

A MEMBER OF THE INTERNATIONAL CODE FAMILY®



IRC®

INTERNATIONAL RESIDENTIAL CODE® FOR ONE- AND TWO-FAMILY DWELLINGS



Receive **FREE** updates, excerpts of code references, technical articles, and more when you register your code book. Go to www.iccsafe.org/CodesPlus today!

2009 International Residential Code® for One- and Two-family Dwellings

First Printing: March 2009

ISBN: 978-1-58001-727-5 (soft-cover edition)
ISBN: 978-1-58001-726-8 (loose-leaf edition)

COPYRIGHT © 2009
by
INTERNATIONAL CODE COUNCIL, INC.

ALL RIGHTS RESERVED. The 2009 *International Residential Code® for One- and Two-family Dwellings* is a copyrighted work owned by the International Code Council, Inc. Without advance written permission from the copyright owner, no part of this book may be reproduced, distributed, or transmitted in any form or by any means, including, without limitation, electronic, optical or mechanical means (by way of example and not limitation, photocopying, or recording by or in an information storage retrieval system). For information on permission to copy material exceeding fair use, please contact: Publications, 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795. Phone 1-888-ICC-SAFE (422-7233).

Trademarks: “International Code Council,” the “International Code Council” logo and the “International Residential Code” are trademarks of the International Code Council, Inc.

PRINTED IN THE U.S.A.

PREFACE

Introduction

Internationally, code officials recognize the need for a modern, up-to-date residential code addressing the design and construction of one- and two-family dwellings and townhouses. The *International Residential 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, stand-alone residential code establishes minimum regulations 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 2009 edition is fully compatible with all the *International Codes*® (I-Codes®) published by the International Code Council® (ICC)®, including the *International Building Code*®, *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 Wildland-Urban Interface Code*™ and *International Zoning Code*®.

The *International Residential Code* provisions provide many benefits, among which is the model code development process that offers an international forum for residential construction professionals to discuss 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 Residential Code* (2000) was the culmination of an effort initiated in 1996 by ICC and consisting of representatives from the three statutory members of the International Code Council at the time, including: Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI), and representatives from the National Association of Home Builders (NAHB). The intent was to draft a stand-alone residential code consistent with and inclusive of the scope of the existing model codes. Technical content of the 1998 *International One- and Two-Family Dwelling Code* and the latest model codes promulgated by BOCA, ICBO, SBCCI and ICC was used as the basis for the development, followed by public hearings in 1998 and 1999 to consider proposed changes. This 2009 edition represents the code as originally issued, with changes reflected in the 2006 edition, and further changes developed through the ICC Code Development Process through 2008. Residential electrical provisions are based on the 2008 *National Electrical Code*® (NFPA 70). A new edition such as this is promulgated every three 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 National Fire Protection Association (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.

Adoption

The *International Residential 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 xiii addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

Maintenance

The *International Residential 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.

The maintenance process for the fuel gas provisions is based upon the process used to maintain the *International Fuel Gas Code*, in conjunction with the American Gas Association. The maintenance process for the electrical provisions is undertaken by the National Fire Protection Association.

While the development procedure of the *International Residential Code* assures the highest degree of care, ICC, the founding members of 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 and its founding members do 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.

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.

Italicized Terms

Selected terms set forth in Chapter 2, Definitions, are italicized where they appear in code text. 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 Residential Code

The *International Residential Code*® (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 *International Building Code*® (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, R320.1, R322.1, N1101.2, M1301.1, G2401.1, P2601.1 and E3401.2 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 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.

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

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 two chapters have their own definitions sections: Chapter 24 for the defined terms that are unique to fuel gas and Chapter 35 containing terms that are applicable to electrical Chapters 34 through 43. In the case where Chapter 2 and another chapter both define the same term differently, the definition found in Chapter 24 and/or 35 is intended to prevail where the term is used in Chapter 24 and/or 35 and the definition contained in Chapter 2 is intended to prevail where the term is used in all other locations in the code. Except where Chapter 24 or 35 has a definition that will prevail therein, the definitions in Chapter 2 are applicable throughout the code.

