



# 2016 CALIFORNIA RESIDENTIAL CODE

CALIFORNIA CODE OF REGULATIONS  
TITLE 24, PART 2.5

Based on the 2015 International Residential Code®

California Building Standards Commission



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For Errata and Supplement effective dates see the History Note Appendix

2016 California Residential Code  
California Code of Regulations, Title 24, Part 2.5

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## PREFACE

This document is Part 2.5 of thirteen parts of the official triennial compilation and publication of the adoptions, amendments and repeal of administrative regulations to *California Code of Regulations, Title 24*, also referred to as the *California Building Standards Code*. This part is known as the *California Residential Code*.

The *California Building Standards Code* is published in its entirety every three years by order of the California legislature, with supplements published in intervening years. The California legislature delegated authority to various state agencies, boards, commissions and departments to create building regulations to implement the State's statutes. These building regulations, or standards, have the same force of law, and take effect 180 days after their publication unless otherwise stipulated. The *California Building Standards Code* applies to occupancies in the State of California as annotated.

A city, county, or city and county may establish more restrictive building standards reasonably necessary because of local climatic, geological or topographical conditions. Findings of the local condition(s) and the adopted local building standard(s) must be filed with the California Building Standards Commission to become effective and may not be effective sooner than the effective date of this edition of the *California Building Standards Code*. Local building standards that were adopted and applicable to previous editions of the *California Building Standards Code* do not apply to this edition without appropriate adoption and the required filing.

Should you find publication (e.g., typographical) errors or inconsistencies in this code or wish to offer comments toward improving its format, please address your comments to:

California Building Standards Commission  
2525 Natomas Park Drive, Suite 130  
Sacramento, CA 95833-2936  
Phone: (916) 263-0916  
Email: [cbsc@dgs.ca.gov](mailto:cbsc@dgs.ca.gov)  
Web page: [www.bsc.ca.gov](http://www.bsc.ca.gov)

## ACKNOWLEDGEMENTS

The 2016 *California Building Standards Code* (Code) was developed through the outstanding collaborative efforts of the Department of Housing and Community Development, Division of State Architect, Office of the State Fire Marshal, Office of Statewide Health Planning and Development, California Energy Commission, California Department of Public Health, California State Lands Commission, Board of State and Community Corrections, and the California Building Standards Commission (Commission).

This collaborative effort included the assistance of the Commission's Code Advisory Committees and many other volunteers who worked tirelessly to assist the Commission in the production of this Code.

*Governor Edmund G. Brown Jr.*

*Members of the California Building Standards Commission*

*Secretary Marybel Batjer – Chair*

*Steven Winkel – Vice-Chair*

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*Kent Sasaki*

*Peter Santillan*

*Jim McGowan – Executive Director*

*Michael L. Nearman – Deputy Executive Director*

For questions on California state agency amendments, please refer to the contact list on page iv.

# CALIFORNIA CODE OF REGULATIONS, TITLE 24

## California Agency Information Contact List

### **Board of State and Community Corrections**

www.bscc.ca.gov..... (916) 445-5073  
Local Adult Jail Standards  
Local Juvenile Facility Standards

### **California Building Standards Commission**

www.bsc.ca.gov..... (916) 263-0916

### **California Energy Commission**

www.energy.ca.gov..... **Energy Hotline** (800) 772-3300  
Building Efficiency Standards  
Appliance Efficiency Standards  
Compliance Manual/Forms

### **California State Lands Commission**

www.slc.ca.gov..... (562) 499-6312  
Marine Oil Terminals

### **California State Library**

www.library.ca.gov..... (916) 653-5217

### **Department of Consumer Affairs:**

#### **Acupuncture Board**

www.acupuncture.ca.gov..... (916) 515-5200  
Office Standards

#### **Board of Pharmacy**

www.pharmacy.ca.gov..... (916) 574-7900  
Pharmacy Standards

#### **Bureau of Barbering and Cosmetology**

www.barbercosmo.ca.gov..... (800) 952-5210  
Barber and Beauty Shop,  
and College Standards

