2021 International Residential Code® as Amended by the Commonwealth of Pennsylvania

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PREFACE

Introduction

The 2021 *International Residential Code® as Amended by the Commonwealth of Pennsylvania* establishes minimum requirements for one- and two family dwellings and townhouses using prescriptive provisions. It is founded on broad-based principles that make possible the use of new materials and new building designs. This 2021 edition is fully compatible with all of the International Codes® (I-Codes®) published by the International Code Council (ICC), including the *International Building Code®* (IBC®), *International Energy Conservation Code®* (IECC®), *International Existing Building Code®* (IEBC®), *International Fire Code®* (IFC®), *International Fuel Gas Code®* (IFGC®), *International Green Construction Code®* (IgCC®), *International Mechanical Code®* (IMC®), *International Plumbing Code®* (IPC®), *International Private Sewage Disposal Code®* (IPSDC®), *International Property Maintenance Code®* (IPMC®), *International Swimming Pool and Spa Code®* (ISPSC®), *International Wildland-Urban Interface Code®* (IWUIC®), *International Zoning Code®* (IZC®) and *International Code Council Performance Code®* (ICCPC®).

The I-Codes, including the IRC, are used in a variety of ways in both the public and private sectors. Most industry professionals are familiar with the I-Codes as the basis of laws and regulations in communities across the US and in other countries. However, the impact of the codes extends well beyond the regulatory arena, as they are used in a variety of nonregulatory settings, including:

- Voluntary compliance programs such as those promoting sustainability, energy efficiency and disaster resistance.
- The insurance industry, to estimate and manage risk, and as a tool in underwriting and rate decisions.
- Certification and credentialing of individuals involved in the fields of building design, construction and safety.
- Certification of building and construction-related products.
- US federal agencies, to guide construction in an array of government-owned properties.
- Facilities management.
- "Best practices" benchmarks for designers and builders, including those who are engaged in projects in jurisdictions that do not have a formal regulatory system or a governmental enforcement mechanism.
- College, university and professional school textbooks and curricula.
- Reference works related to building design and construction.

In addition to the codes themselves, the code development process brings together building professionals on a regular basis. It provides an international forum for discussion and deliberation about building design, construction methods, safety, performance requirements, technological advances and innovative products.

Development

This 2021 edition presents the code as originally issued, with changes reflected in the 2003 through 2018 editions and further changes approved by the ICC Code Development Process through 2019. Residential electrical provisions are based on the 2020 *National Electrical Code®* (NFPA 70). A new edition such as this is promulgated every 3 years.

Fuel gas provisions have been included through an agreement with the American Gas Association (AGA). Electrical provisions have been included through an agreement with the NFPA.

This code is founded on principles intended to establish provisions consistent with the scope of a residential 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.

Maintenance

The IRC is kept up to date through the review of proposed changes submitted by code enforcement 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 ICC Code Development Process reflects principles of openness, transparency, balance, due process and consensus, the principles embodied in OMB Circular A-119, which governs the federal government's use of private-sector standards. The ICC process is open to anyone; there is no cost to participate, and people can participate without travel cost through the ICC's cloud-based app, cdpAccess®. A broad cross section of interests are represented in the ICC Code Development Process. The codes, which are updated regularly, include safeguards that allow for emergency action when required for health and safety reasons.

In order to ensure that organizations with a direct and material interest in the codes have a voice in the process, the ICC has developed partnerships with key industry segments that support the ICC's important public safety mission. Some code development committee members were nominated by the following industry partners and approved by the ICC Board:

- National Association of Home Builders (NAHB)
- National Council of Structural Engineers Association (NCSEA)

The code development committees evaluate and make recommendations regarding proposed changes to the codes. Their recommendations are then subject to public comment and council-wide votes. The ICC's governmental members—public safety officials who have no financial or business interest in the outcome—cast the final votes on proposed changes.

The contents of this work are subject to change through the code development cycles and by any governmental entity that enacts the code into law. For more information regarding the code development process, contact the Codes and Standards Development Department of the ICC.

The maintenance process for the fuel gas provisions is based on the process used to maintain the IFGC, in conjunction with the AGA. The maintenance process for the electrical provisions is undertaken by the NFPA.

While the I-Code development procedure is thorough and comprehensive, the ICC, its members and those participating in the development of the codes disclaim any liability resulting from the publication or use of the I-Codes, or from compliance or noncompliance with their provisions. The ICC does not have the power or authority to police or enforce compliance with the contents of this code.

Code Development Committee Responsibilities (Letter Designations in Front of Section Numbers)

In each code development cycle, proposed changes to this code are considered at the Committee Action Hearings by the applicable International Code Development Committee as follows:

[RB] = IRC—Building Code Development Committee

[RE] = International Residential Energy Conservation Code Development Committee;

[MP] = IRC—Mechanical/Plumbing Code Development Committee

The [RE] committee is also responsible for the IECC—Residential Provisions.

For the development of the 2024 edition of the I-Codes, there will be two groups of code development committees and they will meet in separate years, as shown in the following Code Development Hearings Table.

Code change proposals submitted for IRC Chapters 1 and 3 through 10, Appendices AE, AF, AH, AJ, AK, AL, AM, AN, AO, AQ, AR, AS, AT, AU, AV and AW, and definitions designated [RB] are heard by the IRC—Building Committee during the Group B (2022) cycle code development hearing. Code change proposals submitted for Chapter 11 are heard by the International Energy Conservation Code Development Committee during the Group B (2022) cycle code development hearing. Proposed changes to all other chapters are heard by the IRC Plumbing and Mechanical Committee during the Group A (2021) code development cycle.

It is very important that anyone submitting code change proposals understand which code development committee is responsible for the section of the code that is the subject of the code change proposal. For further information on the code development committee responsibilities, please visit the ICC website at www.iccsafe.org/current-code-development-cycle.

CODE DEVELOPMENT HEARINGS

Group A Codes (Heard in 2021, Code Change Proposals Deadline: January 11, 2021)	Group B Codes (Heard in 2022, Code Change Proposals Deadline: January 10, 2022)
International Building Code – Egress (Chapters 10, 11, Appendix E) – Fire Safety (Chapters 7, 8, 9, 14, 26) – General (Chapters 2–6, 12, 27–33, Appendices A, B, C, D, K, N)	Administrative Provisions (Chapter 1 of all codes except IECC, IRC and IgCC; IBC Appendix O; the appendices titled "Board of Appeals" for all codes except IECC, IRC, IgCC, ICCPC and IZC; administrative updates to currently referenced standards; and designated definitions)
International Fire Code	**International Building Code**– Structural (Chapters 15–25, Appendices F, G, H, I, J, L, M)
International Fuel Gas Code	**International Existing Building Code**
International Mechanical Code	**International Energy Conservation Code—Commercial**
International Plumbing Code	**International Energy Conservation Code—Residential** – IECC—Residential – IRC—Energy (Chapter 11)
International Property Maintenance Code	**International Green Construction Code** (Chapter 1)
International Private Sewage Disposal Code	**International Residential Code** – IRC—Building (Chapters 1–10, Appendices AE, AF, AH, AJ, AK, AL, AM, AO, AQ, AR, AS, AT, AU, AV, AW)
International Residential Code – IRC—Mechanical (Chapters 12–23) – IRC—Plumbing (Chapters 25–33, Appendices AG, AI, AN, AP)	
International Swimming Pool and Spa Code	
International Wildland-Urban Interface Code	
International Zoning Code	

Note: Proposed changes to the ICCPC will be heard by the code development committee noted in brackets [ ] in the text of the ICCPC.

Marginal Markings

Double vertical lines within the body of the code indicate a Commonwealth of Pennsylvania amendment to the 2021 IRC. An open deletion arrow (>) in the margin identifies a Commonwealth of Pennsylvania deletion to the 2021 IRC.

Coordination of the International Codes

The coordination of technical provisions is one of the strengths of the ICC family of model codes. The codes can be used as a complete set of complementary documents, which will provide users with full integration and coordination of technical provisions. Individual codes can also be used in subsets or as stand-alone documents. To make sure that each individual code is as complete as possible, some technical provisions that are relevant to more than one subject area are duplicated in some of the model codes. This allows users maximum flexibility in their application of the I-Codes.