Additional definitions regarding skylights that are not listed in Chapter 2 are found in Section R308.6.1.

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 disability 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 and rules for means of egress. Snow, wind and seismic design and flood-resistant construction, as well as live and dead loads, 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 attaching a deck 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. Chapter 6 also contains requirements for the use of vapor retarders for moisture control in walls.

Chapter 6 also regulates exterior windows and doors installed in walls. The chapter contains criteria for the performance of exterior windows and doors and includes provisions for window sill height, testing and labeling, vehicular access doors, wind-borne 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.

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, attic chases and the proper clearance of combustible insulation from heat-producing devices.

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 material 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 and liquid applied coatings. Chapter 9 also provides requirements for roof drainage, flashing, above deck thermal insulation 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 Energy Efficiency. Chapter 11 contains the energy-efficiency-related requirements for the design and construction of buildings regulated under this code. The applicable portions of the building must comply with the provisions within this chapter for energy efficiency. This chapter defines requirements for the portions of the building and building systems that impact energy use in new construction and promotes the effective use of energy. The provisions within the chapter promote energy efficiency in the building envelope, the heating and cooling system, the service water heating system and the lighting system of the building. This chapter also provides energy efficiency requirements for snow melt systems and pool heaters.

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. 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 either to 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 life-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 non-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 Fuel-burning Equipment. 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 insure 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 Systems. Chapter 23 contains requirements for the construction, alteration and repair of all systems and components of solar 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 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 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 purpose of this chapter is 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 a new 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 reviewed 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 as well as 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 build-up of rainwater on the exterior of the founda-

tion 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 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 impact the meaning of the code text and the intended results. 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 A 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 B 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 C Exit Terminals of Mechanical Draft and Direct-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 D 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 E 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 E are not applicable to the design and construction of manufactured homes. Appendix E 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 F 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 F contains requirements to mitigate the transfer of radon gas 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 G Swimming Pool, Spas and Hot Tubs. Appendix G provides the regulations for swimming pools, hot tubs and spas installed in or on the lot of a one- or two-family dwelling. This appendix contains provisions for an effective barrier surrounding the water area and entrapment protection for suction outlets to reduce the potential for drowning of young children.

Appendix H Patio Covers. Appendix H 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 I Private Sewage Disposal.

Appendix J Existing Buildings and Structures. Appendix J 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 K Sound Transmission. Appendix K regulates the sound transmission of wall and floor-ceiling assemblies separating dwelling units and townhouse units. Air-borne sound insulation is required for walls. Air-borne sound insulation and impact sound insulation are required for floor-ceiling assemblies. The provisions in Appendix K 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 structure-borne sound through common floor-ceiling assemblies separating dwelling units.

Appendix L Permit Fees. Appendix L 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 M Home Day Care – R-3 Occupancy. Appendix M 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 child care facilities in the IBC should be considered also.

Appendix N Venting Methods. Because venting of sanitary drainage systems is perhaps the most difficult concept to understand, and Chapter 51 uses only words to describe venting requirements, illustrations can offer greater insight into what the words mean. Appendix N 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 O Gray Water Recycling Systems. Appendix O offers a method for utilizing gray water that is collected from certain fixtures such as lavatories, bathtubs, showers and clothes washing machines. Because many geographical areas of the world are in short supply of water resources, water that has already passed through these fixtures is an important resource that can lessen the demand for potable water. Where gray water is used for underground irrigation, no treatment other than basic filtering is required. In this application, gray water reuse offers savings in both potable water use and less wastewater to be treated. Gray water can also be reused for flushing water for water closets and urinals. In this application, the gray water requires disinfection and coloring in order

to be safe for use in those fixtures. This appendix provides the user with basic information to choose the necessary components, size and construct a gray water system that suits the particular application.

Appendix P Sizing of Water Piping System. Appendix P 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 Q ICC *International Residential Code Electrical Provisions/National Electrical Code* Cross Reference. This cross reference allows the code user to trace the code sections in Chapters 34 through 43 back to their source: the *National Electrical Code*. See the introduction to Chapter 34 for more information on the relationship between Part VIII of this code and the NEC, NFPA 70.

