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2009 International Energy Conservation Code®

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PREFACE

Introduction

Internationally, code officials recognize the need for a modern, up-to-date energy conservation code addressing the design of energy-efficient building envelopes and installation of energy efficient mechanical, lighting and power systems through requirements emphasizing performance. The *International Energy Conservation Code*® in this 2009 edition, is designed to meet these needs through model code regulations that will result in the optimal utilization of fossil fuel and nondepletable resources in all communities' large and small.

This comprehensive energy conservation code establishes minimum regulations for energy efficient buildings using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new energy efficient 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 Existing Building Code*®, *International Fire Code*®, *International Fuel Gas Code*®, *International Mechanical Code*®, *ICC Performance Code*®, *International Plumbing Code*®, *International Private Sewage Disposal Code*®, *International Property Maintenance Code*®, *International Residential Code*®, *International Wildland-Urban Interface Code*™ and *International Zoning Code*®.

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

Development

The first edition of the *International Energy Conservation Code* (1998) was based on the 1995 edition of the *Model Energy Code* promulgated by the Council of American Building Officials (CABO) and included changes approved through the CABO Code Development Procedures through 1997. CABO assigned all rights and responsibilities to the International Code Council and its three statutory members at that time, including Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI). This 2009 edition presents the code as originally issued, with changes reflected in the 2000, 2003 and 2006 editions and further changes approved through the ICC Code Development Process through 2008. A new edition such as this is promulgated every three years.

This code is founded on principles intended to establish provisions consistent with the scope of an energy conservation code that adequately conserves energy; 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 Energy Conservation 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 vii addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

Maintenance

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

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

While the development procedure of the *International Energy Conservation Code* assures the highest degree of care, ICC, its members and those participating in the development of this code do not accept any liability resulting from compliance or noncompliance with the provisions because ICC and its 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 Energy Conservation Code

The *International Energy Conservation Code* (IECC) is a model code that regulates minimum energy conservation requirements for new buildings. The IECC addresses energy conservation requirements for all aspects of energy uses in both commercial and residential construction, including heating and ventilating, lighting, water heating, and power usage for appliances and building systems.

The IECC is a design document. For example, before one constructs a building, the designer must determine the minimum insulation R-values and fenestration V-factors for the building exterior envelope. Depending on whether the building is for residential use or for commercial use, the IECC sets forth minimum requirements for exterior envelope insulation, window and door V-factors and SHGC ratings, duct insulation, lighting and power efficiency, and water distribution insulation.

Arrangement and Format of the 2009 IECC

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

Chapters	Subjects
1-2	Administration and definitions
3	Climate zones and general materials requirements
4	Energy efficiency for residential buildings
5	Energy efficiency for commercial buildings
6	Referenced standards

The following is a chapter-by-chapter synopsis of the scope and intent of the provisions of the *International Energy Conservation Code*:

Chapter 1 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 energy conservation 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. All terms that are defined in the code are listed alphabetically in Chapter 2. While a defined term may be used in one chapter or another, the meaning provided in Chapter 2 is applicable throughout the code.

Additional definitions regarding climate zones are found in Tables 301.3(1) and (2). These are not listed in Chapter 2.

Where understanding of a term's definition is especially key to or necessary for understanding of a particular code provision, the term is shown in *italics* wherever it appears in the code. This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Guidance regarding tense, gender and plurality of defined terms as well as guidance regarding terms not defined in this code is provided.

Chapter 3 Climate Zones. Chapter 3 specifies the climate zones that will serve to establish the exterior design conditions. In addition, Chapter 3 provides interior design conditions that are used as a basis for assumptions in heating and cooling load calculations, and provides basic material requirements for insulation materials and fenestration materials.

Climate has a major impact on the energy use of most buildings. The code establishes many requirements such as wall and roof insulation R-values, window and door thermal transmittance requirement (V-factors) as well as provisions that affect the mechanical systems based upon the climate where the building is located. This chapter will contain the information that will be used to properly assign the building location into the correct climate zone and will then be used as the basis for establishing requirements or elimination of requirements.

Chapter 4 Residential Energy Efficiency. Chapter 4 contains the energy-efficiency-related requirements for the design and construction of residential buildings regulated under this code. It should be noted that the definition of a *residential building* in this code is unique for this code. In this code, a *residential building* is an R-2, R-3 or R-4 building three stories or less in height. All other buildings, including residential buildings greater than three stories in height, are regulated by the energy conservation requirements of Chapter 5. The applicable portions of a residential building must comply with the provisions within this chapter for energy effi-

ciency. This chapter defines requirements for the portions of the building and building systems that impact energy use in new residential 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 and the service water heating system of the building.

Chapter 5 Commercial Energy Efficiency. Chapter 5 contains the energy-efficiency-related requirements for the design and construction of most types of commercial buildings and residential buildings greater than three stories in height above grade. Residential buildings, townhouses and garden apartments three stories or less in height are covered in Chapter 4. Like Chapter 4, this chapter defines requirements for the portions of the building and building systems that impact energy use in new commercial construction and new residential construction greater than three stories in height, and promotes the effective use of energy. The provisions within the chapter promote energy efficiency in the building envelope, the heating and cooling system and the service water heating system of the building.

Chapter 6 Referenced Standards. The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 6 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 6 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.

ORDINANCE

The International Codes are designed and promulgated to be adopted by reference by ordinance. Jurisdictions wishing to adopt the 2009 *International Energy Conservation Code* as an enforceable regulation governing energy efficient building envelopes and installation of energy efficient mechanical, lighting and power systems 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 ENERGY CONSERVATION CODE* ORDINANCE NO. _____

An ordinance of the [JURISDICTION] adopting the 2009 edition of the *International Energy Conservation Code*, regulating and governing energy efficient building envelopes and installation of energy efficient mechanical, lighting and power systems 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 Energy Conservation Code*, 2009 edition, as published by the International Code Council, be and is hereby adopted as the Energy Conservation Code of the [JURISDICTION], in the State of [STATE NAME] for regulating and governing energy efficient building envelopes and installation of energy efficient mechanical, lighting and power systems 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 Energy Conservation Code on file in the office of the [JURISDICTION] are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any, prescribed in Section 2 of this ordinance.

Section 2. The following sections are hereby revised:

Section 101.1. Insert: [NAME OF JURISDICTION].

Section 108.4. Insert: [DOLLAR AMOUNT] in two places.

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 anyone or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

Section 5. That nothing in this ordinance or in the Energy Conservation 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.

