction 632
 H106 Electrical 632
 H107 Combustible Materials 632
 H108 Animated Devices 632
 H109 Ground Signs 632
 H110 Roof Signs 633
 H111 Wall Signs 633
 H112 Projecting Signs 633
 H113 Marquee Signs 634
 H114 Portable Signs 634
 H115 Referenced Standards 634

APPENDIX I PATIO COVERS 635

Section
 I101 General 635
 I102 Definitions 635
 I103 Exterior Openings 635
 I104 Structural Provisions 635

APPENDIX J GRADING 637

Section
 J101 General 637
 J102 Definitions 637
 J103 Permits Required 637
 J104 Permit Application and Submittals 637
 J105 Inspections 638
 J106 Excavations 638

J107 Fills 638
 J108 Setbacks 638
 J109 Drainage and Terracing 640
 J110 Erosion Control 640
 J111 Referenced Standards 640

APPENDIX K ADMINISTRATIVE PROVISIONS 641

Section
 K101 General 641
 K102 Applicability 641
 K103 Permits 641
 K104 Construction Documents 642
 K105 Alternative Engineered Design 642
 K106 Required Inspections 642
 K107 Prefabricated Construction 642
 K108 Testing 643
 K109 Reconnection 643
 K110 Condemning Electrical Systems 643
 K111 Electrical Provisions 643

INDEX 645

CHAPTER 1

SCOPE AND ADMINISTRATION

PART 1—SCOPE AND APPLICATION

SECTION 101 GENERAL

101.1 Title. These regulations shall be known as the *Building Code* of [NAME OF JURISDICTION], hereinafter referred to as “this code.”

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

Exception: Detached one- and two-family *dwelling*s and multiple single-family *dwelling*s (*townhouses*) not more than three *stories* above *grade plane* in height with a separate *means of egress* and their accessory structures shall comply with the *International Residential Code*.

101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

101.3 Intent. The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, *means of egress* facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

101.4 Referenced codes. The other codes listed in Sections 101.4.1 through 101.4.6 and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

101.4.1 Gas. The provisions of the *International Fuel Gas Code* shall apply to the installation of gas piping from the point of delivery, gas appliances and related accessories as covered in this code. 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* 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.

101.4.3 Plumbing. The provisions of the *International Plumbing Code* shall apply to the installation, *alteration*, repair 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 provisions of the *International Private Sewage Disposal Code* shall apply to private sewage disposal systems.

101.4.4 Property maintenance. The provisions of the *International Property Maintenance Code* shall apply to existing structures and premises; equipment and facilities; light, ventilation, space heating, sanitation, life and fire safety hazards; responsibilities of owners, operators and occupants; and occupancy of existing premises and structures.

101.4.5 Fire prevention. The provisions of the *International Fire Code* shall apply to matters affecting or relating to structures, processes and premises from the hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices; from conditions hazardous to life, property or public welfare in the occupancy of structures or premises; and from the construction, extension, repair, *alteration* or removal of fire suppression and alarm systems or fire hazards in the structure or on the premises from occupancy or operation.

101.4.6 Energy. The provisions of the *International Energy Conservation Code* shall apply to all matters governing the design and construction of buildings for energy efficiency.

SECTION 102 APPLICABILITY

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

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

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

102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

102.5 Partial invalidity. In the event that any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.