ORDINANCE

The *International Codes* are designed and promulgated to be adopted by reference by ordinance. Jurisdictions wishing to adopt the 2009 *International Residential Code* as an enforceable regulation governing one- and two-family dwellings and townhouses 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 RESIDENTIAL CODE

ORDINANCE NO. _____

An ordinance of the [JURISDICTION] adopting the 2009 edition of the *International Residential Code*, regulating and governing the construction, alteration, movement, enlargement, replacement, repair, equipment, location, removal and demolition of detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height with separate means of egress 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 Residential Code*, 2009 edition, including Appendix Chapters [FILL IN THE APPENDIX CHAPTERS BEING ADOPTED] (see *International Residential Code* Section R102.5, 2009 edition), as published by the International Code Council, be and is hereby adopted as the Residential Code of the [JURISDICTION], in the State of [STATE NAME] for regulating and governing the construction, alteration, movement, enlargement, replacement, repair, equipment, location, removal and demolition of detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height with separate means of egress 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 Residential 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 R101.1. Insert: [NAME OF JURISDICTION]

Table R301.2 (1) Insert: [APPROPRIATE DESIGN CRITERIA]

Section P2603.6.1 Insert: [NUMBER OF INCHES IN TWO LOCATIONS]

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 Residential 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

<i>Part I—Administrative</i>	<i>1</i>	R310	Emergency Escape and Rescue Openings	58
CHAPTER 1 SCOPE AND ADMINISTRATION	1	R311	Means of Egress	59
PART 1—SCOPE AND APPLICATION	1	R312	Guards	62
Section		R313	Automatic Fire Sprinkler Systems	62
R101	General	R314	Smoke Alarms	62
R102	Applicability	R315	Carbon Monoxide Alarms	63
		R316	Foam Plastic	63
PART II—ADMINISTRATION AND ENFORCEMENT	1	R317	Protection of Wood and Wood Based Products Against Decay	65
R103	Department of Building Safety	R318	Protection Against Subterranean Termites	66
R104	Duties and Powers of the Building Official	R319	Site Address	67
R105	Permits	R320	Accessibility	67
R106	Construction Documents	R321	Elevators and Platform Lifts	67
R107	Temporary Structures and Uses	R322	Flood-resistant Construction	67
R108	Fees	R323	Storm Shelters	70
R109	Inspections			
R110	Certificate of Occupancy	CHAPTER 4 FOUNDATIONS	71	
R111	Service Utilities	Section		
R112	Board of Appeals	R401	General	71
R113	Violations	R402	Materials	71
R114	Stop Work Order	R403	Footings	72
		R404	Foundation and Retaining Walls	86
<i>Part II—Definitions</i>	<i>9</i>	R405	Foundation Drainage	105
CHAPTER 2 DEFINITIONS	9	R406	Foundation Waterproofing and Dampproofing	107
Section		R407	Columns	108
R201	General	R408	Under-floor Space	108
R202	Definitions			
<i>Part III—Building Planning and Construction</i>	<i>23</i>	CHAPTER 5 FLOORS	111	
CHAPTER 3 BUILDING PLANNING	23	Section		
Section		R501	General	111
R301	Design Criteria	R502	Wood Floor Framing	111
R302	Fire-resistant Construction	R503	Floor Sheathing	122
R303	Light, Ventilation and Heating	R504	Pressure Preservatively Treated-wood Floors (On Ground)	124
R304	Minimum Room Areas	R505	Steel Floor Framing	124
R305	Ceiling Height	R506	Concrete Floors (On Ground)	144
R306	Sanitation			
R307	Toilet, Bath and Shower Spaces	CHAPTER 6 WALL CONSTRUCTION	145	
R308	Glazing	Section		
R309	Garages and Carports	R601	General	145
		R602	Wood Wall Framing	146
		R603	Steel Wall Framing	187