Italicized Terms

Terms italicized in code text, other than document titles, are defined in Chapter 2. The terms selected to be italicized have definitions that the user should read carefully to better understand the code. Where italicized, the Chapter 2 definition applies. If not italicized, common-use definitions apply.

Adoption

The ICC maintains a copyright in all of its codes and standards. Maintaining copyright allows the ICC to fund its mission through sales of books, in both print and electronic formats. The ICC welcomes adoption of its codes by jurisdictions that recognize and acknowledge the ICC's copyright in the code, and further acknowledge the substantial shared value of the public/private partnership for code development between jurisdictions and the ICC.

The ICC also recognizes the need for jurisdictions to make laws available to the public. All I-Codes and I-Standards, along with the laws of many jurisdictions, are available for free in a nondownloadable form on the ICC's website. Jurisdictions should contact the ICC at adoptions@iccsafe.org to learn how to adopt and distribute laws based on the IRC in a manner that provides necessary access, while maintaining the ICC's copyright.

To facilitate adoption, several sections of this code contain blanks for fill-in information that needs to be supplied by the adopting jurisdiction as part of the adoption legislation. For this code, please see:

Section R101.1. Insert: **[NAME OF JURISDICTION]**

Table R301.2. Jurisdictions to fill in details as directed by provisions of the code.

Section P2603.5.1. Insert: **[NUMBER OF INCHES IN TWO LOCATIONS]**

Effective Use of the 2021 International Residential Code® as Amended by Pennsylvania

The IRC was created to serve as a complete, comprehensive code regulating the construction of single-family houses, two-family houses (duplexes) and buildings consisting of three or more townhouse units. All buildings within the scope of the IRC are limited to three stories above grade plane. For example, a four-story single-family house would fall within the scope of the IBC, not the IRC. The benefits of devoting a separate code to residential construction include the fact that the user need not navigate through a multitude of code provisions that do not apply to residential construction in order to locate that which is applicable. A separate code also allows for residential and nonresidential code provisions to be distinct and tailored to the structures that fall within the appropriate code's scopes.

The IRC contains coverage for all components of a house or townhouse, including structural components, fireplaces and chimneys, thermal insulation, mechanical systems, fuel gas systems, plumbing systems and electrical systems.

The IRC is a prescriptive-oriented (specification) code with some examples of performance code language. It has been said that the IRC is the complete cookbook for residential construction. Section R301.1, for example, is written in performance language, but states that the prescriptive requirements of the code will achieve such performance.

It is important to understand that the IRC contains coverage for what is conventional and common in residential construction practice. While the IRC will provide all of the needed coverage for most residential construction, it might not address construction practices and systems that are atypical or rarely encountered in the industry. Sections such as R301.1.3, R301.2.2.1.1, R320.1, M1301.1, G2401.1 and P2601.1 refer to other codes either as an alternative to the provisions of the IRC or where the IRC lacks coverage for a particular type of structure, design, system, appliance or method of construction. In other words, the IRC is meant to be all inclusive for typical residential construction and it relies on other codes only where alternatives are desired or where the code lacks coverage for the uncommon aspect of residential construction. Of course, the IRC constantly evolves to address new technologies and construction practices that were once uncommon, but are now common.

The IRC is unique in that much of it, including Chapters 3 through 9 and Chapters 34 through 43, is presented in an ordered format that is consistent with the normal progression of construction, starting with the design phase and continuing through the final trim-out phase. This is consistent with the "cookbook" philosophy of the IRC.

ARRANGEMENT AND FORMAT OF THE 2021 IRC

The IRC is divided into nine main parts, specifically: Part I—Administrative, Part II—Definitions, Part III—Building Planning and Construction, Part IV—Energy Conservation, Part V—Mechanical, Part VI—Fuel Gas, Part VII—Plumbing, Part VIII—Electrical and Part IX—Referenced Standards.

The following provides a brief description of the content of each chapter and appendix of the IRC:

Chapter 1 Scope and Administration

This chapter contains provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining "due process of law" in enforcing the building criteria contained in the body of the code. Only through careful observation of the administrative provisions can the building official reasonably expect to demonstrate that "equal protection under the law" has been provided.

Chapter 2 Definitions

Terms defined in the code are listed alphabetically in Chapter 2. It is important to note that three chapters have their own definitions sections: Chapter 11 for the defined terms unique to energy conservation, Chapter 24 for the defined terms unique to fuel gas and Chapter 35 for the terms applicable to electrical Chapters 34 through 43. Where Chapter 24 or 35 defines a term differently than it is defined in Chapter 2, the definition applies in that chapter only. Chapter 2 definitions apply in all other locations in the code.

Where understanding a term's definition is key to or necessary for understanding a particular code provision, the term is shown in italics where 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.

Guidance regarding not only tense, gender and plurality of defined terms, but also terms not defined in this code, is provided.

Chapter 3 Building Planning

Chapter 3 provides guidelines for a minimum level of structural integrity, life safety, fire safety and livability for inhabitants of dwelling units regulated by this code. Chapter 3 is a compilation of the code requirements specific to the building planning sector of the design and construction process. This chapter sets forth code requirements dealing with light, ventilation, sanitation, minimum room size, ceiling height and environmental comfort. Chapter 3 establishes life-safety provisions including limitations on glazing used in hazardous areas, specifications on stairways, use of guards at elevated surfaces, window and fall protection, and rules for means of egress. Snow, wind and seismic design live and dead loads and flood-resistant construction, as well as solar energy systems, and swimming pools, spas and hot tubs, are addressed in this chapter.

Chapter 4 Foundations

Chapter 4 provides the requirements for the design and construction of foundation systems for buildings regulated by this code. Provisions for seismic load, flood load and frost protection are contained in this chapter. A foundation system consists of two interdependent components: the foundation structure itself and the supporting soil.

The prescriptive provisions of this chapter provide requirements for constructing footings and walls for foundations of wood, masonry, concrete and precast concrete. In addition to a foundation's ability to support the required design loads, this chapter addresses several other factors that can affect foundation performance. These include controlling surface water and subsurface drainage, requiring soil tests where conditions warrant and evaluating proximity to slopes and minimum depth requirements. The chapter also provides requirements to minimize adverse effects of moisture, decay and pests in basements and crawl spaces.

Chapter 5 Floors

Chapter 5 provides the requirements for the design and construction of floor systems that will be capable of supporting minimum required design loads. This chapter covers four different types: wood floor framing, wood floors on the ground, cold-formed steel floor framing and concrete slabs on the ground. Allowable span tables are provided that greatly simplify the determination of joist, girder and sheathing sizes for raised floor systems of wood framing and cold-formed steel framing. This chapter also contains prescriptive requirements for wood-framed exterior decks and their attachment to the main building.

Chapter 6 Wall Construction

Chapter 6 contains provisions that regulate the design and construction of walls. The wall construction covered in Chapter 6 consists of five different types: wood framed, cold-formed steel framed, masonry, concrete and structural insulated panel (SIP). The primary concern of this chapter is the structural integrity of wall construction and transfer of all imposed loads to the supporting structure. This chapter provides the requirements for the design and construction of wall systems that are capable of supporting the minimum design vertical loads (dead, live and snow loads) and lateral loads (wind or seismic loads). This chapter contains the prescriptive requirements for wall bracing and/or shear walls to resist the imposed lateral loads due to wind and seismic activity.

Chapter 6 also regulates exterior windows and doors installed in walls. This chapter contains criteria for the performance of exterior windows and doors and includes provisions for testing and labeling, garage doors, windborne debris protection and anchorage details.

Chapter 7 Wall Covering

Chapter 7 contains provisions for the design and construction of interior and exterior wall coverings. This chapter establishes the various types of materials, materials standards and methods of application permitted for use as interior coverings, including interior plaster, gypsum board, ceramic tile, wood veneer paneling, hardboard paneling, wood shakes and wood shingles. Chapter 7 also contains requirements for the use of vapor retarders for moisture control in walls.

Exterior wall coverings provide the weather-resistant exterior envelope that protects the building's interior from the elements. Chapter 7 provides the requirements for wind resistance and water-resistive barrier for exterior wall coverings. This chapter prescribes the exterior wall coverings as well as the water-resistive barrier required beneath the exterior materials. Exterior wall coverings regulated by this section include aluminum, stone and masonry veneer, wood, hardboard, particleboard, wood structural panel siding, wood shakes and shingles, exterior plaster, steel, vinyl, fiber cement and exterior insulation finish systems.