#### **Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation**

www.bearhfti.ca.gov..... (916) 999-2041  
Insulation Testing Standards

#### **Structural Pest Control Board**

www.pestboard.ca.gov..... (800) 737-8188  
Structural Standards

#### **Veterinary Medical Board**

www.vmb.ca.gov..... (916) 515-5220  
Veterinary Hospital Standards

### **Department of Food and Agriculture**

www.cdfa.ca.gov  
Meat & Poultry Packing Plant Standards  
Rendering & Collection Standards..... (916) 900-5004  
Dairy Standards..... (916) 900-5008

### **Department of Housing and Community Development**

www.hcd.ca.gov..... (916) 445-9471  
Residential—Hotels, Motels, Apartments,  
Single-Family Dwellings; and  
Permanent Structures in Mobilehome &  
Special Occupancy Parks  
(916) 445-3338  
Factory-Built Housing, Manufactured Housing &  
Commercial Modular  
Mobilehome—Permits & Inspections  
Northern Region—(916) 255-2501  
Southern Region—(951) 782-4420  
(916) 445-9471  
Employee Housing Standards

### **Department of Public Health**

www.dph.ca.gov..... (916) 449-5661  
Organized Camps Standards  
Public Swimming Pools Standards

### **Division of the State Architect**

www.dgs.ca.gov/dsa..... (916) 445-8100

#### **Access Compliance**

#### **Fire and Life Safety**

#### **Structural Safety**

Public Schools Standards  
Essential Services Building Standards  
Community College Standards

#### **State Historical Building Safety Board**

Alternative Building Standards

### **Office of Statewide Health Planning and Development**

www.oshpd.ca.gov..... (916) 440-8356  
Hospital Standards  
Skilled Nursing Facility Standards &  
Clinic Standards  
Permits (916) 654-3362

### **Office of the State Fire Marshal**

osfm.fire.ca.gov..... (916) 445-8200  
Code Development and Analysis  
Fire Safety Standards



# How to Distinguish Between Model Code Language and California Amendments

To distinguish between model code language and the incorporated California amendments, including exclusive California standards, California amendments will appear in italics.

**[BSC]** This is an example of a state agency acronym used to identify an adoption or amendment by the agency. The acronyms will appear at California Amendments and in the Matrix Adoption Tables. Sections 1.2 through 1.14 in Chapter 1, Division 1 of this code, explain the used acronyms, the application of state agency adoptions to building occupancies or building features, the enforcement agency as designated by state law (may be the state adopting agency or local building or fire official), the authority in state law for the state agency to make the adoption, and the specific state law being implemented by the agency's adoption. The following acronyms are used in Title 24 to identify the state adopting agency making an adoption.

## Legend of Acronyms of Adopting State Agencies

BSC	California Building Standards Commission (see Section 1.2)
BSC-CG	California Building Standards Commission-CALGreen (see Section 1.22)
BSCC	Board of State and Community Corrections (see Section 1.3)
SFM	Office of the State Fire Marshal (see Section 1.11)
HCD 1	Department of Housing and Community Development (see Section 1.8.2.1.1)
HCD 2	Department of Housing and Community Development (see Section 1.8.2.1.3)
HCD 1/AC	Department of Housing and Community Development (see Section 1.8.2.1.2)
DSA-AC	Division of the State Architect-Access Compliance (see Section 1.9.1)
DSA-SS	Division of the State Architect-Structural Safety (see Section 1.9.2)
DSA-SS/CC	Division of the State Architect-Structural Safety/Community Colleges (see Section 1.9.2.2)
OSHPD 1	Office of Statewide Health Planning and Development (see Section 1.10.1)
OSHPD 2	Office of Statewide Health Planning and Development (see Section 1.10.2)
OSHPD 3	Office of Statewide Health Planning and Development (see Section 1.10.3)
OSHPD 4	Office of Statewide Health Planning and Development (see Section 1.10.4)
DPH	Department of Public Health (see Section 1.7)
AGR	Department of Food and Agriculture (see Section 1.6)
CEC	California Energy Commission (see Section 100 in Part 2, the California Energy Code)
CA	Department of Consumer Affairs (see Section 1.6): Board of Barbering and Cosmetology Board of Examiners in Veterinary Medicine Board of Pharmacy Acupuncture Board Bureau of Home Furnishings Structural Pest Control Board
SL	State Library (see Section 1.12)
SLC	State Lands Commission (see Section 1.14)
DWR	Department of Water Resources (see Section 1.12 of Chapter 1 of the California Plumbing Code in Part 2 of Title 24)