TABLE OF CONTENTS

R604 Wood Structural Panels 261
 R605 Particleboard. 261
 R606 General Masonry Construction 261
 R607 Unit Masonry 269
 R608 Multiple Wythe Masonry. 270
 R609 Grouted Masonry 271
 R610 Glass Unit Masonry 273
 R611 Exterior Concrete Wall Construction 274
 R612 Exterior Windows and Doors 345
 R613 Structural Insulated Panel Wall
 Construction. 348

CHAPTER 7 WALL COVERING 357

Section

R701 General 357
 R702 Interior Covering 357
 R703 Exterior Covering. 360

**CHAPTER 8 ROOF-CEILING
 CONSTRUCTION 373**

Section

R801 General 373
 R802 Wood Roof Framing 373
 R803 Roof Sheathing. 399
 R804 Steel Roof Framing 399
 R805 Ceiling Finishes 430
 R806 Roof Ventilation. 430
 R807 Attic Access 431

CHAPTER 9 ROOF ASSEMBLIES 433

Section

R901 General 433
 R902 Roof Classification 433
 R903 Weather Protection. 433
 R904 Materials. 433
 R905 Requirements for Roof Coverings 435
 R906 Roof Insulation. 443
 R907 Reroofing 443

CHAPTER 10 CHIMNEYS AND FIREPLACES. . . 445

Section

R1001 Masonry Fireplaces 445
 R1002 Masonry Heaters 448
 R1003 Masonry Chimneys 449
 R1004 Factory-built Fireplaces. 454

R1005 Factory-built Chimneys 454
 R1006 Exterior Air Supply 454

Part IV—Energy Conservation 455

CHAPTER 11 ENERGY EFFICIENCY. 455

Section

N1101 General 455
 N1102 Building Thermal Envelope. 468
 N1103 Systems. 471
 N1104 Lighting Systems 473

Part V—Mechanical. 475

**CHAPTER 12 MECHANICAL
 ADMINISTRATION 475**

Section

M1201 General 475
 M1202 Existing Mechanical Systems 475

**CHAPTER 13 GENERAL MECHANICAL
 SYSTEM REQUIREMENTS 477**

Section

M1301 General 477
 M1302 Approval. 477
 M1303 Labeling of Appliances 477
 M1304 Type of Fuel 477
 M1305 Appliance Access. 477
 M1306 Clearances from Combustible Construction. . . 478
 M1307 Appliance Installation 478
 M1308 Mechanical Systems Installation. 481

**CHAPTER 14 HEATING AND COOLING
 EQUIPMENT 483**

Section

M1401 General 483
 M1402 Central Furnaces 483
 M1403 Heat Pump Equipment 483
 M1404 Refrigeration Cooling Equipment. 483
 M1405 Baseboard Convectors 483
 M1406 Radiant Heating Systems. 483
 M1407 Duct Heaters. 484
 M1408 Vented Floor Furnaces 484
 M1409 Vented Wall Furnaces 484
 M1410 Vented Room Heaters 485