Chapter 8 Roof-ceiling Construction

Chapter 8 regulates the design and construction of roof-ceiling systems. This chapter contains two roof-ceiling framing systems: wood framing and cold-formed steel framing. Allowable span tables are provided to simplify the selection of rafter and ceiling joist size for wood roof framing and cold-formed steel framing. Chapter 8 also provides requirements for the application of ceiling finishes, the proper ventilation of concealed spaces in roofs (e.g., enclosed attics and rafter spaces), unvented attic assemblies and attic access.

Chapter 9 Roof Assemblies

Chapter 9 regulates the design and construction of roof assemblies. A roof assembly includes the roof deck, vapor retarder, substrate or thermal barrier, insulation, vapor retarder and roof covering. This chapter provides the requirement for wind resistance of roof coverings.

The types of roof covering materials and installation regulated by Chapter 9 are: asphalt shingles, clay and concrete tile, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shakes and shingles, built-up roofs, metal roof panels, modified bitumen roofing, thermoset and thermoplastic single-ply roofing, sprayed polyurethane foam roofing, liquid applied coatings and photovoltaic shingles. Chapter 9 also provides requirements for roof drainage, flashing, above deck thermal insulation, rooftop-mounted photovoltaic systems and recovering or replacing an existing roof covering.

Chapter 10 Chimneys and Fireplaces

Chapter 10 contains requirements for the safe construction of masonry chimneys and fireplaces and establishes the standards for the use and installation of factory-built chimneys, fireplaces and masonry heaters. Chimneys and fireplaces constructed of masonry rely on prescriptive requirements for the details of their construction; the factory-built type relies on the listing and labeling method of approval. Chapter 10 provides the requirements for seismic reinforcing and anchorage of masonry fireplaces and chimneys.

Chapter 11 [RE] Energy Efficiency

The purpose of Chapter 11 [RE] 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. The provisions of Chapter 11 [RE] are duplicated from the *International Energy Conservation Code—Residential Provisions*, as applicable for buildings which fall under the scope of the IRC.

For ease of use and coordination of provisions, the corresponding IECC—Residential Provisions section number is indicated following the IRC section number [e.g., N1102.1 (R402.1)].

Chapter 12 Mechanical Administration

Chapter 12 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. A mechanical code, like any other 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 12 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. It also relates this chapter to the administrative provisions in Chapter 1.

Chapter 13 General Mechanical System Requirements

Chapter 13 contains broadly applicable requirements related to appliance listing and labeling, appliance location and installation, appliance and systems access, protection of structural elements and clearances to combustibles, among others.

Chapter 14 Heating and Cooling Equipment and Appliances

Chapter 14 is a collection of requirements for various heating and cooling appliances, dedicated to single topics by section. The common theme is that all of these types of appliances use energy in one form or another, and the improper installation of such appliances would present a hazard to the occupants of the dwellings, due to either the potential for fire or the accidental release of refrigerants. Both situations are undesirable in dwellings that are covered by this code.

Chapter 15 Exhaust Systems

Chapter 15 is a compilation of code requirements related to residential exhaust systems, including kitchens and bathrooms, clothes dryers and range hoods. The code regulates the materials used for constructing and installing such duct systems. Air brought into the building for ventilation, combustion or makeup purposes is protected from contamination by the provisions found in this chapter.

Chapter 16 Duct Systems

Chapter 16 provides requirements for the installation of ducts for supply, return and exhaust air systems. This chapter contains no information on the design of these systems from the standpoint of air movement, but is concerned with the structural integrity of the systems and the overall impact of the systems on the fire-safety performance of the building. This chapter regulates the materials and methods of construction which affect the performance of the entire air distribution system.

Chapter 17 Combustion Air

Complete combustion of solid and liquid fuel is essential for the proper operation of appliances, control of harmful emissions and achieving maximum fuel efficiency. If insufficient quantities of oxygen are supplied, the combustion process will be incomplete, creating dangerous byproducts and wasting energy in the form of unburned fuel (hydrocarbons). The byproducts of incomplete combustion are poisonous, corrosive and combustible, and can cause serious appliance or equipment malfunctions that pose fire or explosion hazards.

The combustion air provisions in this code from previous editions have been deleted from Chapter 17 in favor of a single section that directs the user to NFPA 31 for oil-fired appliance combustion air requirements and the manufacturer's installation instructions for solid fuel-burning appliances. If fuel gas appliances are used, the provisions of Chapter 24 must be followed.

Chapter 18 Chimneys and Vents

Chapter 18 regulates the design, construction, installation, maintenance, repair and approval of chimneys, vents and their connections to fuel-burning appliances. A properly designed chimney or vent system is needed to conduct the flue gases produced by a fuel-burning appliance to the outdoors. The provisions of this chapter are intended to minimize the hazards associated with high temperatures and potentially toxic and corrosive combustion gases. This chapter addresses factory-built and masonry chimneys, vents and venting systems used to vent oil-fired and solid fuel-burning appliances.

Chapter 19 Special Appliances, Equipment and Systems

Chapter 19 regulates the installation of fuel-burning appliances that are not covered in other chapters, such as ranges and ovens, sauna heaters, fuel cell power plants and hydrogen systems. Because the subjects in this chapter do not contain the volume of text necessary to warrant individual chapters, they have been combined into a single chapter. The only commonality is that the subjects use energy to perform some task or function. The intent is to provide a reasonable level of protection for the occupants of the dwelling.

Chapter 20 Boilers and Water Heaters

Chapter 20 regulates the installation of boilers and water heaters. Its purpose is to protect the occupants of the dwelling from the potential hazards associated with such appliances. A water heater is any appliance that heats potable water and supplies it to the plumbing hot water distribution system. A boiler either heats water or generates steam for space heating and is generally a closed system.

Chapter 21 Hydronic Piping

Hydronic piping includes piping, fittings and valves used in building space conditioning systems. Applications include hot water, chilled water, steam, steam condensate, brines and water/antifreeze mixtures. Chapter 21 regulates installation, alteration and repair of all hydronic piping systems to ensure the reliability, serviceability, energy efficiency and safety of such systems.

Chapter 22 Special Piping and Storage Systems

Chapter 22 regulates the design and installation of fuel oil storage and piping systems. The regulations include reference to construction standards for above-ground and underground storage tanks, material standards for piping systems (both above-ground and underground) and extensive requirements for the proper assembly of system piping and components. The purpose of this chapter is to prevent fires, leaks and spills involving fuel oil storage and piping systems, whether inside or outside structures and above or underground.

Chapter 23 Solar Thermal Energy Systems

Chapter 23 contains requirements for the construction, alteration and repair of all systems and components of solar thermal energy systems used for space heating or cooling, and domestic hot water heating or processing. The provisions of this chapter are limited to those necessary to achieve installations that are relatively hazard free.

A solar thermal energy system can be designed to handle 100 percent of the energy load of a building, although this is rarely accomplished. Because solar energy is a low-intensity energy source and dependent on the weather, it is usually necessary to supplement a solar thermal energy system with traditional energy sources.

As our world strives to find alternate means of producing power for the future, the requirements of this chapter will become more and more important over time.

Chapter 24 Fuel Gas

Chapter 24 regulates the design and installation of fuel gas distribution piping and systems, appliances, appliance venting systems and combustion air provisions. The definition of “Fuel gas” includes natural, liquefied petroleum and manufactured gases and mixtures of these gases.

The purposes of this chapter are to establish the minimum acceptable level of safety and to protect life and property from the potential dangers associated with the storage, distribution and use of fuel gases and the byproducts of combustion of such fuels. This code also protects the personnel who install, maintain, service and replace the systems and appliances addressed herein.

Chapter 24 is composed entirely of text extracted from the IFGC; therefore, whether using the IFGC or the IRC, the fuel gas provisions will be identical. Note that to avoid the potential for confusion and conflicting definitions, Chapter 24 has its own definition section.

Chapter 25 Plumbing Administration

The requirements of Chapter 25 do not supersede the administrative provisions of Chapter 1. Rather, the administrative guidelines of Chapter 25 pertain to plumbing installations that are best referenced and located within the plumbing chapters. This chapter addresses how to apply the plumbing provisions of this code to specific types or phases of construction. This chapter also outlines the responsibilities of the applicant, installer and inspector with regard to testing plumbing installations.