The state agencies are available to answer questions about their adoptions. Contact information is provided on page iv of this code.

To learn more about the use of this code refer to pages vii and viii. Training materials on the application and use of this code are available at the website of the California Building Standards Commission [www.bsc.ca.gov](http://www.bsc.ca.gov).



# California Matrix Adoption Tables

## Format of the California Matrix Adoption Tables

The matrix adoption tables, examples of which follow, are non-regulatory aids intended to show the user which state agencies have adopted and/or amended given sections of the model code. An agency's statutory authority for certain occupancies or building applications determines which chapter or section may be adopted, repealed, amended or added. See Chapter 1, Division I, Sections 1.2 through 1.14 for agency authority, building applications and enforcement responsibilities.

The side headings identify the scope of state agencies' adoption as follows:

### Adopt the entire IRC chapter without state amendments.

If there is an "X" under a particular state agency's acronym on this row; this means that particular state agency has adopted the entire model code chapter without any state amendments.

#### Example:

#### CALIFORNIA FIRE CODE-MATRIX ADOPTION TABLE

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.  
See Chapter 1 for state agency authority and building applications.)

#### CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD				BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	2	3	4							
Adopt entire chapter			X																	
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below								S	A	M	P	L	E							
Chapter/Section																				

### Adopt the entire IRC chapter as amended, state-amended sections are listed below:

If there is an "X" under a particular state agency's acronym on this row, it means that particular state agency has adopted the entire model code chapter; with state amendments.

Each state-amended section that the agency has added to that particular chapter is listed. There will be an "X" in the column, by that particular section, under the agency's acronym, as well as an "X" by each section that the agency has adopted.

#### Example:

#### CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD				BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	2	3	4							
Adopt entire chapter																				
Adopt entire chapter as amended (amended sections listed below)			X																	
Adopt only those sections that are listed below								S	A	M	P	L	E							
Chapter 1																				
202			X																	



**Adopt only those sections that are listed below:**

If there is an “X” under a particular state agency’s acronym on this row, it means that particular state agency is adopting only specific model code or state-amended sections within this chapter. There will be an “X” in the column under the agency’s acronym, as well as an “X” by each section that the agency has adopted.

**Example:**

**CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS**

Adopting agency	BSC	BSC- CG	SFM	HCD			DSA			OSHDP				BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	2	3	4							
Adopt entire chapter																				
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below					X	X		S	A	M	P	L	E							
Chapter 1																				
202					X	X		S	A	M	P	L	E							
202					X	X			C	O	N	T.								
203					X	X														
203					X	X														

## Marginal Markings

- || This symbol indicates that a change has been made to a California amendment.
- > This symbol indicates deletion of California amendment language.
- | This symbol indicates that a change has been made to International Code Council model language.
- ➔ This symbol indicates deletion of International Code Council model language.

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2012 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.

Symbols in the margin indicate the status of code changes as follows:

A single asterisk [\*] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [\*\*] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code. The following table indicates such relocations in the 2015 edition of the *International Residential Code*.

<b>2015 LOCATION</b>	<b>2012 LOCATION</b>
R302.13	R501.3
R403.1.3.4	R403.1.4.2
R404.1.1	R404.1.3
R502.2.2	R502.1.2
Tables R602.7(1) and (2)	Tables R502.5(1) and (2)
P2902.3.7	P2905.4.1

## 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 Codes and Standards 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* ensures 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.