M1411 Heating and Cooling Equipment	485	M2003 Expansion Tanks	503
M1412 Absorption Cooling Equipment	486	M2004 Water Heaters Used for Space Heating.	503
M1413 Evaporative Cooling Equipment	486	M2005 Water Heaters	503
M1414 Fireplace Stoves	486	M2006 Pool Heaters	504
M1415 Masonry Heaters	486		
CHAPTER 15 EXHAUST SYSTEMS	487	CHAPTER 21 HYDRONIC PIPING	505
Section		Section	
M1501 General	487	M2101 Hydronic Piping Systems Installation	505
M1502 Clothes Dryer Exhaust.	487	M2102 Baseboard Convectors	505
M1503 Range Hoods	488	M2103 Floor Heating Systems.	505
M1504 Installation of Microwave Ovens	488	M2104 Low Temperature Piping	507
M1505 Overhead Exhaust Hoods	488	M2105 Ground Source Heat Pump System Loop Piping	508
M1506 Exhaust Ducts.	488		
M1507 Mechanical Ventilation	488	CHAPTER 22 SPECIAL PIPING AND STORAGE SYSTEMS	509
CHAPTER 16 DUCT SYSTEMS	491	Section	
Section		M2201 Oil Tanks	509
M1601 Duct Construction	491	M2202 Oil Piping, Fitting and Connections	509
M1602 Return Air.	493	M2203 Installation	509
CHAPTER 17 COMBUSTION AIR	495	M2204 Oil Pumps and Valves	510
Section		CHAPTER 23 SOLAR SYSTEMS	511
M1701 General	495	Section	
CHAPTER 18 CHIMNEYS AND VENTS	497	M2301 Solar Energy Systems	511
Section		<i>Part VI—Fuel Gas</i>	<i>513</i>
M1801 General	497	CHAPTER 24 FUEL GAS	513
M1802 Vent Components	497	Section	
M1803 Chimney and Vent Connectors	498	G2401 General	513
M1804 Vents	499	G2402 General	513
M1805 Masonry and Factory-built Chimneys.	499	G2403 General Definitions	513
CHAPTER 19 SPECIAL FUEL-BURNING EQUIPMENT	501	G2404 General	519
Section		G2405 Structural Safety.	519
M1901 Ranges and Ovens	501	G2406 Appliance Location	519
M1902 Sauna Heaters.	501	G2407 Combustion, Ventilation and Dilution Air	520
M1903 Stationary Fuel Cell Power Plants	501	G2408 Installation	524
M1904 Gaseous Hydrogen Systems	501	G2409 Clearance Reduction	524
CHAPTER 20 BOILERS AND WATER HEATERS	503	G2410 Electrical.	526
Section		G2411 Electrical Bonding	526
M2001 Boilers.	503	G2412 General	528
M2002 Operating and Safety Controls	503	G2413 Pipe Sizing	528
		G2414 Piping Materials.	550
		G2415 Piping System Installation.	552
		G2416 Piping Bends and Changes in Direction.	553

TABLE OF CONTENTS

G2417 Inspection, Testing and Purging 554

G2418 Piping Support 555

G2419 Drips and Sloped Piping 555

G2420 Gas Shutoff Valves 555

G2421 Flow Controls 556

G2422 Appliance Connections 557

G2423 CNG Gas-dispensing Systems 558

G2424 Piping Support Intervals 558

G2425 General 558

G2426 Vents 559

G2427 Venting of Appliances 560

G2428 Sizing of Category I Appliance
Venting Systems 569

G2429 Direct-vent, Integral Vent, Mechanical Vent
and Ventilation/Exhaust Hood Venting. 581