Chapter 26 General Plumbing Requirements

The content of Chapter 26 is often referred to as "miscellaneous," rather than general plumbing requirements. This is the only chapter of the plumbing chapters of the code whose requirements do not interrelate. If a requirement cannot be located in another plumbing chapter, it should be located in this chapter. Chapter 26 contains safety requirements for the installation of plumbing systems and includes requirements for the identification of pipe, pipe fittings, traps, fixtures, materials and devices used in plumbing systems. If specific provisions do not demand that a requirement be located in another chapter, the requirement is located in this chapter.

Chapter 27 Plumbing Fixtures

Chapter 27 requires fixtures to be of the proper type, approved for the purpose intended and installed properly to promote usability and safe, sanitary conditions. This chapter regulates the quality of fixtures and faucets by requiring those items to comply with nationally recognized standards. Because fixtures must be properly installed so that they are usable by the occupants of the building, this chapter contains the requirements for the installation of fixtures.

Chapter 28 Water Heaters

Chapter 28 regulates the design, approval and installation of water heaters and related safety devices. The intent is to minimize the hazards associated with the installation and operation of water heaters. Although this chapter does not regulate the size of a water heater, it does regulate all other aspects of the water heater installation such as temperature and pressure relief valves, safety drip pans and connections. Where a water heater also supplies water for space heating, this chapter regulates the maximum water temperature supplied to the water distribution system.

Chapter 29 Water Supply and Distribution

This chapter regulates the supply of potable water from both public and individual sources to every fixture and outlet so that it remains potable and uncontaminated by cross connections. Chapter 29 also regulates the design of the water distribution system, which will allow fixtures to function properly. Because it is critical that the potable water supply system remain free of actual or potential sanitary hazards, this chapter has the requirements for providing backflow protection devices.

Chapter 30 Sanitary Drainage

The purpose of Chapter 30 is to regulate the materials, design and installation of sanitary drainage piping systems as well as the connections made to the system. The intent is to design and install sanitary drainage systems that will function reliably, are neither undersized nor oversized and are constructed from materials, fittings and connections whose quality is regulated by this section. This chapter addresses the proper use of fittings for directing the flow into and within the sanitary drain piping system. Materials and provisions necessary for servicing the drainage system are also included in this chapter.

Chapter 31 Vents

Venting protects the trap seal of each trap. The vents are designed to limit differential pressures at each trap to 1 inch of water column (249 Pa). Because waste flow in the drainage system creates pressure fluctuations that can negatively affect traps, the sanitary drainage system must have a properly designed venting system. Chapter 31 covers the requirements for vents and venting. All of the provisions set forth in this chapter are intended to limit the pressure differentials in the drainage system to a maximum of 1 inch of water column (249 Pa) above or below atmospheric pressure (i.e., positive or negative pressures).

Chapter 32 Traps

Traps prevent sewer gas from escaping from the drainage piping into the building. Water seal traps are the simplest and most reliable means of preventing sewer gas from entering the interior environment. This chapter lists prohibited trap types and specifies the minimum trap size for each type of fixture.

Chapter 33 Storm Drainage

Rainwater infiltration into the ground adjacent to a building can cause the interior of foundation walls to become wet. The installation of a subsoil drainage system prevents the buildup of rainwater on the exterior of the foundation walls. This chapter provides the specifications for subsoil drain piping. Where the discharge of the subsoil drain system is to a sump, this chapter also provides coverage for sump construction, pumps and discharge piping.

Chapter 34 General Requirements

This chapter contains broadly applicable, general and miscellaneous requirements including scope, listing and labeling, equipment locations and clearances for conductor materials and connections and conductor identification.

Chapter 35 Electrical Definitions

Chapter 35 is the repository of the definitions of terms used in the body of Part VIII of the code. To avoid the potential for confusion and conflicting definitions, Part VIII, Electrical, has its own definition chapter.

Codes are technical documents and every word, term and punctuation mark can add to or change the meaning of a technical requirement. The code often uses terms that have a unique meaning in the code, which can differ substantially from the ordinarily understood meaning of the term as used outside of the code.

The terms defined in Chapter 35 are deemed to be of prime importance in establishing the meaning and intent of the electrical 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 36 Services

This chapter covers the design, sizing and installation of the building's electrical service equipment and grounding electrode system. It includes an easy-to-use load calculation method and service conductor sizing table. The electrical service is generally the first part of the electrical system to be designed and installed.

Chapter 37 Branch Circuit and Feeder Requirements

Chapter 37 addresses the requirements for designing the power distribution system, which consists of feeders and branch circuits emanating from the service equipment. This chapter dictates the ratings of circuits and the allowable loads, the number and types of branch circuits required, the wire sizing for such branch circuits and feeders and the requirements for protection from overcurrent for conductors. A load calculation method specific to feeders is also included. This chapter is used to design the electrical system on the load side of the service.

Chapter 38 Wiring Methods

Chapter 38 specifies the allowable wiring methods, such as cable, conduit and raceway systems, and provides the installation requirements for the wiring methods. This chapter is primarily applicable to the "rough-in" phase of construction.

Chapter 39 Power and Lighting Distribution

This chapter mostly contains installation requirements for the wiring that serves the lighting outlets, receptacle outlets, appliances and switches located throughout the building. The required distribution and spacing of receptacle outlets and lighting outlets is prescribed in this chapter, as well as the requirements for ground-fault and arc-fault circuit-interrupter protection.

Chapter 40 Devices and Luminaires

This chapter focuses on the devices, including switches and receptacles, and lighting fixtures that are typically installed during the final phase of construction.

Chapter 41 Appliance Installation

Chapter 41 addresses the installation of appliances including HVAC appliances, water heaters, fixed space-heating equipment, dishwashers, garbage disposals, range hoods and suspended paddle fans.

Chapter 42 Swimming Pools

This chapter covers the electrical installation requirements for swimming pools, storable swimming pools, wading pools, decorative pools, fountains, hot tubs, spas and hydromassage bathtubs. The allowable wiring methods are specified along with the required clearances between electrical system components and pools, spas and tubs. This chapter includes the special grounding requirements related to pools, spas and tubs, and also prescribes the equipotential bonding requirements that are unique to pools, spas and tubs.

Chapter 43 Class 2 Remote-control, Signaling and Power-limited Circuits

This chapter covers the power supplies, wiring methods and installation requirements for the Class 2 circuits found in dwellings. Such circuits include thermostat wiring, alarm systems, security systems, automated control systems and doorbell systems.

Chapter 44 Referenced Standards

The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 44 contains a comprehensive list of all standards that are referenced in the code. The standards are part of the code to the extent of the reference to the standard. 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 code official, contractor, designer and owner.

Chapter 44 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.

Appendix AA Sizing and Capacities of Gas Piping

This appendix is informative and not part of the code. It provides design guidance, useful facts and data and multiple examples of how to apply the sizing tables and sizing methodologies of Chapter 24.

Appendix AB Sizing of Venting Systems Serving Appliances Equipped with Draft Hoods, Category I Appliances, and Appliances Listed for Use with Type B Vents

This appendix is informative and not part of the code. It contains multiple examples of how to apply the vent and chimney tables and methodologies of Chapter 24.

Appendix AC Exit Terminals of Mechanical Draft and Direct-vent Venting Systems

This appendix is informative and not part of the code. It consists of a figure and notes that visually depict code requirements from Chapter 24 for vent terminals with respect to the openings found in building exterior walls.

Appendix AD Recommended Procedure for Safety Inspection of an Existing Appliance Installation

This appendix is informative and not part of the code. It provides recommended procedures for testing and inspecting an appliance installation to determine if the installation is operating safely and if the appliance is in a safe condition.

Appendix AE Manufactured Housing Used as Dwellings

The criteria for the construction of manufactured homes are governed by the National Manufactured Housing Construction and Safety Act. While this act may seem to cover the bulk of the construction of manufactured housing, it does not cover those areas related to the placement of the housing on the property. The provisions of Appendix AE are not applicable to the design and construction of manufactured homes. Appendix AE provides a complete set of regulations in conjunction with federal law for the installation of manufactured housing. This appendix also contains provisions for existing manufactured home installations.