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

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

[RB] = IRC—Building Code Development Committee

[RE] = Residential Energy Code Development Committee

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

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

For the development of the 2018 edition of the I-Codes, there will be three groups of code development committees and they will meet in separate years. Note that these are tentative groups.

<b>Group A Codes (Heard in 2015, Code Change Proposals Deadline: January 12, 2015)</b>	<b>Group B Codes (Heard in 2016, Code Change Proposals Deadline: January 11, 2016)</b>	<b>Group C Codes (Heard in 2017, Code Change Proposals Deadline: January 11, 2017)</b>
International Building Code – Fire Safety (Chapters 7, 8, 9, 14, 26) – Means of Egress (Chapters 10, 11, Appendix E) – General (Chapters 2-6, 12, 27-33, Appendices A, B, C, D, K)	Administrative Provisions (Chapter 1 all codes except the IRC and IECC, adminis- trative updates to currently referenced standards, and designated definitions)	International Green Construction Code
International Fuel Gas Code	International Building Code – Structural (Chapters 15-25, Appendices F, G, H, I, J, L, M)	
International Existing Building Code	International Energy Conservation Code	
International Mechanical Code	International Fire Code	
International Plumbing Code	<b>International Residential Code</b> – IRC-Building (Chapters 1, 3-10, Appendices E, F, H, J, K, L, M, O, R, S, T, U)	
International Private Sewage Disposal Code	International Wildland-Urban Interface Code	
International Property Maintenance Code		
<b>International Residential Code</b> – IRC-Mechanical (Chapters 12-24) – IRC-Plumbing (Chapters 25-33, Appendices G, I, N, P)		
International Swimming Pool and Spa Code		
International Zoning Code		

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

Code change proposals submitted to Chapters 1 and 3 through 10, Appendices E, F, H, J, K, L, M, O, R, S, T, U and Definitions designated [RB] of the *International Residential Code* are heard by the IRC—Building Committee during the Group B (2016) cycle code development hearing. Proposed changes to all other chapters are heard by the IRC Plumbing and Mechanical Committee during the Group A (2015) 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 web site at [www.iccsafe.org/scoping](http://www.iccsafe.org/scoping).

# EFFECTIVE USE OF THE INTERNATIONAL RESIDENTIAL 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, R301.2.2.1.1, 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 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.

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.

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 testing and labeling, garage 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. 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 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 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 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 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 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 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 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 calcula-

tion 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-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 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 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 G Piping Standards for Various Applications.** Appendix G provides standards for various types of plastic piping products. This appendix is informative and is not part of the code.

**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 I 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 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 and 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 31 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 Automatic Vehicular Gates.** Appendix O 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 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 appendix provided a cross reference that allowed the code user to trace the code sections in Chapters 34 through 43 back to their source: the *National Electrical Code*. This appendix is no longer provided.

**Appendix R 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 S 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 T Recommended Procedure for Worst-Case Testing of Atmospheric Venting Systems under N1102.4 or N1105 Conditions  $\leq 5ACH_{50}$ .** This appendix is an informative appendix that is provided for testing of atmospheric venting conditions in a house when the leak tightness is less than five air changes per hour at 50 Pascals. The air leakage limitations in the energy provisions of Chapter 11 could have a direct impact on the building pressure boundary affecting the safe operation of combustion equipment.

Appendix T is intended to provide clear guidance to builders, code officials and home performance contractors for worst-case testing of atmospheric venting systems where air-sealing techniques and air-leakage performance testing requirements of Chapter 11 or the 2015 IECC are employed. Worst-case testing is used by home performance contractors to identify problems that weaken draft and restrict combustion air. Worst-case vent testing uses the home's exhaust fans, air-handling appliances and chimneys to create worst-case depressurization in the combustion appliance zone (CAZ).