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CHAPTER 1

ADMINISTRATION

I PART 1-SCOPE AND APPLICATION

SECTION 101 SCOPE AND GENERAL REQUIREMENTS

101.1 Title. This code shall be known as the *International Energy Conservation Code* of [NAME OF JURISDICTION], and shall be cited as such. It is referred to herein as "this code."

101.2 Scope. This code applies to *residential* and *commercial* buildings.

101.3 Intent. This code shall regulate the design and construction of buildings for the effective use of energy. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve the effective use of energy. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

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

101.4.1 Existing buildings. Except as specified in this chapter, this code shall not be used to require the removal, *alteration* or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.

101.4.2 Historic buildings. Any building or structure that is listed in the State or National Register of Historic Places; designated as a historic property under local or state designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National or State Registers of Historic Places either individually or as a contributing building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, are exempt from this code.

101.4.3 Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the exist-

ing building and addition comply with this code as a single building.

Exception: The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
6. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed.
7. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

101.4.4 Change in occupancy or use. Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuel or electrical energy shall comply with this code. Where the use in a space changes from one use in Table 505.5.2 to another use in Table 505.5.2, the installed lighting wattage shall comply with Section 505.5.

101.4.5 Change in space conditioning. Any nonconditioned space that is altered to become *conditioned space* shall be required to be brought into full compliance with this code.

101.4.6 Mixed occupancy. Where a building includes both *residential* and *commercial* occupancies, each occupancy shall be separately considered and meet the applicable provisions of Chapter 4 for *residential* and Chapter 5 for *commercial*.

101.5 Compliance. *Residential buildings* shall meet the provisions of Chapter 4. *Commercial buildings* shall meet the provisions of Chapter 5.

101.5.1 Compliance materials. The *code official* shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

101.5.2 Low energy buildings. The following buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this code shall be exempt from the *building thermal envelope* provisions of this code:

1. Those with a peak design rate of energy usage less than $3.4 \text{ Btu/h}\cdot\text{ft}^2$ (10.7 W/m^2) or 1.0 watt/ft^2 (10.7 W/m^2) of floor area for space conditioning purposes.
2. Those that do not contain *conditioned space*.

SECTION 102 ALTERNATE MATERIALS-METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

102.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating system has been *approved* by the *code official* as meeting the intent of this code.

102.1.1 Above code programs. The *code official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code. Buildings *approved* in writing by such an energy efficiency program shall be considered in compliance with this code. The requirements identified as "mandatory" in Chapters 4 and 5 of this code, as applicable, shall be met.

I PART 2-ADMINISTRATION AND ENFORCEMENT

SECTION 103 CONSTRUCTION DOCUMENTS

103.1 General. Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *code official* is authorized to require necessary construction documents to be prepared by a registered design professional.

Exception: The *code official* is authorized to waive the requirements for construction documents or other supporting data if the *code official* determines they are not necessary to confirm compliance with this code.

103.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted

when *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, as applicable, insulation materials and their R-values; fenestration V-factors and SHGCs; area-weighted V-factor and SHGC calculations; mechanical system design criteria; mechanical and service water heating system and equipment types, sizes and efficiencies; economizer description; equipment and systems controls; fan motor horsepower (hp) and controls; duct sealing, duct and pipe insulation and location; lighting fixture schedule with wattage and control narrative; and air sealing details.

103.3 Examination of documents. The *code official* shall examine or cause to be examined the accompanying construction documents and shall ascertain whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances.

103.3.1 Approval of construction documents. When the *code official* issues a permit where construction documents are required, the construction documents shall be endorsed in writing and stamped "Reviewed for Code Compliance." Such *approved* construction documents shall not be changed, modified or altered without authorization from the *code official*. Work shall be done in accordance with the *approved* construction documents.

One set of construction documents so reviewed shall be retained by the *code official*. The other set shall be returned to the applicant, kept at the site of work and shall be open to inspection by the *code official* or a duly authorized representative.

103.3.2 Previous approvals. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

103.3.3 Phased approval. The *code official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.

103.4 Amended construction documents. Changes made during construction that are not in compliance with the *approved* construction documents shall be resubmitted for approval as an amended set of construction documents.

103.5 Retention of construction documents. One set of *approved* construction documents shall be retained by the *code official* for a period of not less than 180 days from date of completion of the permitted work, or as required by state or local laws.

SECTION 104 INSPECTIONS

104.1 General. Construction or work for which a permit is required shall be subject to inspection by the *code official*.

104.2 Required approvals. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the *code official*. The *code official*, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the *code official*.

104.3 Final inspection. The building shall have a final inspection and not be occupied until *approved*.

104.4 Reinspection. A building shall be reinspected when determined necessary by the *code official*.

104.5 Approved inspection agencies. The *code official* is authorized to accept reports of *approved* inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability.

104.6 Inspection requests. It shall be the duty of the holder of the permit or their duly authorized agent to notify the *code official* when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

104.7 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the *code official* for inspection and testing.

104.8 Approval. After the prescribed tests and inspections indicate that the work complies in all respects with this code, a notice of approval shall be issued by the *code official*.

104.8.1 Revocation. The *code official* is authorized to, in writing, suspend or revoke a notice of approval issued under the provisions of this code wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure, premise, or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.

SECTION 105 VALIDITY

105.1 General. If a portion of this code is held to be illegal or void, such a decision shall not affect the validity of the remainder of this code.

SECTION 106 REFERENCED STANDARDS

106.1 General. The codes and standards referenced in this code shall be those listed in Chapter 6, and such codes and stan-

dards shall be considered as part of the requirements of this code to the prescribed extent of each such reference.

106.2 Conflicting requirements. Where the provisions of this code and the referenced standards conflict, the provisions of this code shall take precedence.

106.3 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.

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

SECTION 107 FEES

107.1 Fees. A permit shall not be issued until the fees prescribed in Section 107.2 have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

107.2 Schedule of permit fees. A fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

107.3 Work commencing before permit issuance. Any person who commences any work before obtaining the necessary permits shall be subject to an additional fee established by the *code official*, which shall be in addition to the required permit fees.

107.4 Related fees. The payment of the fee for the construction, *alteration*, removal or demolition of work done in connection to or concurrently with the work or activity authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

107.5 Refunds. The *code official* is authorized to establish a refund policy.

SECTION 108 STOP WORK ORDER

108.1 Authority. Whenever the *code official* finds any work regulated by this code being performed in a manner either contrary to the provisions of this code or dangerous or unsafe, the *code official* is authorized to issue a stop work order.

108.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property involved, or to the owner's agent, or to the person doing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order, and the conditions under which the cited work will be permitted to resume.