Appendix AF Radon Control Methods

Radon comes from the natural (radioactive) decay of the element radium in soil, rock and water and finds its way into the air. Appendix AF contains requirements to mitigate the transfer of radon gases from the soil into the dwelling. The provisions of this appendix regulate the design and construction of radon-resistant measures intended to reduce the entry of radon gases into the living space of residential buildings.

Appendix AG Piping Standards for Various Applications

Appendix AG provides standards for various types of plastic piping products. This appendix is informative and is not part of the code.

Appendix AH Patio Covers

Appendix AH sets forth the regulations and limitations for patio covers. The provisions address those uses permitted in patio cover structures, the minimum design loads to be assigned for structural purposes, and the effect of the patio cover on egress and emergency escape or rescue from sleeping rooms. This appendix also contains the special provisions for aluminum screen enclosures in hurricane-prone regions.

Appendix AI Private Sewage Disposal

Appendix AI simply provides the opportunity to utilize the International Private Sewage Disposal Code for the design and installation of private sewage disposal in one- and two-family dwellings.

Appendix AJ Existing Buildings and Structures

Appendix AJ contains the provisions for the repair, renovation, alteration and reconstruction of existing buildings and structures that are within the scope of this code. To accomplish this objective and to make the rehabilitation process more available, this appendix allows for a controlled departure from full code compliance without compromising minimum life safety, fire safety, structural and environmental features of the rehabilitated existing building or structure.

Appendix AK Sound Transmission

Appendix AK regulates the sound transmission of wall and floor-ceiling assemblies separating dwelling units and townhouse units. Airborne sound insulation is required for walls. Airborne sound insulation and impact sound insulation are required for floor-ceiling assemblies. The provisions in Appendix AK set forth a minimum Sound Transmission Class (STC) rating for common walls and floor-ceiling assemblies between dwelling units. In addition, a minimum Impact Insulation Class (IIC) rating is also established to limit structureborne sound through common floor-ceiling assemblies separating dwelling units.

Appendix AL Permit Fees

Appendix AL provides guidance to jurisdictions for setting appropriate permit fees. This appendix will aid many jurisdictions to assess permit fees that will assist to fairly and properly administer the code. This appendix can be used for informational purposes only or may be adopted when specifically referenced in the adopting ordinance.

Appendix AM Home Day Care—Occupancy

Appendix AM provides means of egress and smoke detection requirements for a Group R-3 Occupancy that is to be used as a home day care for more than five children who receive custodial care for less than 24 hours. This appendix is strictly for guidance and/or adoption by those jurisdictions that have Licensed Home Care Provider laws and statutes that allow more than five children to be cared for in a person's home. When a jurisdiction adopts this appendix, the provisions for day care and child care facilities in the IBC should be considered also.

Appendix AN Venting Methods

Because venting of sanitary drainage systems is a difficult concept to understand, and Chapter 31 uses only words to describe venting requirements, illustrations can offer greater insight into what the words mean. Appendix AN has a number of illustrations for commonly installed sanitary drainage systems in order for the reader to gain a better understanding of this code's venting requirements.

Appendix AO Automatic Vehicular Gates

Appendix AO provides the requirements for the design and construction of automatic vehicular gates. The provisions are for where automatic gates are installed for use at a vehicular entrance or exit on the lot of a one- or two-family dwelling. The requirements provide protection for individuals from potential entrapment between an automatic gate and a stationary object or surface.

Appendix AP Sizing of Water Piping System

Appendix AP provides two recognized methods for sizing the water service and water distribution piping for a building. The method under Section AP103 provides friction loss diagrams that require the user to "plot" points and read values from the diagrams in order to perform the required calculations and necessary checks. This method is the most accurate of the two presented in this appendix. The method under Section AP201 is known to be conservative; however, very few calculations are necessary in order to determine a pipe size that satisfies the flow requirements of any application.

Appendix AQ Tiny Houses

For dwelling units that are 400 square feet (37 m^2) or less in floor area, excluding lofts, Appendix AQ provides relaxed provisions as compared to those in the body of the code. These provisions primarily address reduced ceiling heights for loft areas and specific stair and ladder detail requirements that allow for more compact designs where accessing lofts.

Appendix AR Light Straw-clay Construction

This appendix regulates the use of light straw-clay as a construction material. It is limited in application to nonbearing wall infill systems.

Appendix AS Strawbale Construction

This appendix provides prescriptive requirements for the use of strawbale as a construction material. It is limited in application to the walls of one-story structures, except where additional engineering is provided.

Appendix AT Solar-ready Provisions—Detached One- and Two-family Dwellings and Townhouses

This appendix provides requirements for preparation of a house for future installation of solar equipment for electrical power or heating. Given the growing popularity of solar power and the possible need for the equipment in the future, this appendix, if adopted, would require an area be provided on the building roof that would accommodate solar equipment. In addition, pathways for routing of plumbing and conduit need to be provided.

Appendix AU Cob Construction (Monolithic Adobe)

This appendix provides prescriptive requirements for the use of natural cob (monolithic adobe) as a construction material. It is limited in application to the walls of one-story structures, except where additional engineering is provided.

Appendix AV Board of Appeals

This appendix provides criteria for Board of Appeals members and procedures by which the Board of Appeals should conduct its business.

Appendix AW 3D-printed Building Construction

Appendix AW provides for the design, construction and inspection of buildings, structures and building elements fabricated by 3D-printed construction techniques.

Appendix AX Zero Energy Residential Building Provisions

This appendix provides requirements for residential buildings intended to result in net zero energy consumption over the course of a year.

TABLE OF CONTENTS

Part I—Administrative *1-1*

CHAPTER 1 SCOPE AND ADMINISTRATION **1-1**

PART 1—SCOPE AND APPLICATION **1-1**

Section

R101 Scope and General Requirements 1-1

R102 Applicability 1-1

PART 2—ADMINISTRATION AND ENFORCEMENT **1-2**

Section

R103 Department of Building Safety 1-2

R104 Duties and Powers of the Building Official 1-2

R105 Permits 1-3

R106 Construction Documents 1-6

R107 Temporary Structures and Uses 1-7

R108 Fees 1-7

R109 Inspections 1-7

R110 Certificate of Occupancy 1-8

R111 Service Utilities 1-8

R112 Board of Appeals 1-9

R113 Violations 1-9

R114 Stop Work Order 1-9

Part II—Definitions *2-1*

CHAPTER 2 DEFINITIONS **2-1**

Section

R201 General 2-1

R202 Definitions 2-1

Part III—Building Planning and Construction *3-1*

CHAPTER 3 BUILDING PLANNING **3-1**

Section

R301 Design Criteria 3-1

R302 Fire-Resistant Construction 3-33

R303 Light, Ventilation and Heating 3-39

R304 Minimum Room Areas 3-40

R305 Ceiling Height 3-41

R306 Sanitation 3-41

R307 Toilet, Bath and Shower Spaces 3-41

R308 Glazing 3-41

R309 Garages and Carports 3-45

R310 Emergency Escape and Rescue Openings 3-46

R311 Means of Egress 3-48

R312 Guards and Window Fall Protection 3-51

R313 Automatic Fire Sprinkler Systems 3-52

R314 Smoke Alarms 3-52

R315 Carbon Monoxide Alarms 3-53

R316 Foam Plastic 3-54

R317 Protection of Wood and Wood-Based Products against Decay 3-56

R318 Protection against Subterranean Termites 3-57

R319 Site Address 3-58

R320 Accessibility 3-58

R321 Elevators and Platform Lifts 3-58

R322 Flood-Resistant Construction 3-58

R323 Storm Shelters 3-64

R324 Solar Energy Systems 3-64

R325 Mezzanines 3-65

R326 Habitable Attics 3-65

R327 Swimming Pools, Spas and Hot Tubs 3-66

R328 Energy Storage Systems 3-66

R329 Stationary Engine Generators 3-67

R330 Stationary Fuel Cell Power Systems 3-67

CHAPTER 4 FOUNDATIONS **4-1**

Section

R401 General 4-1

R402 Materials 4-1

R403 Footings 4-2

R404 Foundation and Retaining Walls 4-22

R405 Foundation Drainage 4-42

R406 Foundation Waterproofing and Dampproofing 4-43

R407 Columns 4-44

R408 Under-Floor Space 4-44

CHAPTER 5 FLOORS **5-1**

Section

R501 General 5-1

R502 Wood Floor Framing 5-1

R503 Floor Sheathing 5-10

R504 Pressure Preservative-Treated Wood Floors (On Ground) 5-12

R505 Cold-Formed Steel Floor Framing 5-12

R506 Concrete Floors (On Ground) 5-21
R507 Exterior Decks 5-25

CHAPTER 6 WALL CONSTRUCTION 6-1
Section
R601 General. 6-1
R602 Wood Wall Framing 6-1
R603 Cold-Formed Steel Wall Framing 6-54
R604 Wood Structural Panels 6-88
R605 Particleboard 6-89
R606 General Masonry Construction 6-89
R607 Glass Unit Masonry 6-105
R608 Exterior Concrete Wall Construction 6-107
R609 Exterior Windows and Doors 6-179
R610 Structural Insulated Panel Wall Construction. 6-180