**Appendix U Solar-Ready Provisions—Detached One- and Two-Family Dwellings, Multiple Single-Family Dwellings (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.

# TABLE OF CONTENTS

<i>Part I—Administrative</i> . . . . .	3
<b>CHAPTER 1 SCOPE AND APPLICATION</b> . . . . .	<b>3</b>
<b>DIVISION I—CALIFORNIA ADMINISTRATION</b> . . . . .	<b>3</b>
Section	
1.1 General . . . . .	3
1.2 Reserved . . . . .	6
1.3 Reserved . . . . .	6
1.4 Reserved . . . . .	6
1.5 Reserved . . . . .	6
1.6 Reserved . . . . .	6
1.7 Reserved . . . . .	6
1.8 Department of Housing and Community Development (HCD) . . . . .	6
1.8.2 Authority and Abbreviations . . . . .	6
1.8.3 Local Enforcing Agency . . . . .	7
1.8.4 Permits, Fees, Applications and Inspections . . . . .	8
1.8.5 Right of Entry for Enforcement . . . . .	8
1.8.6 Local Modification by Ordinance or Regulation . . . . .	9
1.8.7 Alternate Materials, Designs, Tests and Methods of Construction . . . . .	9
1.8.8 Appeals Board . . . . .	10
1.8.9 Unsafe Buildings or Structures . . . . .	10
1.8.10 Other Building Regulations . . . . .	11
1.9 Reserved . . . . .	11
1.10 Reserved . . . . .	11
1.11 Office of the State Fire Marshal . . . . .	11
1.12 Reserved . . . . .	15
1.13 Reserved . . . . .	15
1.14 Reserved . . . . .	15
<b>DIVISION II—ADMINISTRATION</b> . . . . .	<b>16</b>
Section	
R101 General . . . . .	16
R102 Applicability . . . . .	16
R103 Department of Building Safety . . . . .	17
R104 Duties and Powers of the Building Official . . . . .	17
R105 Permits . . . . .	18
R106 Construction Documents . . . . .	20
R107 Temporary Structures and Uses . . . . .	21
R108 Fees . . . . .	21
R109 Inspections . . . . .	22
R110 Certificate of Occupancy . . . . .	23
R111 Service Utilities . . . . .	23
R112 Board of Appeals . . . . .	24
R113 Violations . . . . .	24
R114 Stop Work Order . . . . .	24
<i>Part II—Definitions</i> . . . . .	<b>29</b>
<b>CHAPTER 2 DEFINITIONS</b> . . . . .	<b>29</b>
Section	
R201 General . . . . .	29
R202 Definitions . . . . .	29
<i>Part III—Building Planning and Construction</i> . . . . .	<b>45</b>
<b>CHAPTER 3 BUILDING PLANNING</b> . . . . .	<b>45</b>
Section	
R300 Site Drainage . . . . .	45
R301 Design Criteria . . . . .	45
R302 Fire-resistant Construction . . . . .	69
R303 Light, Ventilation and Heating . . . . .	75
R304 Minimum Room Areas . . . . .	76
R305 Ceiling Height . . . . .	77
R306 Sanitation . . . . .	77
R307 Toilet, Bath and Shower Spaces . . . . .	77
R308 Glazing . . . . .	77
R309 Garages and Carports . . . . .	80
R310 Emergency Escape and Rescue Openings . . . . .	81
R311 Means of Egress . . . . .	82
R312 Guards and Window Fall Protection . . . . .	85
R313 Automatic Fire Sprinkler Systems . . . . .	86
R314 Smoke Alarms . . . . .	98
R315 Carbon Monoxide Alarms . . . . .	102
R316 Foam Plastic . . . . .	104
R317 Protection of Wood and Wood-based Products against Decay . . . . .	105
R318 Protection against Subterranean Termites . . . . .	107
R319 Site Address . . . . .	108
R320 Accessibility . . . . .	108
R321 Elevators and Platform Lifts . . . . .	108