108.3 Emergencies. Where an emergency exists, the *code official* shall not be required to give a written notice prior to stopping the work.

108.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a vio-

lation or unsafe condition, shall be liable to a fine of not less than [AMOUNT] dollars or more than [AMOUNT] dollars.

SECTION 109 BOARD OF APPEALS

109.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the *code official* relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The *code official* shall be an ex officio member of said board but shall have no vote on any matter before the board. The board of appeals shall be appointed by the governing body and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the *code official*.

109.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The board shall have no authority to waive requirements of this code.

109.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training and are not employees of the jurisdiction.

CHAPTER 2

DEFINITIONS

SECTION 201 GENERAL

201.1 Scope. Unless stated otherwise, the following words and terms in this code shall have the meanings indicated in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural includes the singular.

201.3 Terms defined in other codes. Terms that are not defined in this code but are defined in the *International Building Code*, *International Fire Code*, *International Fuel Gas Code*, *International Mechanical Code*, *International Plumbing Code* or the *International Residential Code* shall have the meanings ascribed to them in those codes.

201.4 Terms not defined. Terms not defined by this chapter shall have ordinarily accepted meanings such as the context implies.

SECTION 202 GENERAL DEFINITIONS

ABOVE-GRADE WALL. A wall more than 50 percent above grade and enclosing *conditioned space*. This includes between-floor spandrels, peripheral edges of floors, roof and basement knee walls, dormer walls, gable end walls, walls enclosing a mansard roof and skylight shafts.

ACCESSIBLE. Admitting close approach as a result of not being guarded by locked doors, elevation or other effective means (see "Readily accessible").

ADDITION. An extension or increase in the *conditioned space* floor area or height of a building or structure.

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

ALTERATION. Any construction or renovation to an existing structure other than repair or addition that requires a permit. Also, a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit.

APPROVED. Approval by the *code official* as a result of investigation and tests conducted by him or her, or by reason of accepted principles or tests by nationally recognized organizations.

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current strength, pressure, temperature or mechanical configuration (see "Manual").

BASEMENT WALL. A wall 50 percent or more below grade and enclosing *conditioned space*.

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof, and any other building element that enclose *conditioned space*. This boundary also includes the boundary between *conditioned space* and any exempt or unconditioned space.

C-FACTOR (THERMAL CONDUCTANCE). The coefficient of heat transmission (surface to surface) through a building component or assembly, equal to the time rate of heat flow per unit area and the unit temperature difference between the warm side and cold side surfaces ($\text{Btu/h ft}^2 \times \text{OF}$) [$\text{W}/(\text{m}^2 \times \text{K})$].

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COMMERCIAL BUILDING. For this code, all buildings that are not included in the definition of "Residential buildings."

CONDITIONED FLOOR AREA. The horizontal projection of the floors associated with the *conditioned space*.

CONDITIONED SPACE. An area or room within a building being heated or cooled, containing uninsulated ducts, or with a fixed opening directly into an adjacent *conditioned space*.

CRAWL SPACE WALL. The opaque portion of a wall that encloses a crawl space and is partially or totally below grade.

CURTAIN WALL. Fenestration products used to create an external nonload-bearing wall that is designed to separate the exterior and interior environments.

DAYLIGHT ZONE.

1. Under skylights. The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to-ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.
2. Adjacent to vertical fenestration. The area adjacent to vertical fenestration which receives daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight zone depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight zone width is assumed to be the width of the window plus 2 feet (610 mm) on each side, or the window width plus the distance to an opaque partition, or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

DEMAND CONTROL VENTILATION (DCV). A ventilation system capability that provides for the automatic reduction of outdoor air intake below design rates when the actual occupancy of spaces served by the system is less than design occupancy.

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING UNIT. A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

ECONOMIZER, AIR. A duct and damper arrangement and automatic control system that allows a cooling system to supply outside air to reduce or eliminate the need for mechanical cooling during mild or cold weather.

ECONOMIZER, WATER. A system where the supply air of a cooling system is cooled indirectly with water that is itself cooled by heat or mass transfer to the environment without the use of mechanical cooling.

ENERGY ANALYSIS. A method for estimating the annual energy use of the *proposed design* and *standard reference design* based on estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building functions regulated by this code, including applicable demand charges.

ENERGY RECOVERY VENTILATION SYSTEM. Systems that employ air-to-air heat exchangers to recover energy from exhaust air for the purpose of preheating, precooling, humidifying or dehumidifying outdoor ventilation air prior to supplying the air to a space, either directly or as part of an HVAC system.

ENERGY SIMULATION TOOL. An *approved* software program or calculation-based methodology that projects the annual energy use of a building.

ENTRANCE DOOR. Fenestration products used for ingress, egress and access in nonresidential buildings, including, but not limited to, exterior entrances that utilize latching hardware and automatic closers and contain over 50-percent glass specifically designed to withstand heavy use and possibly abuse.

EXTERIOR WALL. Walls including both above-grade walls and basement walls.

FAN BRAKE HORSEPOWER (BHP). The horsepower delivered to the fan's shaft. Brake horsepower does not include the mechanical drive losses (belts, gears, etc.).

FAN SYSTEM BHP. The sum of the fan brake horsepower of all fans that are required to operate at fan system design conditions to supply air from the heating or cooling source to the *conditioned spaces*) and return it to the source or exhaust it to the outdoors.

FAN SYSTEM DESIGN CONDITIONS. Operating conditions that can be expected to occur during normal system operation that result in the highest supply fan airflow rate to conditioned spaces served by the system.

FAN SYSTEM MOTOR NAMEPLATE HP. The sum of the motor nameplate horsepower of all fans that are required to operate at design conditions to supply air from the heating or cooling source to the *conditioned spaces*) and return it to the source or exhaust it to the outdoors.

FENESTRATION. Skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass and nonglass glazing materials.

F-FACTOR. The perimeter heat loss factor for slab-on-grade floors (Btu/h x ft x OF) [W/(m x K)].

HEAT TRAP. An arrangement of piping and fittings, such as elbows, or a commercially available heat trap that prevents thermosyphoning of hot water during standby periods.

HEATED SLAB. Slab-on-grade construction in which the heating elements, hydronic tubing, or hot air distribution system is in contact with, or placed within or under, the slab.

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts,
2. 50 lumens per watt for lamps over 15 watts to 40 watts, and
3. 40 lumens per watt for lamps 15 watts or less.

HUMIDISTAT. A regulatory device, actuated by changes in humidity, used for automatic control of relative humidity.