CHAPTER 7 WALL COVERING. 7-1
Section
R701 General. 7-1
R702 Interior Covering 7-1
R703 Exterior Covering 7-7
R704 Soffits. 7-27

CHAPTER 8 ROOF-CEILING CONSTRUCTION 8-1
Section
R801 General. 8-1
R802 Wood Roof Framing 8-1
R803 Roof Sheathing 8-30
R804 Cold-Formed Steel Roof Framing 8-30
R805 Ceiling Finishes 8-46
R806 Roof Ventilation 8-46
R807 Attic Access 8-48

CHAPTER 9 ROOF ASSEMBLIES 9-1
Section
R901 General. 9-1
R902 Fire Classification 9-1
R903 Weather Protection 9-1
R904 Materials 9-2
R905 Requirements for Roof Coverings 9-2
R906 Roof Insulation 9-14
R907 Rooftop-Mounted Photovoltaic Panel Systems. 9-14
R908 Reroofing 9-14

CHAPTER 10 CHIMNEYS AND FIREPLACES. 10-1
Section
R1001 Masonry Fireplaces 10-1
R1002 Masonry Heaters 10-5
R1003 Masonry Chimneys 10-5
R1004 Factory-Built Fireplaces. 10-10
R1005 Factory-Built Chimneys. 10-10
R1006 Exterior Air Supply 10-11

Part IV—Energy Conservation 11-1

CHAPTER 11 ENERGY EFFICIENCY. 11-1
Section
N1101 General 11-1
N1102 Building Thermal Envelope 11-41
N1103 Systems 11-49
N1104 Electrical Power and Lighting Systems 11-52
N1105 Total Building Performance. 11-52
N1106 Energy Rating Index Compliance Alternative 11-59
N1107 Tropical Climate Region Compliance Path . . .11-61
N1108 Additional Efficiency Package Options. 11-62
N1109 Existing Buildings—General 11-62
N1110 Additions 11-63
N1111 Alterations 11-64
N1112 Repairs 11-64
N1113 Change of Occupancy or Use. 11-65

Part V—Mechanical. 12-1

CHAPTER 12 MECHANICAL ADMINISTRATION 12-1
Section
M1201 General 12-1
M1202 Existing Mechanical Systems 12-1

CHAPTER 13 GENERAL MECHANICAL SYSTEM REQUIREMENTS 13-1
Section
M1301 General 13-1
M1302 Approval. 13-1
M1303 Labeling of Appliances 13-1
M1304 Type of Fuel 13-1
M1305 Appliance Access. 13-2
M1306 Clearances from Combustible Construction . . .13-3

M1307 Appliance Installation 13-3
M1308 Mechanical Systems Installation 13-6

CHAPTER 14 HEATING AND COOLING EQUIPMENT AND APPLIANCES 14-1

Section
M1401 General 14-1
M1402 Central Furnaces 14-1
M1403 Heat Pump Equipment 14-1
M1404 Refrigeration Cooling Equipment 14-1
M1405 Baseboard Convectors 14-1
M1406 Radiant Heating Systems 14-2
M1407 Duct Heaters 14-2
M1408 Vented Floor Furnaces 14-2
M1409 Vented Wall Furnaces 14-3
M1410 Vented Room Heaters 14-3
M1411 Heating and Cooling Equipment 14-3
M1412 Absorption Cooling Equipment 14-5
M1413 Evaporative Cooling Equipment 14-5
M1414 Fireplace Stoves 14-5
M1415 Masonry Heaters 14-5

CHAPTER 15 EXHAUST SYSTEMS 15-1

Section
M1501 General 15-1
M1502 Clothes Dryer Exhaust 15-1
M1503 Domestic Cooking Exhaust Equipment 15-2
M1504 Exhaust Ducts and Exhaust Openings 15-3
M1505 Mechanical Ventilation 15-3

CHAPTER 16 DUCT SYSTEMS 16-1

Section
M1601 Duct Construction 16-1
M1602 Return Air 16-4

CHAPTER 17 COMBUSTION AIR 17-1

Section
M1701 General 17-1

CHAPTER 18 CHIMNEYS AND VENTS 18-1

Section
M1801 General 18-1
M1802 Vent Components 18-2
M1803 Chimney and Vent Connectors 18-2
M1804 Vents 18-3
M1805 Masonry and Factory-Built Chimneys 18-4

CHAPTER 19 SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS . . . 19-1

Section
M1901 Ranges and Ovens 19-1
M1902 Sauna Heaters 19-1
M1903 Stationary Fuel Cell Power Plants 19-1
M1904 Gaseous Hydrogen Systems 19-1

CHAPTER 20 BOILERS AND WATER HEATERS 20-1

Section
M2001 Boilers 20-1
M2002 Operating and Safety Controls 20-1
M2003 Expansion Tanks 20-1
M2004 Water Heaters Used for Space Heating 20-2
M2005 Water Heaters 20-2
M2006 Pool Heaters 20-2

CHAPTER 21 HYDRONIC PIPING 21-1

Section
M2101 Hydronic Piping Systems Installation 21-1
M2102 Baseboard Convectors 21-4
M2103 Floor Heating Systems 21-5
M2104 Low Temperature Piping 21-5
M2105 Ground-Source Heat-Pump System Loop Piping 21-6

CHAPTER 22 SPECIAL PIPING AND STORAGE SYSTEMS 22-1

Section
M2201 Oil Tanks 22-1
M2202 Oil Piping, Fitting and Connections 22-1
M2203 Installation 22-1
M2204 Oil Pumps and Valves 22-2

CHAPTER 23 SOLAR THERMAL ENERGY SYSTEMS 23-1

Section
M2301 Solar Thermal Energy Systems 23-1

Part VI—Fuel Gas* *24-1

CHAPTER 24 FUEL GAS 24-1

Section
G2401 General 24-1
G2402 General 24-1
G2403 General Definitions 24-2
G2404 General 24-8

G2405 Structural Safety 24-8
G2406 Appliance Location. 24-9
G2407 Combustion, Ventilation and Dilution Air 24-9
G2408 Installation 24-13
G2409 Clearance Reduction. 24-14
G2410 Electrical. 24-17
G2411 Electrical Bonding 24-17
G2412 General 24-17
G2413 Pipe Sizing 24-18
G2414 Piping Materials 24-40
G2415 Piping System Installation 24-42
G2416 Piping Bends and Changes in Direction 24-45
G2417 Inspection, Testing and Purging 24-45
G2418 Piping Support 24-47
G2419 Drips and Sloped Piping. 24-47
G2420 Shutoff Valves 24-48
G2421 Flow Controls 24-49
G2422 Appliance Connections. 24-49
G2423 Compressed Natural Gas Motor Vehicle Fuel-Dispensing Facilities. 24-50
G2424 Piping Support Intervals 24-50
G2425 General 24-51
G2426 Vents. 24-52
G2427 Venting of Appliances 24-53
G2428 Sizing of Category I Appliance Venting Systems 24-62
G2429 Direct-Vent, Integral Vent, Mechanical Vent and Ventilation/Exhaust Hood Venting . . . 24-73
G2430 Factory-Built Chimneys 24-73
G2431 General 24-74
G2432 Decorative Appliances for Installation in Fireplaces. 24-74
G2433 Log Lighters 24-74
G2434 Vented Gas Fireplaces (Decorative Appliances). 24-74
G2435 Vented Gas Fireplace Heaters 24-74
G2436 Vented Wall Furnaces 24-74
G2437 Floor Furnaces 24-74
G2438 Clothes Dryers 24-75
G2439 Clothes Dryer Exhaust 24-75
G2440 Sauna Heaters 24-76
G2441 Pool and Spa Heaters 24-77
G2442 Forced-Air Warm-Air Furnaces 24-77
G2443 Conversion Burners 24-78
G2444 Unit Heaters 24-78
G2445 Unvented Room Heaters 24-78
G2446 Vented Room Heaters 24-78
G2447 Cooking Appliances. 24-78
G2448 Water Heaters. 24-79
G2449 Air-Conditioning Appliances. 24-79
G2450 Illuminating Appliances. 24-79
G2451 Infrared Radiant Heaters 24-79
G2452 Boilers 24-80
G2453 Outdoor Decorative Appliances. 24-80