**TABLE OF CONTENTS**

R322 Flood-resistant Construction . . . . . 108  
R323 Storm Shelters . . . . . 111  
R324 Solar Energy Systems. . . . . 111  
R325 Mezzanines . . . . . 112  
R326 Swimming Pools, Spas and Hot Tubs . . . . . 113  
R334 Construction Waste Reduction,  
Disposal and Recycling . . . . . 113  
R335 Special Provisions for Licensed  
24-hour Care Facilities in a Group R-3.1 . . . . 113  
R336 Large Family Day-care Homes . . . . . 116  
R337 Materials and Construction Methods  
for Exterior Wildfire Exposure. . . . . 117  
R337.1 Scope, Purpose and Application. . . . . 117  
R337.2 Definitions . . . . . 118  
R337.3 Standards of Quality . . . . . 119  
R337.4 Ignition Resistant Construction . . . . . 120  
R337.5 Roofing. . . . . 120  
R337.6 Vents. . . . . 121  
R337.7 Exterior Covering. . . . . 121  
R337.8 Exterior Windows and Doors . . . . . 123  
R337.9 Decking. . . . . 124  
R337.10 Accessory Structures . . . . . 124  
R338 Electric Vehicle . . . . . 124  
R340 Pollutant Control . . . . . 125

**CHAPTER 4 FOUNDATIONS . . . . . 127**

Section

R401 General . . . . . 127  
R402 Materials. . . . . 128  
R403 Footings . . . . . 129  
R404 Foundation and Retaining Walls . . . . . 150  
R405 Foundation Drainage . . . . . 168  
R406 Foundation Waterproofing and  
Dampproofing. . . . . 169  
R407 Columns . . . . . 170  
R408 Under-floor Space . . . . . 170

**CHAPTER 5 FLOORS. . . . . 173**

Section

R501 General . . . . . 173  
R502 Wood Floor Framing . . . . . 173  
R503 Floor Sheathing . . . . . 182  
R504 Pressure Preservative-treated Wood  
Floors (On Ground) . . . . . 184

R505 Cold-formed Steel Floor Framing . . . . . 184  
R506 Concrete Floors (On Ground) . . . . . 195  
R507 Exterior Decks . . . . . 197

**CHAPTER 6 WALL CONSTRUCTION. . . . . 207**

Section

R601 General. . . . . 207  
R602 Wood Wall Framing. . . . . 207  
R603 Cold-formed Steel Wall Framing. . . . . 257  
R604 Wood Structural Panels . . . . . 293  
R605 Particleboard . . . . . 293  
R606 General Masonry Construction . . . . . 298  
R607 Glass Unit Masonry . . . . . 310  
R608 Exterior Concrete Wall Construction. . . . . 312  
R609 Exterior Windows and Doors. . . . . 382  
R610 Structural Insulated Panel Wall  
Construction. . . . . 385

**CHAPTER 7 WALL COVERING . . . . . 395**

Section

R701 General. . . . . 395  
R702 Interior Covering . . . . . 395  
R703 Exterior Covering. . . . . 399

**CHAPTER 8 ROOF-CEILING  
CONSTRUCTION . . . . . 417**

Section

R801 General. . . . . 417  
R802 Wood Roof Framing . . . . . 417  
R803 Roof Sheathing. . . . . 443  
R804 Cold-formed Steel Roof Framing . . . . . 446  
R805 Ceiling Finishes . . . . . 460  
R806 Roof Ventilation. . . . . 460  
R807 Attic Access . . . . . 464

**CHAPTER 9 ROOF ASSEMBLIES . . . . . 465**

Section

R901 General. . . . . 465  
R902 Roof Classification. . . . . 465  
R903 Weather Protection. . . . . 466  
R904 Materials. . . . . 466  
R905 Requirements for Roof Coverings . . . . . 467  
R906 Roof Insulation. . . . . 477  
R907 Rooftop-mounted Photovoltaic Systems . . . . . 477