INFILTRATION. The uncontrolled inward air leakage into a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.

INSULATING SHEATHING. An insulating board with a core material having a minimum R-value of R-2.

LABELED. Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the *code official* and concerned with evaluation of products or services that maintains periodic inspection of production of *listed* equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose.

LOW-VOLTAGE LIGHTING. Lighting equipment powered through a transformer such as a cable conductor, a rail conductor and track lighting.

MANUAL. Capable of being operated by personal intervention (see "Automatic").

NAMEPLATE HORSEPOWER. The nominal motor horsepower rating stamped on the motor nameplate.

PROPOSED DESIGN. A description of the proposed building used to estimate annual energy use for determining compliance based on total building performance.

READILY ACCESSIBLE. Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "Accessible").

REPAIR. The reconstruction or renewal of any part of an existing building.

RESIDENTIAL BUILDING. For this code, includes R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

ROOF ASSEMBLY. A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly includes the roof covering, underlayment, roof deck, insulation, vapor retarder and interior finish.

R-VALUE (THERMAL RESISTANCE). The inverse of the time rate of heat flow through a body from one of its bounding surfaces to the other surface for a unit temperature difference between the two surfaces, under steady state conditions, per unit area ($h \cdot ft^2 \cdot of/Btu$) [$(m^2 \cdot K)/W$].

SCREW LAMP HOLDERS. A lamp base that requires a screw-in-type lamp, such as a compact-fluorescent, incandescent, or tungsten-halogen bulb.

SERVICE WATER HEATING. Supply of hot water for purposes other than comfort heating.

SKYLIGHT. Glass or other transparent or translucent glazing material installed at a slope of 15 degrees (0.26 rad) or more from vertical. Glazing material in skylights, including unit skylights, solariums, sunrooms, roofs and sloped walls is included in this definition.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not *sleeping units*.

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then reradiated, conducted or convected into the space.

STANDARD REFERENCE DESIGN. A version of the *proposed design* that meets the minimum requirements of this code and is used to determine the maximum annual energy use requirement for compliance based on total building performance.

STOREFRONT. A nonresidential system of doors and windows mullied as a composite fenestration structure that has been designed to resist heavy use. *Storefront systems* include, but are not limited to, exterior fenestration systems that span from the floor level or above to the ceiling of the same story on commercial buildings.

SUNROOM. A one-story structure attached to a dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.

THERMAL ISOLATION. Physical and space conditioning separation from *conditioned space(s)*. The *conditioned space(s)* shall be controlled as separate zones for heating and cooling or conditioned by separate equipment.

THERMOSTAT. An automatic control device used to maintain temperature at a fixed or adjustable set point.

V-FACTOR (THERMAL TRANSMITTANCE). The coefficient of heat transmission (air to air) through a building component or assembly, equal to the time rate of heat flow per unit area and unit temperature difference between the warm side and cold side air films ($Btu/h \cdot ft^2 \cdot OF$) [$W/(m^2 \cdot K)$].

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VENTILATION AIR. That portion of supply air that comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

ZONE. A space or group of spaces within a building with heating or cooling requirements that are sufficiently similar so that desired conditions can be maintained throughout using a single controlling device.

CHAPTER 3

CLIMATE ZONES

SECTION 301 CLIMATE ZONES

301.1 General. Climate *zones* from Figure 301.1 or Table 301.1 shall be used in determining the applicable requirements from Chapters 4 and 5. Locations not in Table 301.1 (outside the United States) shall be assigned a climate *zone* based on Section 301.3.

301.2 Warm humid counties. Warm humid counties are identified in Table 301.1 by an asterisk.

301.3 International climate zones. The climate *zone* for any location outside the United States shall be determined by

- applying Table 301.3(1) and then Table 301.3(2).