Part VII—Plumbing 25-1

CHAPTER 25 PLUMBING ADMINISTRATION 25-1

Section
P2501 General 25-1
P2502 Existing Plumbing Systems 25-1
P2503 Inspection and Tests. 25-1

CHAPTER 26 GENERAL PLUMBING REQUIREMENTS. 26-1

Section
P2601 General 26-1
P2602 Individual Water Supply and Sewage Disposal 26-1
P2603 Structural and Piping Protection 26-1
P2604 Trenching and Backfilling 26-2
P2605 Support 26-2
P2606 Penetrations 26-2
P2607 Waterproofing of Openings 26-3
P2608 Workmanship 26-3
P2609 Materials Evaluation and Listing 26-3

CHAPTER 27 PLUMBING FIXTURES 27-1

Section
P2701 Fixtures, Faucets and Fixture Fittings 27-1
P2702 Fixture Accessories 27-1
P2703 Tail Pieces 27-1
P2704 Slip-Joint Connections 27-1
P2705 Installation 27-1
P2706 Waste Receptors. 27-3
P2707 Directional Fittings. 27-3
P2708 Showers 27-3
P2709 Shower Receptors. 27-3
P2710 Shower Walls 27-4
P2711 Lavatories. 27-4
P2712 Water Closets 27-4

P2713 Bathtubs 27-5
P2714 Sinks 27-5
P2715 Laundry Tubs 27-5
P2716 Food-Waste Disposer 27-5
P2717 Dishwashing Machines 27-5
P2718 Clothes Washing Machine 27-6
P2719 Floor Drains 27-6
P2720 Whirlpool Bathtubs 27-6
P2721 Bidet Installations 27-6
P2722 Fixture Fitting 27-6
P2723 Macerating Toilet Systems 27-6
P2724 Specialty Temperature Control Devices and Valves 27-6
P2725 Nonliquid Saturated Treatment Systems 27-7

CHAPTER 28 WATER HEATERS 28-1

Section
P2801 General 28-1
P2802 Solar Water Heating Systems 28-1
P2803 Water Heaters Used for Space Heating 28-2
P2804 Relief Valves 28-2

CHAPTER 29 WATER SUPPLY AND DISTRIBUTION 29-1

Section
P2901 General 29-1
P2902 Protection of Potable Water Supply 29-2
P2903 Water Supply System 29-5
P2904 Dwelling Unit Fire Sprinkler Systems 29-8
P2905 Heated Water Distribution Systems 29-21
P2906 Materials, Joints and Connections 29-21
P2907 Changes in Direction 29-25
P2908 Support 29-25
P2909 Drinking Water Treatment Units 29-25
P2910 Nonpotable Water Systems 29-26
P2911 On-site Nonpotable Water Reuse Systems . . . 29-28
P2912 Nonpotable Rainwater Collection and Distribution Systems 29-30
P2913 Reclaimed Water Systems 29-32

CHAPTER 30 SANITARY DRAINAGE 30-1

Section
P3001 General 30-1
P3002 Materials 30-1
P3003 Joints and Connections 30-3
P3004 Determining Drainage Fixture Units 30-6
P3005 Drainage System 30-6
P3006 Sizing of Drain Pipe Offsets 30-9
P3007 Sumps and Ejectors 30-9
P3008 Backwater Valves 30-10
P3009 Graywater Soil Absorption Systems 30-10
P3010 Replacement of Underground Building Sewers and Building Drains by Pipe Bursting Methods 30-13
P3011 Relining of Building Sewers and Building Drains 30-13

CHAPTER 31 VENTS 31-1

Section
P3101 Vent Systems 31-1
P3102 Vent Stacks and Stack Vents 31-1
P3103 Vent Terminals 31-1
P3104 Vent Connections and Grades 31-2
P3105 Fixture Vents 31-2
P3106 Individual Vent 31-2
P3107 Common Vent 31-2
P3108 Wet Venting 31-3
P3109 Waste Stack Vent 31-3
P3110 Circuit Venting 31-4
P3111 Combination Waste and Vent System 31-4
P3112 Island Fixture Venting 31-4
P3113 Vent Pipe Sizing 31-5
P3114 Air Admittance Valves 31-5

CHAPTER 32 TRAPS 32-1

Section
P3201 Fixture Traps 32-1

CHAPTER 33 STORM DRAINAGE 33-1

Section
P3301 General 33-1
P3302 Subsoil Drains 33-1
P3303 Sumps and Pumping Systems 33-1

Part VIII—Electrical* *34-1

CHAPTER 34 GENERAL REQUIREMENTS . . . 34-1

Section
E3401 General 34-1
E3402 Building Structure Protection 34-2
E3403 Inspection and Approval 34-2
E3404 General Equipment Requirements 34-2
E3405 Equipment Location and Clearances 34-4
E3406 Electrical Conductors and Connections 34-6
E3407 Conductor and Terminal Identification 34-7

CHAPTER 35 ELECTRICAL DEFINITIONS . . . 35-1

Section

E3501 General 35-1

CHAPTER 36 SERVICES 36-1

Section

E3601 General Services 36-1

E3602 Service Size and Rating 36-2

E3603 Service, Feeder and Grounding Electrode Conductor Sizing 36-2

E3604 Overhead Service and Service-Entrance Conductor Installation 36-4

E3605 Service-Entrance Conductors 36-6

E3606 Service Equipment—General 36-7

E3607 System Grounding 36-7

E3608 Grounding Electrode System 36-8

E3609 Bonding 36-9

E3610 Grounding Electrode Conductors 36-10

E3611 Grounding Electrode Conductor Connection to the Grounding Electrodes 36-11

CHAPTER 37 BRANCH CIRCUIT AND FEEDER REQUIREMENTS 37-1

Section

E3701 General 37-1

E3702 Branch Circuit Ratings 37-1

E3703 Required Branch Circuits 37-3

E3704 Feeder Requirements 37-3

E3705 Conductor Sizing and Overcurrent Protection. 37-5

E3706 Panelboards. 37-8

CHAPTER 38 WIRING METHODS. 38-1

Section

E3801 General Requirements 38-1

E3802 Above-ground Installation Requirements. 38-1

E3803 Underground Installation Requirements. 38-4

CHAPTER 39 POWER AND LIGHTING DISTRIBUTION. 39-1

Section

E3901 Receptacle Outlets 39-1

E3902 Ground-Fault and Arc-Fault Circuit-Interrupter Protection 39-4

E3903 Lighting Outlets 39-5

E3904 General Installation Requirements 39-6

E3905 Boxes, Conduit Bodies and Fittings 39-17

E3906 Installation of Boxes, Conduit Bodies and Fittings. 39-20

E3907 Cabinets and Panelboards 39-22

E3908 Grounding and Bonding. 39-25

E3909 Flexible Cords and Flexible Cables 39-29

CHAPTER 40 DEVICES AND LUMINAIRES 40-1

Section

E4001 Switches 40-1

E4002 Receptacles. 40-3

E4003 Luminaires 40-4

E4004 Luminaire Installation 40-6

E4005 Track Lighting 40-6

CHAPTER 41 APPLIANCE INSTALLATION. . . .41-1

Section

E4101 General 41-1

CHAPTER 42 SWIMMING POOLS 42-1

Section

E4201 General 42-1

E4202 Wiring Methods for Pools, Spas, Hot Tubs and Hydromassage Bathtubs 42-2

E4203 Equipment Location and Clearances 42-3

E4204 Equipotential Bonding 42-5

E4205 Bonding and Grounding. 42-8

E4206 Equipment Installation 42-9

E4207 Storable Swimming Pools, Storable Spas and Storable Hot Tubs. 42-11

E4208 Spas and Hot Tubs 42-12

E4209 Hydromassage Bathtubs. 42-12

CHAPTER 43 CLASS 2 REMOTE-CONTROL, SIGNALING AND POWER-LIMITED CIRCUITS 43-1

Section

E4301 General 43-1

E4302 Power Sources 43-1

E4303 Wiring Methods 43-1

E4304 Installation Requirements. 43-2

Part IX—Referenced Standards. 44-1

CHAPTER 44 REFERENCED STANDARDS. 44-1

CHAPTER 45 PENNSYLVANIA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS. 45-1