G2430 Factory-built Chimneys 581

G2431 General 581

G2432 Decorative Appliances for Installation
in Fireplaces 581

G2433 Log Lighters 581

G2434 Vented Gas Fireplaces
(Decorative Fireplaces) 581

G2435 Vented Gas Fireplace Heaters 581

G2436 Vented Wall Furnaces 581

G2437 Floor Furnaces 582

G2438 Clothes Dryers 582

G2439 Clothes Dryer Exhaust 582

G2440 Sauna Heaters 583

G2441 Pool and Spa Heaters 584

G2442 Forced-air Warm-air Furnaces 584

G2443 Conversion Burners 585

G2444 Unit Heaters 585

G2445 Unvented Room Heaters 585

G2446 Vented Room Heaters 585

G2447 Cooking Appliances 586

G2448 Water Heaters 586

G2449 Air Conditioning Appliances 586

G2450 Illuminating Appliances 586

G2451 Infrared Radiant Heaters 587

G2452 Boilers 587

G2453 Chimney Damper Opening Area 587

Part VII—Plumbing 589

**CHAPTER 25 PLUMBING
ADMINISTRATION 589**

Section

P2501 General 589

P2502 Existing Plumbing Systems 589

P2503 Inspection and Tests 589

**CHAPTER 26 GENERAL PLUMBING
REQUIREMENTS 591**

Section

P2601 General 591

P2602 Individual Water Supply and
Sewage Disposal 591

P2603 Structural and Piping Protection 591

P2604 Trenching and Backfilling 592

P2605 Support 592

P2606 Waterproofing of Openings 592

P2607 Workmanship 592

P2608 Materials Evaluation and Listing 592

CHAPTER 27 PLUMBING FIXTURES 595

Section

P2701 Fixtures, Faucets and Fixture Fittings 595

P2702 Fixture Accessories 595

P2703 Tail Pieces 595

P2704 Access to Connections 595

P2705 Installation 595

P2706 Waste Receptors 595

P2707 Directional Fittings 597

P2708 Showers 597

P2709 Shower Receptors 597

P2710 Shower Walls 598

P2711 Lavatories 598

P2712 Water Closets 598

P2713 Bathtubs 599

P2714 Sinks 599

P2715 Laundry Tubs 599

P2716 Food Waste Grinder 599

P2717 Dishwashing Machines 599

P2718 Clothes Washing Machine 599

P2719 Floor Drains 599

P2720 Whirlpool Bathtubs 599

P2721 Bidet Installations 600

P2722	Fixture Fitting	600	P3111	Combination Waste and Vent System	637
P2723	Macerating Toilet Systems	600	P3112	Island Fixture Venting	638
P2724	Speciality Temperature Control Devices and Valves.	600	P3113	Vent Pipe Sizing	638
			P3114	Air Admittance Valves	638
CHAPTER 28 WATER HEATERS 601			CHAPTER 32 TRAPS 641		
Section			Section		
P2801	General	601	P3201	Fixture Traps	641
P2802	Water Heaters Used for Space Heating	601	CHAPTER 33 STORM DRAINAGE 643		
P2803	Relief Valves	601	Section		
CHAPTER 29 WATER SUPPLY AND DISTRIBUTION 603			P3301	General	643
Section			P3302	Subsoil Drains	643
P2901	General	603	P3303	Sumps and Pumping Systems	643
P2902	Protection of Potable Water Supply	603	Part VIII—Electrical 645		
P2903	Water-supply System	606	CHAPTER 34 GENERAL REQUIREMENTS 645		
P2904	Dwelling Unit Fire Sprinkler Systems	609	Section		
P2905	Materials, Joints and Connections	621	E3401	General	645
P2906	Changes in Direction	624	E3402	Building Structure Protection	646
P2907	Support	624	E3403	Inspection and Approval	646
P2908	Drinking Water Treatment Units	624	E3404	General Equipment Requirements	646
CHAPTER 30 SANITARY DRAINAGE 625			E3405	Equipment Location and Clearances	648
Section			E3406	Electrical Conductors and Connections	648
P3001	General	625	E3407	Conductor and Terminal Identification	650
P3002	Materials	625	CHAPTER 35 ELECTRICAL DEFINITIONS 653		
P3003	Joints and Connections	625	Section		
P3004	Determining Drainage Fixture Units	630	E3501	General	653
P3005	Drainage System	630	CHAPTER 36 SERVICES 657		
P3006	Sizing of Drain Pipe Offsets	633	Section		
P3007	Sumps and Ejectors	633	E3601	General Services	657
P3008	Backwater Valves	634	E3602	Service Size and Rating	657
CHAPTER 31 VENTS 635			E3603	Service, Feeder and Grounding Electrode Conductor Sizing	658
Section			E3604	Overhead Service-drop and Service Conductor Installation	659
P3101	Vent Systems	635	E3605	Service-entrance Conductors	661
P3102	Vent Stacks and Stack Vents	635	E3606	Service Equipment—General	661
P3103	Vent Terminals	635	E3607	System Grounding	662
P3104	Vent Connections and Grades	635	E3608	Grounding Electrode System	662
P3105	Fixture Vents	636	E3609	Bonding	664
P3106	Individual Vent	636	E3610	Grounding Electrode Conductors	664
P3107	Common Vent	636	E3611	Grounding Electrode Conductor Connection to the Grounding Electrodes	665
P3108	Wet Venting	636			
P3109	Waste Stack Vent	637			
P3110	Circuit Venting	637			

TABLE OF CONTENTS

CHAPTER 37 BRANCH CIRCUIT AND FEEDER REQUIREMENTS 667

Section

E3701 General 667
 E3702 Branch Circuit Ratings 667
 E3703 Required Branch Circuits 668
 E3704 Feeder Requirements 669
 E3705 Conductor Sizing and Overcurrent Protection 670
 E3706 Panelboards 673