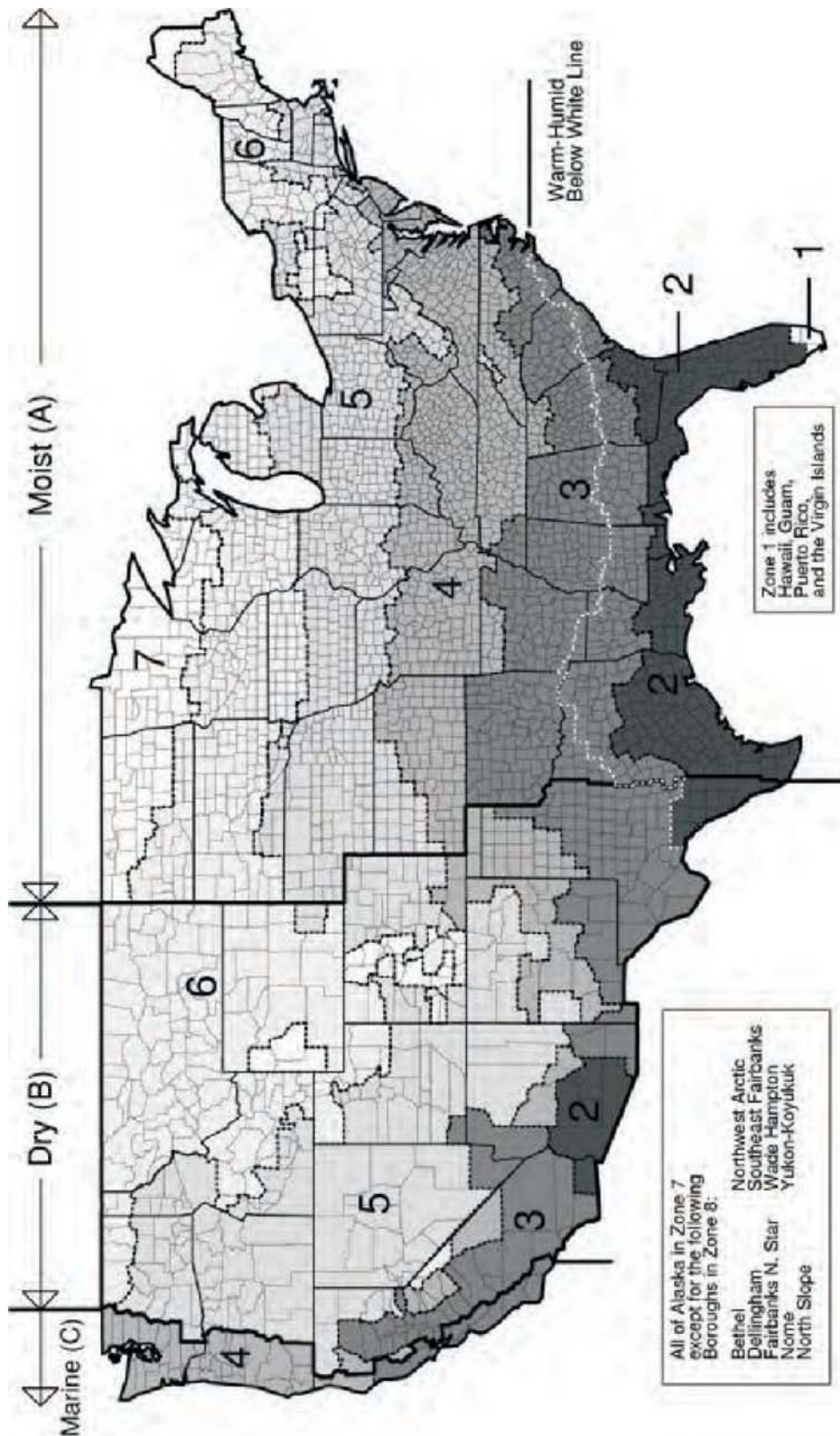


FIGURE 301.1
CLIMATE ZONES

TABLE 301.1
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

Note: Table 301.1 in the 2006 edition has been replaced in its entirety. Margin lines are omitted for clarity.

Key: A - Moist, B - Dry, C - Marine. Absence of moisture designation indicates moisture regime is irrelevant.
 Asterisk (*) indicates a warm-humid location.

US STATES

ALABAMA	3A Henry*	ALASKA	SB Coconino	3A Desha
3A Autauga*	3A Houston*	7 Aleutians East	4B Gila	3A Drew
2A Baldwin*	3A Jackson	7 Aleutians West	3B Graham	3A Faulkner
3A Barbour*	3A Jefferson	7 Anchorage	3B Greenlee	3A Franklin
3A Bibb	3A Lamar	8 Bethel	2B La Paz	4A Fulton
3A Blount	3A Lauderdale	7 Bristol Bay	2B Maricopa	3A Garland
3A Bullock*	3A Lawrence	7 Denali	3B Mohave	3A Grant
3A Butler*	3A Lee	8 Dillingham	SB Navajo	3A Greene
3A Calhoun	3A Limestone	8 Fairbanks North	2B Pima	3A Hempstead*
3A Chambers	3A Lowndes*	Star	2B Pinal	3A Hot Spring
3A Cherokee	3A Macon*	7 Haines	3B Santa Cruz	3A Howard
3A Chilton	3A Madison	7 Juneau	4B Yavapai	3A Independence
3A Choctaw*	3A Marengo*	7 Kenai Peninsula	2B Yuma	4A Izard
3A Clarke*	3A Marion	7 Ketchikan Gateway	ARKANSAS	3A Jackson
3A Clay	3A Marshall	7 Kodiak Island	3A Arkansas	3A Jefferson
3A Cleburne	2A Mobile*	7 Lake and Peninsula	3A Ashley	3A Johnson
3A Coffee*	3A Monroe*	7 Matanuska-Susitna	4A Baxter	3A Lafayette*
3A Colbert	3A Montgomery*	8 Nome	4A Benton	3A Lawrence
3A Conecuh*	3A Morgan	8 North Slope	4A Boone	3A Lee
3A Coosa	3A Perry*	8 Northwest Arctic	3A Bradley	3A Lincoln
3A Covington*	3A Pickens	7 Prince of Wales-Outer Ketchikan	3A Calhoun	3A Little River*
3A Crenshaw*	3A Pike*	7 Sitka	4A Carroll	3A Logan
3A Cullman	3A Randolph	7 Skagway-Hoonah-Angoon	3A Chicot	3A Lonoke
3A Dale*	3A Russell*	8 Southeast Fairbanks	3A Clark	4A Madison
3A Dallas*	3A Shelby	7 Valdez-Cordova	3A Clay	4A Marion
3A DeKalb	3A St. Clair	8 Wade Hampton	3A Cleburne	3A Miller*
3A Elmore*	3A Sumter	7 Wrangell-Petersburg	3A Cleveland	3A Mississippi
3A Escambia*	3A Talladega	7 Yakutat	3A Columbia*	3A Monroe
3A Etowah	3A Tallapoosa	8 Yukon-Koyukuk	3A Conway	3A Montgomery
3A Fayette	3A Tuscaloosa	ARIZONA	3A Craighead	3A Nevada
3A Franklin	3A Walker	SB Apache	3A Crawford	4A Newton
3A Geneva*	3A Washington*	3B Cochise	3A Crittenden	3A Ouachita
3A Greene	3A Wilcox*		3A Cross	3A Perry
3A Hale	3A Winston		3A Dallas	3A Phillips

(continued)