APPENDIX AA SIZING AND CAPACITIES OF GAS PIPING AA-1

Section

AA101 General Piping Considerations AA-1
AA102 Description of Tables AA-1
AA103 Use of Capacity Tables AA-4
AA104 Use of Sizing Equations AA-6
AA105 Pipe and Tube Diameters AA-7
AA106 Examples of Piping System Design and Sizing AA-7

APPENDIX AB SIZING OF VENTING SYSTEMS SERVING APPLIANCES EQUIPPED WITH DRAFT HOODS, CATEGORY I APPLIANCES, AND APPLIANCES LISTED FOR USE WITH TYPE B VENTS AB-1

Section

AB101 Examples Using Single-appliance Venting Tables AB-1
AB102 Examples Using Common Venting Tables AB-4

APPENDIX AC RESERVED AC-1

APPENDIX AD RECOMMENDED PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE INSTALLATION AD-1

Section

AD101 General AD-1
AD102 Occupant and Inspector Safety AD-1
AD103 Gas Piping and Connections Inspections AD-2
AD104 Inspections to be Performed with the Appliance Not Operating AD-2
AD105 Inspections to be Performed with the Appliance Operating AD-3
AD106 Appliance-Specific Inspections AD-4

APPENDIX AE MANUFACTURED HOUSING USED AS DWELLINGS AE-1

Section

AE101 Scope AE-1
AE102 Application to Existing Manufactured Homes and Building Service Equipment AE-1
AE103 Definitions AE-2
AE104 Permits AE-2
AE105 Application for Permit AE-3
AE106 Permits Issuance AE-3
AE107 Fees AE-4
AE108 Inspections AE-4
AE109 Special Inspections AE-5
AE110 Utility Service AE-5
AE111 Occupancy Classification AE-6
AE112 Location on Property AE-6
AE113 Design AE-6
AE114 Foundation Systems AE-6
AE115 Skirting and Perimeter Enclosures AE-6
AE116 Structural Additions AE-7
AE117 Building Service Equipment AE-7
AE118 Exits AE-7
AE119 Occupancy, Fire Safety and Energy Conservation Standards AE-7
AE120 Special Requirements for Foundation Systems AE-7
AE121 Footings and Foundations AE-7
AE122 Pier Construction AE-7
AE123 Height of Piers AE-8
AE124 Anchorage Installations AE-8
AE125 Ties, Materials and Installation AE-8
AE126 Referenced Standards AE-9

APPENDIX AF RADON CONTROL METHODS AF-1

Section

AF101 Scope AF-1
AF102 Definitions AF-1
AF103 Requirements AF-1
AF104 Testing AF-10

APPENDIX AG PIPING STANDARDS FOR VARIOUS APPLICATIONS AG-1

Section

AG101 Plastic Piping Standards AG-1
AG102 Referenced Standards AG-1

APPENDIX AH PATIO COVERS AH-1

Section

AH101 General AH-1
AH102 Definition AH-1
AH103 Exterior Walls and Openings AH-1
AH104 Height AH-1

AH105 Structural Provisions. AH-1
AH106 Special Provisions for Aluminum Screen Enclosures in Hurricane-Prone Regions. . . AH-1

APPENDIX AI PRIVATE SEWAGE DISPOSAL. AI-1

Section
AI101 General AI-1

APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES AJ-1

Section
AJ101 Purpose and Intent AJ-1
AJ102 Compliance. AJ-1
AJ103 Preliminary Meeting. AJ-2
AJ104 Evaluation of an Existing Building AJ-2
AJ105 Permit AJ-2
AJ106 Definitions AJ-2
AJ107 Repairs AJ-3
AJ108 Renovations AJ-3
AJ109 Alterations AJ-4
AJ110 Reconstruction AJ-4
AJ111 Referenced Standards. AJ-5

APPENDIX AK SOUND TRANSMISSION. AK-1

Section
AK101 General AK-1
AK102 Airborne Sound. AK-1
AK103 Structural-borne Sound. AK-1
AK104 Referenced Standards. AK-1

APPENDIX AL PERMIT FEES AL-1

Section
AL101 General AL-1

APPENDIX AM HOME DAY CARE—OCCUPANCY AM-1

Section
AM101 General. AM-1
AM102 Definition AM-1
AM103 Means of Egress. AM-1
AM104 Smoke Detection. AM-2

APPENDIX AN VENTING METHODS. AN-1

Section
AN101 Venting Methods AN-1

APPENDIX AO AUTOMATIC VEHICULAR GATES AO-1

Section
AO101 General. AO-1
AO102 Definition AO-1
AO103 Automatic Vehicular Gates AO-1
AO104 Referenced Standards. AO-1

APPENDIX AP SIZING OF WATER PIPING SYSTEM. AP-1

Section
AP101 General. AP-1
AP102 Information Required. AP-1
AP103 Selection of Pipe Size. AP-1
AP201 Selection of Pipe Size. AP-19

APPENDIX AQ TINY HOUSES. AQ-1

Section
AQ101 General. AQ-1
AQ102 Definitions AQ-1
AQ103 Ceiling Height AQ-1
AQ104 Lofts. AQ-1
AQ105 Emergency Escape and Rescue Openings AQ-2
AQ106 Energy Conservation AQ-2

APPENDIX AR LIGHT STRAW-CLAY CONSTRUCTION AR-1

Section
AR101 General AR-1
AR102 Definitions. AR-1
AR103 Nonbearing Light Straw-Clay Construction AR-1
AR104 Thermal Performance AR-4
AR105 Referenced Standards AR-4

APPENDIX AS STRAWBALE CONSTRUCTION AS-1

Section
AS101 General AS-1
AS102 Definitions. AS-1
AS103 Bales AS-3
AS104 Finishes. AS-4
AS105 Strawbale Walls—General AS-5
AS106 Strawbale Walls—Structural. AS-11
AS107 Fire Resistance AS-14

AS108 Thermal Insulation AS-17
AS109 Referenced Standards AS-17

APPENDIX AT SOLAR-READY PROVISIONS—DETACHED ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES AT-1

Section
AT101 Scope AT-1
AT102 General Definition AT-1
AT103 Solar-ready Zone AT-1

APPENDIX AU COB CONSTRUCTION (MONOLITHIC ADOBE) AU-1

Section
AU101 General AU-1
AU102 Definitions AU-2
AU103 Materials, Mixing and Installation AU-2
AU104 Finishes AU-3
AU105 Cob Walls—General AU-4
AU106 Cob Walls—Structural AU-6
AU107 Cob Floors AU-16
AU108 Fire Resistance AU-16
AU109 Thermal Performance AU-16
AU110 Referenced Standards AU-16

APPENDIX AV BOARD OF APPEALS AV-1

Section
AV101 General AV-1

APPENDIX AW 3D-PRINTED BUILDING CONSTRUCTION AW-1

Section
AW101 General AW-1
AW102 Definitions AW-1
AW103 Building Design AW-1
AW104 Building Construction AW-1
AW105 Special Inspections AW-1
AW106 Referenced Standards AW-2

APPENDIX AX ZERO ENERGY RESIDENTIAL BUILDING PROVISONS AX-1

Section
AX 101 Compliance AX-1
AX 102 Zero Energy Residential Buildings AX-1
AX 103 Referenced Standards AX-1

INDEX INDEX-1