R908 Reroofing ..... 477

R909 Rooftop-mounted Photovoltaic  
Panel Systems ..... 478

R918 Solar Photovoltaic Panels/Modules ..... 478

**CHAPTER 10 CHIMNEYS AND FIREPLACES... 479**

Section

R1001 Masonry Fireplaces ..... 479

R1002 Masonry Heaters..... 483

R1003 Masonry Chimneys..... 483

R1004 Factory-built Fireplaces ..... 488

R1005 Factory-built Chimneys ..... 488

R1006 Exterior Air Supply ..... 488

*Part IV—Energy Conservation..... 491*

*Part V—Mechanical ..... 493*

*Part VI—Fuel Gas..... 495*

*Part VII—Plumbing ..... 497*

*Part VIII—Electrical..... 499*

*Part IX—Referenced Standards ..... 503*

**CHAPTER 44 REFERENCED STANDARDS ..... 503**

**APPENDIX A SIZING AND CAPACITIES  
OF GAS PIPING..... 533**

**APPENDIX B SIZING OF VENTING SYSTEMS  
SERVING APPLIANCES EQUIPPED  
WITH DRAFT HOODS, CATEGORY I  
APPLIANCES, AND APPLIANCES  
LISTED FOR USE WITH TYPE B  
VENTS ..... 543**

**APPENDIX C EXIT TERMINALS OF  
MECHANICAL DRAFT AND  
DIRECT-VENT VENTING  
SYSTEMS ..... 553**

**APPENDIX D RECOMMENDED PROCEDURE  
FOR SAFETY INSPECTION OF  
AN EXISTING APPLIANCE  
INSTALLATION ..... 555**

**APPENDIX E MANUFACTURED HOUSING  
USED AS DWELLINGS ..... 561**

Section

AE101 Scope ..... 561

AE102 Application to Existing Manufactured Homes  
and Building Service Equipment..... 561

AE201 Definitions ..... 562

AE301 Permits ..... 563

AE302 Application for Permit ..... 563

AE303 Permits Issuance..... 563

AE304 Fees ..... 564

AE305 Inspections ..... 565

AE306 Special Inspections..... 566

AE307 Utility Service ..... 566

AE401 Occupancy Classification..... 566

AE402 Location on Property ..... 566

AE501 Design ..... 566

AE502 Foundation Systems..... 566

AE503 Skirting and Perimeter Enclosures..... 567

AE504 Structural Additions..... 567

AE505 Building Service Equipment ..... 567

AE506 Exits ..... 567

AE507 Occupancy, Fire Safety and Energy  
Conservation Standards ..... 567

AE600 Special Requirements for  
Foundation Systems ..... 567

AE601 Footings and Foundations ..... 567

AE602 Pier Construction ..... 567

AE603 Height of Piers ..... 568

AE604 Anchorage Installations ..... 568

AE605 Ties, Materials and Installation ..... 569

AE606 Referenced Standards..... 569

**APPENDIX F PASSIVE RADON  
GAS CONTROLS..... 571**

Section

AF101 Scope ..... 571

AF102 Definitions ..... 571

AF103 Passive Radon-resistant  
System Requirements..... 572

**APPENDIX G PIPING STANDARDS FOR  
VARIOUS APPLICATIONS..... 579**

Section

AG101 Plastic Piping Standards..... 579

**TABLE OF CONTENTS**

AG102 Referenced Standards . . . . . 579

**APPENDIX H PATIO COVERS . . . . . 583**

Section  
 AH101 General . . . . . 583  
 AH102 Definition . . . . . 583  
 AH103 Exterior Walls and Openings . . . . . 583  
 AH104 Height . . . . . 583  
 AH105 Structural Provisions . . . . . 583  
 AH106 Special Provisions for Aluminum Screen  
 Enclosures in Hurricane-prone Regions . . . . . 584