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

3A Pike	3B Los Angeles	COLORADO	7 Mineral	2A Charlotte*
3A Poinsett	3B Madera	5B Adams	6B Moffat	2A Citrus*
3A Polk	3C Marin	6B Alamosa	5B Montezuma	2A Clay*
3A Pope	4B Mariposa	5B Arapahoe	5B Montrose	2A Collier*
3A Prairie	3C Mendocino	6B Archuleta	5B Morgan	2A Columbia*
3A Pulaski	3B Merced	4B Baca	4B Otero	2A DeSoto*
3A Randolph	5B Modoc	5B Bent	6B Ouray	2A Dixie*
3A Saline	6B Mono	5B Boulder	7 Park	2A Duval*
3A Scott	3C Monterey	6B Chaffee	5B Phillips	2A Escambia*
4A Searcy	3C Napa	5B Cheyenne	7 Pitkin	2A Flagler*
3A Sebastian	5B Nevada	7 Clear Creek	5B Prowers	2A Franklin*
3A Sevier*	3B Orange	6B Conejos	5B Pueblo	2A Gadsden*
3A Sharp	3B Placer	6B Costilla	6B Rio Blanco	2A Gilchrist*
3A St. Francis	5B Plumas	5B Crowley	7 Rio Grande	2A Glades*
4A Stone	3B Riverside	6B Custer	7 Routt	2A Gulf*
3A Union*	3B Sacramento	5B Delta	6B Saguache	2A Hamilton*
3A Van Buren	3C San Benito	5B Denver	7 San Juan	2A Hardee*
4A Washington	3B San Bernardino	6B Dolores	6B San Miguel	2A Hendry*
3A White	3B San Diego	5B Douglas	5B Sedgwick	2A Hernando*
3A Woodruff	3C San Francisco	6B Eagle	7 Summit	2A Highlands*
3A Yell	3B San Joaquin	5B Elbert	5B Teller	2A Hillsborough*
CALIFORNIA	3C San Luis Obispo	5B El Paso	5B Washington	2A Holmes*
3C Alameda	3C San Mateo	5B Fremont	5B Weld	2A Indian River*
6B Alpine	3C Santa Barbara	5B Garfield	5B Yuma	2A Jackson*
4B Amador	3C Santa Clara	5B Gilpin	CONNECTICUT	2A Jefferson*
3B Butte	3C Santa Cruz	7 Grand	5A (all)	2A Lafayette*
4B Calaveras	3B Shasta	7 Gunnison	DELAWARE	2A Lake*
3B Colusa	5B Sierra	7 Hinsdale	4A (all)	2A Lee*
3B Contra Costa	5B Siskiyou	5B Huerfano	DISTRICT OF COLUMBIA	2A Leon*
4C Del Norte	3B Solano	7 Jackson	4A (all)	2A Levy*
4B El Dorado	3C Sonoma	5B Jefferson	FLORIDA	2A Liberty*
3B Fresno	3B Stanislaus	5B Kiowa	2A Alachua*	2A Madison*
3B Glenn	3B Sutter	5B Kit Carson	2A Baker*	2A Manatee*
4C Humboldt	3B Tehama	7 Lake	2A Bay*	2A Marion*
2B Imperial	4B Trinity	5B La Plata	2A Bradford*	2A Martin*
4B Inyo	3B Tulare	5B Larimer	2A Brevard*	1A Miami-Dade*
3B Kern	4B Tuolumne	4B Las Animas	1A Broward*	1A Monroe*
3B Kings	3C Ventura	5B Lincoln	2A Calhoun*	2A Nassau*
4B Lake	3B Yolo	5B Logan		2A Okaloosa*
5B Lassen	3B Yuba	5B Mesa		2A Okeechobee*

(continued)

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

2A Orange*	2A Camden*	4A Gilmer	3A Monroe	3A Twiggs*
2A Osceola*	3A Candler*	3A Glascock	3A Montgomery*	4A Union
2A Palm Beach*	3A Carroll	2A Glynn*	3A Morgan	3A Upson
2A Pasco*	4A Catoosa	4A Gordon	4A Murray	4A Walker
2A Pinellas*	2A Charlton*	2A Grady*	3A Muscogee	3A Walton
2A Polk*	2A Chatham*	3A Greene	3A Newton	2A Ware*
2A Putnam*	3A Chattahoochee*	3A Gwinnett	3A Oconee	3A Warren
2A Santa Rosa*	4A Chattooga	4A Habersham	3A Oglethorpe	3A Washington
2A Sarasota*	3A Cherokee	4A Hall	3A Paulding	2A Wayne*
2A Seminole*	3A Clarke	3A Hancock	3A Peach*	3A Webster*
2A St. Johns*	3A Clay*	3A Haralson	4A Pickens	3A Wheeler*
2A St. Lucie*	3A Clayton	3A Harris	2A Pierce*	4A White
2A Sumter*	2A Clinch*	3A Hart	3A Pike	4A Whitfield
2A Suwannee*	3A Cobb	3A Heard	3A Polk	3A Wilcox*
2A Taylor*	3A Coffee*	3A Henry	3A Pulaski*	3A Wilkes
2A Union*	2A Colquitt*	3A Houston*	3A Putnam	3A Wilkinson
2A Volusia*	3A Columbia	3A Irwin*	3A Quitman*	3A Worth*
2A Wakulla*	2A Cook*	3A Jackson	4A Rabun	
2A Walton*	3A Coweta	3A Jasper	3A Randolph*	HAWAII
2A Washington*	3A Crawford	2A Jeff Davis*	3A Richmond	1A (all) *
	3A Crisp*	3A Jefferson	3A Rockdale	IDAHO
GEORGIA	4A Dade	3A Jenkins*	3A Schley*	5B Ada
2A Appling*	4A Dawson	3A Johnson*	3A Screven*	6B Adams
2A Atkinson*	2A Decatur*	3A Jones	2A Seminole*	6B Bannock
2A Bacon*	3A DeKalb	3A Lamar	3A Spalding	6B Bear Lake
2A Baker*	3A Dodge*	2A Lanier*	4A Stephens	5B Benewah
3A Baldwin	3A Dooly*	3A Laurens*	3A Stewart*	6B Bingham
4A Banks	3A Dougherty*	3A Lee*	3A Sumter*	6B Blaine
3A Barrow	3A Douglas	2A Liberty*	3A Talbot	6B Boise
3A Bartow	3A Early*	3A Lincoln	3A Taliaferro	6B Bonner
3A Ben Hill*	2A Echols*	2A Long*	2A Tattnall*	6B Bonneville
2A Berrien*	2A Effingham*	2A Lowndes*	3A Taylor*	6B Boundary
3A Bibb	3A Elbert	4A Lumpkin	3A Telfair*	6B Butte
3A Bleckley*	3A Emanuel*	3A Macon*	3A Terrell*	6B Camas
2A Brantley*	2A Evans*	3A Madison	2A Thomas*	5B Canyon
2A Brooks*	4A Fannin	3A Marion*	3A Tift*	6B Caribou
2A Bryan*	3A Fayette	3A McDuffie	2A Toombs*	5B Cassia
3A Bulloch*	4A Floyd	2A McIntosh*	4A Towns	6B Clark
3A Burke	3A Forsyth	3A Meriwether	3A Treutlen*	5B Clearwater
3A Butts	4A Franklin	2A Miller*	3A Troup	6B Custer
3A Calhoun*	3A Fulton	2A Mitchell*	3A Turner*	5B Elmore

(continued)