CHAPTER 38 WIRING METHODS..... 675

Section

E3801 General Requirements 675
 E3802 Above-ground Installation Requirements..... 675
 E3803 Underground Installation Requirements..... 678

CHAPTER 39 POWER AND LIGHTING DISTRIBUTION..... 681

Section

E3901 Receptacle Outlets 681
 E3902 Ground-fault and Arc-fault Circuit-interrupter Protection 683
 E3903 Lighting Outlets 684
 E3904 General Installation Requirements 684
 E3905 Boxes, Conduit Bodies and Fittings 695
 E3906 Installation of Boxes, Conduit Bodies and Fittings 698
 E3907 Cabinets and Panelboards 699
 E3908 Grounding..... 700
 E3909 Flexible Cords 703

CHAPTER 40 DEVICES AND LUMINAIRES 705

Section

E4001 Switches 705
 E4002 Receptacles..... 706
 E4003 Fixtures..... 707
 E4004 Luminaire Installation 708
 E4005 Track Lighting 708

CHAPTER 41 APPLIANCE INSTALLATION 711

Section

E4101 General 711

CHAPTER 42 SWIMMING POOLS..... 713

Section

E4201 General 713

E4202 Wiring Methods for Pools, Spas, Hot Tubs and Hydromassage Bathtubs 713
 E4203 Equipment Location and Clearances 715
 E4204 Bonding 716
 E4205 Grounding..... 718
 E4206 Equipment Installation..... 719
 E4207 Storable Swimming Pools 721
 E4208 Spas and Hot Tubs 722
 E4209 Hydromassage Bathtubs 722

CHAPTER 43 CLASS 2 REMOTE-CONTROL, SIGNALING AND POWER-LIMITED CIRCUITS 725

Section

E4301 General 725
 E4302 Power Sources 725
 E4303 Wiring Methods 725
 E4304 Installation Requirements 725

Part IX—Referenced Standards 727

CHAPTER 44 REFERENCED STANDARDS 727

APPENDIX A SIZING AND CAPACITIES OF GAS PIPING 749

APPENDIX B SIZING OF VENTING SYSTEMS SERVING APPLIANCES EQUIPPED WITH DRAFT HOODS, CATEGORY I APPLIANCES, AND APPLIANCES LISTED FOR USE WITH TYPE B VENTS 761

APPENDIX C EXIT TERMINALS OF MECHANICAL DRAFT AND DIRECT-VENT VENTING SYSTEMS 771

APPENDIX D RECOMMENDED PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE INSTALLATION 773

APPENDIX E MANUFACTURED HOUSING USED AS DWELLINGS 775

Section

AE101 Scope 775
 AE102 Application to Existing Manufactured Homes and Building Service Equipment 775
 AE201 Definitions 776
 AE301 Permits 776