**APPENDIX I PRIVATE SEWAGE DISPOSAL . . . . . 587**

Section  
 AI101 General . . . . . 587

**APPENDIX J EXISTING BUILDINGS  
 AND STRUCTURES . . . . . 589**

Section  
 AJ101 Purpose and Intent . . . . . 589  
 AJ102 Compliance . . . . . 589  
 AJ103 Preliminary Meeting . . . . . 590  
 AJ104 Evaluation of an Existing Building . . . . . 590  
 AJ105 Permit . . . . . 590  
 AJ201 Definitions . . . . . 591  
 AJ301 Repairs . . . . . 591  
 AJ401 Renovations . . . . . 591  
 AJ501 Alterations . . . . . 592  
 AJ601 Reconstruction . . . . . 593

**APPENDIX K SOUND TRANSMISSION . . . . . 595**

Section  
 AK101 General . . . . . 595  
 AK102 Air-borne Sound . . . . . 595  
 AK103 Structural-borne Sound . . . . . 595  
 AK104 Referenced Standards . . . . . 595

**APPENDIX L PERMIT FEES . . . . . 597**

**APPENDIX M HOME DAY CARE—  
 R-3 OCCUPANCY . . . . . 599**

**APPENDIX N VENTING METHODS . . . . . 601**

**APPENDIX O AUTOMATIC  
 VEHICULAR GATES . . . . . 607**

Section  
 AO101 General . . . . . 607  
 AO102 Definition . . . . . 607  
 AO103 Automatic Vehicular Gates . . . . . 607

**APPENDIX P SIZING OF WATER  
 PIPING SYSTEM . . . . . 609**

Section  
 AP101 General . . . . . 609  
 AP102 Information Required . . . . . 609  
 AP103 Selection of Pipe Size . . . . . 609  
 AP201 Selection of Pipe Size . . . . . 626

**APPENDIX Q Reserved . . . . . 629**

**APPENDIX R LIGHT STRAW-CLAY  
 CONSTRUCTION . . . . . 631**

Section  
 AR101 General . . . . . 631  
 AR102 Definitions . . . . . 631  
 AR103 Nonbearing Light Straw-clay Construction . . . . . 631  
 AR104 Thermal Insulation . . . . . 633  
 AR105 Referenced Standard . . . . . 633

**APPENDIX S STRAWBALE CONSTRUCTION . . . . . 635**

Section  
 AS101 General . . . . . 635  
 AS102 Definitions . . . . . 635  
 AS103 Bales . . . . . 636  
 AS104 Finishes . . . . . 636  
 AS105 Strawbale Walls—General . . . . . 637  
 AS106 Strawbale Walls—Structural . . . . . 639  
 AS107 Fire Resistance . . . . . 641  
 AS108 Thermal Insulation . . . . . 643  
 AS109 Referenced Standards . . . . . 643

**APPENDIX T RECOMMENDED PROCEDURE  
 FOR WORST-CASE TESTING  
 OF ATMOSPHERIC VENTING  
 SYSTEMS UNDER N1102.4 OR  
 N1105 CONDITIONS ≤ 5ACH<sub>50</sub> . . . . . 645**

Section  
 T101 Scope . . . . . 645  
 T202 General Definitions . . . . . 645  
 T301 Testing Procedure . . . . . 645

**APPENDIX U SOLAR-READY PROVISIONS—  
DETACHED ONE- AND TWO-  
FAMILY DWELLINGS, MULTIPLE  
SINGLE-FAMILY DWELLINGS  
(TOWNHOUSES) ..... 649**

Section

U101 Scope ..... 649

U102 General Definitions ..... 649

U103 Solar-ready Zone ..... 649

**APPENDIX V SWIMMING POOL  
SAFETY ACT ..... 651**

**APPENDIX W AREAS PROTECTED BY  
THE FACILITIES OF THE  
CENTRAL VALLEY FLOOD  
PROTECTION PLAN ..... 655**

**INDEX ..... 661**

**HISTORY NOTE ..... 667**