CLIMATE ZONES

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

6B Franklin	SA Cook	4A Macoupin	4A Wayne	SA Henry
6B Fremont	4A Crawford	4A Madison	4A White	SA Howard
SBGem	SA Cumberland	4A Marion	SA Whiteside	SA Huntington
SB Gooding	SA DeKalb	SA Marshall	SA Will	4A Jackson
SB Idaho	SA De Witt	SA Mason	4A Williamson	SA Jasper
6B jefferson	SA Douglas	4A Massac	SA Winnebago	SA Jay
SB jerome	SA DuPage	SA McDonough	SA Woodford	4A jefferson
SB Kootenai	SA Edgar	SA McHenry	INDIANA	4A jennings
SB Latah	4A Edwards	SA McLean		SA Johnson
6B Lemhi	4A Effingham	SA Menard		4A Knox
SB Lewis	4A Fayette	SA Mercer		SA Kosciusko
SB Lincoln	SA Ford	4A Monroe		SA Lagrange
6B Madison	4A Franklin	4A Montgomery		SA Lake
SB Minidoka	SA Fulton	SA Morgan		SA La Porte
SB Nez Perce	4A Gallatin	SA Moultrie		4A Lawrence
6B Oneida	SA Greene	SA Ogle		SA Madison
SB Owyhee	SA Grundy	SA Peoria		SA Marion
SB Payette	4A Hamilton	4A Perry		SA Marshall
SB Power	SA Hancock	SA Piatt		4A Martin
SB Shoshone	4A Hardin	SA Pike		SA Miami
6B Teton	SA Henderson	4A Pope		4A Monroe
SB Twin Falls	SA Henry	4A Pulaski		SA Montgomery
6B Valley	SA Iroquois	SA Putnam		SA Morgan
SB Washington	4A Jackson	4A Randolph		SA Newton
ILLINOIS	4A Jasper	4A Richland		SA Noble
	4A jefferson	SA Rock Island		4A Ohio
	SA Adams	4A Saline		4A Orange
	4A Alexander	SA Sangamon		SA Owen
	4A Bond	SA Schuyler		SA Parke
	SA Boone	SA Scott		4A Perry
	SA Brown	4A Shelby		4A Pike
	SA Bureau	SA Stark		SA Porter
	SA Calhoun	4A St. Clair		4A Posey
	SA Carroll	SA Stephenson		SA Pulaski
	SA Cass	SA Tazewell		SA Putnam
	SA Champaign	4A Union		SA Randolph
	4A Christian	SA Vermilion		4A Ripley
	SA Clark	4A Wabash		SA Rush
	4A Clay	SA Warren		4A Scott
	4A Clinton	4A Washington		SA Shelby
	SA Coles			

(continued)

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

4A Spencer	SA Clarke	6A Lyon	KANSAS	4A Harvey
SA Starke	6A Clay	SA Madison	4A Allen	4A Haskell
SA Steuben	6A Clayton	SA Mahaska	4A Anderson	4A Hodgeman
SA St. Joseph	SA Clinton	SA Marion	4A Atchison	4A Jackson
4A Sullivan	SA Crawford	SA Marshall	4A Barber	4A Jefferson
4A Switzerland	SA Dallas	SA Mills	4A Barton	SA Jewell
SA Tippecanoe	SA Davis	6A Mitchell	4A Bourbon	4A Johnson
SA Tipton	SA Decatur	SA Monona	4A Brown	4A Kearny
SA Union	6A Delaware	SA Monroe	4A Butler	4A Kingman
4A Vanderburgh	SA Des Moines	SA Montgomery	4A Chase	4A Kiowa
SA Vermillion	6A Dickinson	SA Muscatine	4A Chautauqua	4A Labette
SA Vigo	SA Dubuque	6A O'Brien	4A Cherokee	SA Lane
SA Wabash	6A Emmet	6A Osceola	SA Cheyenne	4A Leavenworth
SA Warren	6A Fayette	SA Page	4A Clark	4A Lincoln
4A Warrick	6A Floyd	6A Palo Alto	4A Clay	4A Linn
4A Washington	6A Franklin	6A Plymouth	SA Cloud	SA Logan
SA Wayne	SA Fremont	6A Pocahontas	4A Coffey	4A Lyon
SA Wells	SA Greene	SA Polk	4A Comanche	4A Marion
SA White	6A Grundy	SA Pottawattamie	4A Cowley	4A Marshall
SA Whitley	SA Guthrie	SA Poweshiek	4A Crawford	4A McPherson
IOWA	6A Hamilton	SA Ringgold	SA Decatur	4A Meade
SA Adair	6A Hancock	6A Sac	4A Dickinson	4A Miami
SA Adams	6A Hardin	SA Scott	4A Doniphan	SA Mitchell
6A Allamakee	SA Harrison	SA Shelby	4A Douglas	4A Montgomery
SA Appanoose	SA Henry	6A Sioux	4A Edwards	4A Morris
SA Audubon	6A Howard	SA Story	4A Elk	4A Morton
SA Benton	6A Humboldt	SA Tama	SA Ellis	4A Nemaha
6A Black Hawk	6A Ida	SA Taylor	4A Ellsworth	4A Neosho
SA Boone	SA Iowa	SA Union	4A Finney	SA Ness
6A Bremer	SA Jackson	SA Van Buren	4A Ford	SA Norton
6A Buchanan	SA Jasper	SA Wapello	4A Franklin	4A Osage
6A Buena Vista	SA Jefferson	SA Warren	4A Geary	SA Osborne
6A Butler	SA Johnson	SA Washington	SA Gove	4A Ottawa
6A Calhoun	SA Jones	SA Wayne	SA Graham	4A Pawnee
SA Carroll	SA Keokuk	6A Webster	4A Grant	SA Phillips
SA Cass	6A Kossuth	6A Winnebago	4A Gray	4A Pottawatomie
SA Cedar	SA Lee	6A Winneshiek	SA Greeley	4A Pratt
6A Cerro Gordo	SA Linn	SA Woodbury	4A Greenwood	SA Rawlins
6A Cherokee	SA Louisa	6A Worth	SA Hamilton	4A Reno
6A Chickasaw	SA Lucas	6A Wright	4A Harper	SA Republic

(continued)