AE302 Application for Permit	776	APPENDIX H PATIO COVERS	795
AE303 Permits Issuance	777	Section	
AE304 Fees	777	AH101 General	795
AE305 Inspections	778	AH102 Definition	795
AE306 Special Inspections	779	AH103 Permitted Uses	795
AE307 Utility Service	779	AH104 Design Loads	795
AE401 Occupancy Classification	779	AH105 Light and Ventilation/Emergency Egress	795
AE402 Location on Property	779	AH106 Footings	795
AE501 Design	779	AH107 Special Provisions for Aluminum Screen Enclosures in Hurricane-prone Regions	795
AE502 Foundation Systems	780	APPENDIX I PRIVATE SEWAGE DISPOSAL	797
AE503 Skirting and Perimeter Enclosures	780	Section	
AE504 Structural Additions	780	AI101 General	797
AE505 Building Service Equipment	780	APPENDIX J EXISTING BUILDINGS AND STRUCTURES	799
AE506 Exits	781	Section	
AE507 Occupancy, Fire Safety and Energy Conservation Standards	781	AJ101 Purpose and Intent	799
AE600 Special Requirements for Foundation Systems	781	AJ102 Compliance	799
AE601 Footings and Foundations	781	AJ103 Preliminary Meeting	799
AE602 Pier Construction	781	AJ104 Evaluation of an Existing Building	799
AE603 Height of Piers	781	AJ105 Permit	800
AE604 Anchorage Installations	781	AJ201 Definitions	800
AE605 Ties, Materials and Installation	782	AJ301 Repairs	800
AE606 Referenced Standards	782	AJ401 Renovations	801
APPENDIX F RADON CONTROL METHODS	783	AJ501 Alterations	801
Section		AJ601 Reconstruction	802
AF101 Scope	783	APPENDIX K SOUND TRANSMISSION	803
AF102 Definitions	783	Section	
AF103 Requirements	783	AK101 General	803
APPENDIX G SWIMMING POOLS, SPAS AND HOT TUBS	791	AK102 Air-borne Sound	803
Section		AK103 Structural-borne Sound	803
AG101 General	791	AK104 Referenced Standards	803
AG102 Definitions	791	APPENDIX L PERMIT FEES	805
AG103 Swimming Pools	791	APPENDIX M HOME DAY CARE— R-3 OCCUPANCY	807
AG104 Spas and Hot Tubs	791	AM101 General	807
AG105 Barrier Requirements	791	AM102 Definitions	807
AG106 Entrapment Protection for Swimming Pool and Spa Suction Outlets	792	AM103 Means of Egress	807
AG107 Abbreviations	793	AM104 Smoke Detection	808
AG108 Standards	793		

TABLE OF CONTENTS

APPENDIX N VENTING METHODS 809

**APPENDIX O GRAY WATER
RECYCLING SYSTEMS 817**

AO101 General 817

AO102 Systems for Flushing Water Closets
and Urinals 817

AO103 Subsurface Landscape
Irrigation Systems 819

**APPENDIX P SIZING OF WATER
PIPING SYSTEM..... 823**

AP101 General 823

AP102 Information Required..... 823

AP103 Selection of Pipe Size 823

AP201 Selection of Pipe Size 840

**APPENDIX Q ICC INTERNATIONAL
RESIDENTIAL CODE ELECTRICAL
PROVISIONS/NATIONAL
ELECTRICAL CODE CROSS-
REFERENCE 843**

INDEX..... 857

Part I—Administrative

CHAPTER 1

SCOPE AND ADMINISTRATION

PART I—SCOPE AND APPLICATION

SECTION R101 GENERAL

R101.1 Title. These provisions shall be known as the *Residential Code for One- and Two-family Dwellings* of [NAME OF JURISDICTION], and shall be cited as such and will be referred to herein as “this code.”

R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures*.

Exception: Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family *dwellings* or townhouses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section 903.3.1.3 of the *International Building Code*.

R101.3 Intent. The purpose of this code is to establish minimum requirements to safeguard the public safety, health and general welfare through affordability, structural strength, means of egress facilities, stability, sanitation, 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.

SECTION R102 APPLICABILITY

R102.1 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.

R102.2 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

R102.3 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.

R102.4 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.

Exception: Where enforcement of a code provision would violate the conditions of the *listing* of the *equipment* or *appliance*, the conditions of the *listing* and manufacturer’s instructions shall apply.

R102.5 Appendices. Provisions in the appendices shall not apply unless specifically referenced in the adopting ordinance.

R102.6 Partial invalidity. In the event any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions.

R102.7 Existing structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Property Maintenance Code* or the *International Fire Code*, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

R102.7.1 Additions, alterations or repairs. *Additions, alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with all of the requirements of this code, unless otherwise stated. *Additions, alterations* or repairs shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

PART II—ADMINISTRATION AND ENFORCEMENT

SECTION R103 DEPARTMENT OF BUILDING SAFETY

R103.1 Creation of enforcement agency. The department of building safety is hereby created and the official in charge thereof shall be known as the *building official*.

R103.2 Appointment. The *building official* shall be appointed by the chief appointing authority of the *jurisdiction*.

R103.3 Deputies. In accordance with the prescribed procedures of this *jurisdiction* and with the concurrence of the appointing authority, the *building official* shall have the author-