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

4A Rice	2A Cameron*	2A St. Mary*	4A Cecil	6A Crawford
4A Riley	3A Catahoula*	2A St. Tammany*	4A Charles	6A Delta
SA Rooks	3A Claiborne*	2A Tangipahoa*	4A Dorchester	6A Dickinson
4A Rush	3A Concordia*	3A Tensas*	4A Frederick	SA Eaton
4A Russell	3A De Soto*	2A Terrebonne*	SA Garrett	6A Emmet
4A Saline	2A East Baton Rouge*	3A Union*	4A Harford	SA Genesee
SA Scott	3A East Carroll	2A Vermilion*	4A Howard	6A Gladwin
4A Sedgwick	2A East Feliciana*	3A Vernon*	4A Kent	7 Gogebic
4A Seward	2A Evangeline*	2A Washington*	4A Montgomery	6A Grand Traverse
4A Shawnee	3A Franklin*	3A Webster*	4A Prince George's	SA Gratiot
SA Sheridan	3A Grant*	2A West Baton Rouge*	4A Queen Anne's	SA Hillsdale
SA Sherman	2A Iberia*	3A West Carroll	4A Somerset	7 Houghton
SA Smith	2A Iberville*	2A West Feliciana*	4A St. Mary's	6A Huron
4A Stafford	3A Jackson*	3A Winn*	4A Talbot	SA Ingham
4A Stanton	2A Jefferson*	MAINE	4A Washington	SA Ionia
4A Stevens	2A Jefferson Davis*	6A Androscoggin	4A Wicomico	6A Iosco
4A Sumner	2A Lafayette*	7 Aroostook	4A Worcester	7 Iron
SA Thomas	2A Lafourche*	6A Cumberland	MASSACHUSETTS	6A Isabella
SA Trego	3A La Salle*	6A Franklin	SA (all)	SA Jackson
4A Wabunsee	3A Lincoln*	6A Hancock	MICHIGAN	SA Kalamazoo
SA Wallace	2A Livingston*	6A Kennebec	6A Alcona	6A Kalkaska
4A Washington	3A Madison*	6A Knox	6A Alger	SA Kent
SA Wichita	3A Morehouse	6A Lincoln	SA Allegan	7 Keweenaw
4A Wilson	3A Natchitoches*	6A Oxford	6A Alpena	6A Lake
4A Woodson	2A Orleans*	6A Penobscot	6A Antrim	SA Lapeer
4A Wyandotte	3A Ouachita*	6A Piscataquis	6A Arenac	6A Leelanau
KENTUCKY	2A Plaquemines*	6A Sagadahoc	7 Baraga	SA Lenawee
4A (all)	2A Pointe Coupee*	6A Somerset	SA Barry	SA Livingston
LOUISIANA	2A Rapides*	6A Waldo	SA Bay	7 Luce
2A Acadia*	3A Red River*	6A Washington	SA Benzie	7 Mackinac
2A Allen*	3A Richland*	6A York	SA Berrien	SA Macomb
2A Ascension*	3A Sabine*	MARYLAND	SA Branch	6A Manistee
2A Assumption*	2A St. Bernard*	4A Allegany	SA Calhoun	6A Marquette
2A Avoyelles*	2A St. Charles*	4A Anne Arundel	SA Cass	6A Mason
2A Beauregard*	2A St. Helena*	4A Baltimore	6A Charlevoix	6A Mecosta
3A Bienville*	2A St. James*	4A Baltimore (city)	6A Cheboygan	6A Menominee
3A Bossier*	2A St. John the Baptist*	4A Calvert	7 Chippewa	SA Midland
3A Caddo*	2A St. Landry*	4A Caroline	6A Clare	6A Missaukee
2A Calcasieu*	2A St. Martin*	4A Carroll	SA Clinton	SA Monroe
3A Caldwell*				SA Montcalm

(continued)

TABLE 301.1-continued
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS
BY STATE, COUNTY AND TERRITORY

6A Montmorency	7 Cook	7 Pennington	3A Carroll	3A Montgomery
SA Muskegon	6A Cottonwood	7 Pine	3A Chickasaw	3A Neshoba
6A Newaygo	7 Crow Wing	6A Pipestone	3A Choctaw	3A Newton
SA Oakland	6A Dakota	7 Polk	3A Claiborne*	3A Noxubee
6A Oceana	6A Dodge	6A Pope	3A Clarke	3A Oktibbeha
6A Ogemaw	6A Douglas	6A Ramsey	3A Clay	3A Panola
7 Ontonagon	6A Faribault	7 Red Lake	3A Coahoma	2A Pearl River*
6A Osceola	6A Fillmore	6A Redwood	3A Copiah*	3A Perry*
6A Oscoda	6A Freeborn	6A Renville	3A Covington*	3A Pike*
6A Otsego	6A Goodhue	6A Rice	3A DeSoto	3A Pontotoc
SA Ottawa	7 Grant	6A Rock	3A Forrest*	3A Prentiss
6A Presque Isle	6A Hennepin	7 Roseau	3A Franklin*	3A Quitman
6A Roscommon	6A Houston	6A Scott	3A George*	3A Rankin*
SA Saginaw	7 Hubbard	6A Sherburne	3A Greene*	3A Scott
6A Sanilac	6A Isanti	6A Sibley	3A Grenada	3A Sharkey
7 Schoolcraft	7 Itasca	6A Stearns	2A Hancock*	3A Simpson*
SA Shiawassee	6A Jackson	6A Steele	2A Harrison*	3A Smith*
SA St. Clair	7 Kanabec	6A Stevens	3A Hinds*	2A Stone*
SA St. Joseph	6A Kandiyohi	7 St. Louis	3A Holmes	3A Sunflower
SA Tuscola	7 Kittson	6A Swift	3A Humphreys	3A Tallahatchie
SA Van Buren	7 Koochiching	6A Todd	3A Issaquena	3A Tate
SA Washtenaw	6A Lac qui Parle	6A Traverse	3A Itawamba	3A Tippah
SA Wayne	7 Lake	6A Wabasha	2A Jackson*	3A Tishomingo
6A Wexford	7 Lake of the Woods	7 Wadena	3A Jasper	3A Tunica
MINNESOTA	6A Le Sueur	6A Waseca	3A Jefferson*	3A Union
7 Aitkin	6A Lincoln	6A Washington	3A Jefferson Davis*	3A Walthall*
6A Anoka	6A Lyon	6A Watonwan	3A Jones*	3A Warren*
7 Becker	7 Mahnommen	7 Wilkin	3A Kemper	3A Washington
7 Beltrami	7 Marshall	6A Winona	3A Lafayette	3A Wayne*
6A Benton	6A Martin	6A Wright	3A Lamar*	3A Webster
6A Big Stone	6A McLeod	6A Yellow	3A Lauderdale	3A Wilkinson*
6A Blue Earth	6A Meeker	Medicine	3A Lawrence*	3A Winston
6A Brown	7 Mille Lacs	MISSISSIPPI	3A Leake	3A Yalobusha
7 Carlton	6A Morrison	3A Adams*	3A Lee	3A Yazoo
6A Carver	6A Mower	3A Alcorn	3A Leflore	MISSOURI
7 Cass	6A Murray	3A Amite*	3A Lincoln*	SA Adair
6A Chippewa	6A Nicollet	3A Attala	3A Lowndes	SA Andrew
6A Chisago	6A Nobles	3A Benton	3A Madison	SA Atchison
7 Clay	7 Norman	3A Bolivar	3A Marion*	4A Audrain
7 Clearwater	6A Olmsted	3A Calhoun	3A Marshall	4A Barry
	7 Otter Tail		3A Monroe	

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