PUBLIC PROPOSAL FORM

FOR PUBLIC PROPOSALS ON THE INTERNATIONAL CODES
2003/2004 CODE DEVELOPMENT CYCLE

PLEASE SEE REVERSE FOR INSTRUCTIONS ON SUBMITTING PUBLIC PROPOSALS. PROPOSALS MUST COMPLY WITH THESE INSTRUCTIONS.

CLOSING DATE: All Proposals Must Be Received by March 24, 2003.

1) Indicate the format in which you would like to receive your Public Proposals Monograph (PPM), Report of the Hearing (ROH) and Final Action Agenda (FAA):

[x] Paper [ ] * CD [ ] *Download from ICC Website

(*Note: A paper copy will not be sent to you if you have chosen the CD or Download format.)

2) PLEASE TYPE OR PRINT CLEARLY: FORMS WILL BE RETURNED if they contain unreadable information.

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Jurisdiction/Company:	U.S. Department of Energy				
Submitted on Behalf of:	U.S. Department of Energy				
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3) *Signature: _____ [X] **Signature on File**

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4) Cost Impact: Indicate if this Proposal: [ ] will [X] will not increase the cost of construction.

5) Indicate appropriate International Code(s) associated with this Public Proposal – Please use Acronym: **IECC**
(See back of this form or the instructions for list of names and acronyms for the International Codes):

6) Revision to: [x] Section 1,2,3,4,5,6, & app. [ ] Table _____ [ ] Figure _____

7) PROPOSAL Please check appropriate box:

[ ] **Revise as follows:** [ ] **Add new text as follows** [X] **Delete and substitute as follows:** [ ] **Delete without Substitution(s):**

Show the proposed NEW, REVISED or DELETED TEXT in legislative format: ~~Line through text to be deleted.~~ Underline text to be added.

IECC delete Chapters 1, 2, 3, 4, 5, and 6 and substitute as follows. Delete first Appendix.

CHAPTER 1
ADMINISTRATION AND ENFORCEMENT

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.

Exception: Existing buildings undergoing repair, alteration, or additions, and change of occupancy shall be permitted to comply with the *International Existing Building Code*.

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.

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. Buildings, or portions thereof, specifically classified as historic buildings by the state or local jurisdiction, listed in *The National Register of Historic Places*, or determined eligible for such listing by a designated authority 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.

Exceptions: 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.

101.4.4 Change in occupancy. Buildings 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.

101.4.5 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 Btu/h·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
MATERIALS, SYSTEMS AND EQUIPMENT

102.1 Identification. Materials, systems and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this code.

102.1.1 Building thermal envelope insulation. An R-value identification mark shall be applied by the manufacturer to each piece of building thermal envelope insulation 12 inches (305 mm) or greater in width. Alternately, the insulation installers shall provide a certification listing the type, manufacturer and R-value of insulation installed in each element of the building thermal envelope. For blown or sprayed insulation, the initial installed thickness, settled thickness, settled R-value, installed density, coverage area and number of bags installed shall be listed on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

102.1.1.1 Blown or sprayed roof/ceiling insulation. The thickness of blown in or sprayed roof/ceiling insulation shall be written in inches on markers that are installed at least one for every 300 ft^2 (28 m^2) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers a

minimum of 1 inch (25 mm) in height. Each marker shall face the attic access opening.

102.1.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer's R-value mark is readily observable upon inspection.

Table 102.1.3.
Default Glazed Fenestration U-Factors

Frame Type	Single Pane	Double Pane	Skylight	
			Single	Double
Metal	1.20	0.80	1.60	1.05
Non-Metal or metal clad	0.95	0.55	1.25	0.80
Glazed Block	0.60			

102.1.3 Fenestration product rating. U-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled U-factor shall be assigned a default U-factor from Table 102.1.3. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC shall be assigned a default SHGC of 0.75 for single pane and 0.65 for double pane and glazed block.

102.2 Installation. All materials, systems and equipment shall be installed in accordance with the manufacturer's installation instructions and the conditions of any listing or required certifications.

102.2.1 Protection of exposed foundation insulation. Insulation applied to the exterior of foundation walls and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed exterior insulation and extend a minimum of 6 inches (153 mm) below grade.

102.3 Maintenance information. Maintenance instructions shall be furnished for equipment and systems that require preventive maintenance. Required regular maintenance actions shall be clearly stated and incorporated on a readily accessible label. The label shall include the title or publication number for the operation and maintenance manual for that particular model and type of product.

102.4 Equipment labeling. Heating, cooling and service water heating equipment with equipment efficiency regulated as an AFUE, HSPF, SEER or EF shall have the efficiency specified on a permanent factory-applied nameplate.

Exception: Equipment assembled in the field.

SECTION 103
ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

103.1 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.

103.1.1 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.

SECTION 104
CONSTRUCTION DOCUMENTS

104.1 General. Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. 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.

104.2 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, insulation materials and their R-values; fenestration U-factors and SHGCs; system and equipment efficiencies, types, sizes and controls; duct sealing, insulation and location; and air sealing details.

SECTION 105
INSPECTIONS

105.1 General. Construction or work for which a permit is required shall be inspected by the code official.

105.2 Required approvals. No work shall be done on any part of the building beyond the point indicated in each successive inspection without first obtaining the written approval of the code official. No construction shall be concealed without being inspected and approved.

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

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

SECTION 106
VALIDITY

106.1 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 107
REFERENCED STANDARDS

107.1 General. The standards, and portions thereof, referred to in this code and listed in Chapter 6 shall be considered part of the requirements of this code to the extent of such reference.

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

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 Cod*e, ICC *Electrical Cod*e, *International Fire Cod*e, *International Fuel Gas Cod*e, *International Mechanical Code, International Plumbing Cod*e 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% 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 due to 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.
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. Acceptable to the code official.
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% 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.
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.
CRAWLSPACE WALL. The opaque portion of a wall that encloses a crawl space and is partially or totally below grade.
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 SIMULATION TOOL. An approved software program or calculation-based methodology that projects the annual energy use of a building.

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

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 non-glass glazing materials.

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.

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. Devices, equipment, or materials 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 that attests to compliance with a specific standard.

LISTED. Equipment, appliances, assemblies or materials included in a list published by an approved testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment, appliances, assemblies or material, and whose listing states either that the equipment, appliances, assemblies, or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

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”)

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 inspections, 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.

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 ($h \cdot ft^2 \cdot °F/Btu$) [$(m^2 \cdot K)/W$].

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.

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.

SOLAR HEAT GAIN COEFFICENT. The ratio of the solar heat gain through a fenestration or glazing assembly to the incident solar radiation.

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.

SKYLIGHT. Glazing that is more than 15 degrees (0.26 rad) from vertical.

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.

U-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 ($Btu/h \cdot ft^2 \cdot °F$) [$W/(m^2 \cdot K)$].

VAPOR RETARDER. A vapor resistant material, membrane or covering such as foil, plastic sheeting, or insulation facing having a permeance rating of 1 perm or less, when tested in accordance with the dessicant method using Procedure A of ASTME96. Vapor retarders limit the amount of moisture vapor that passes through a material or wall assembly.

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 Table 301.1 shall be used in determining the applicable requirements from Chapters 4 and 5. Locations not in Table 301.1 (outside the US) shall be assigned a climate zone based on Section 301.2.

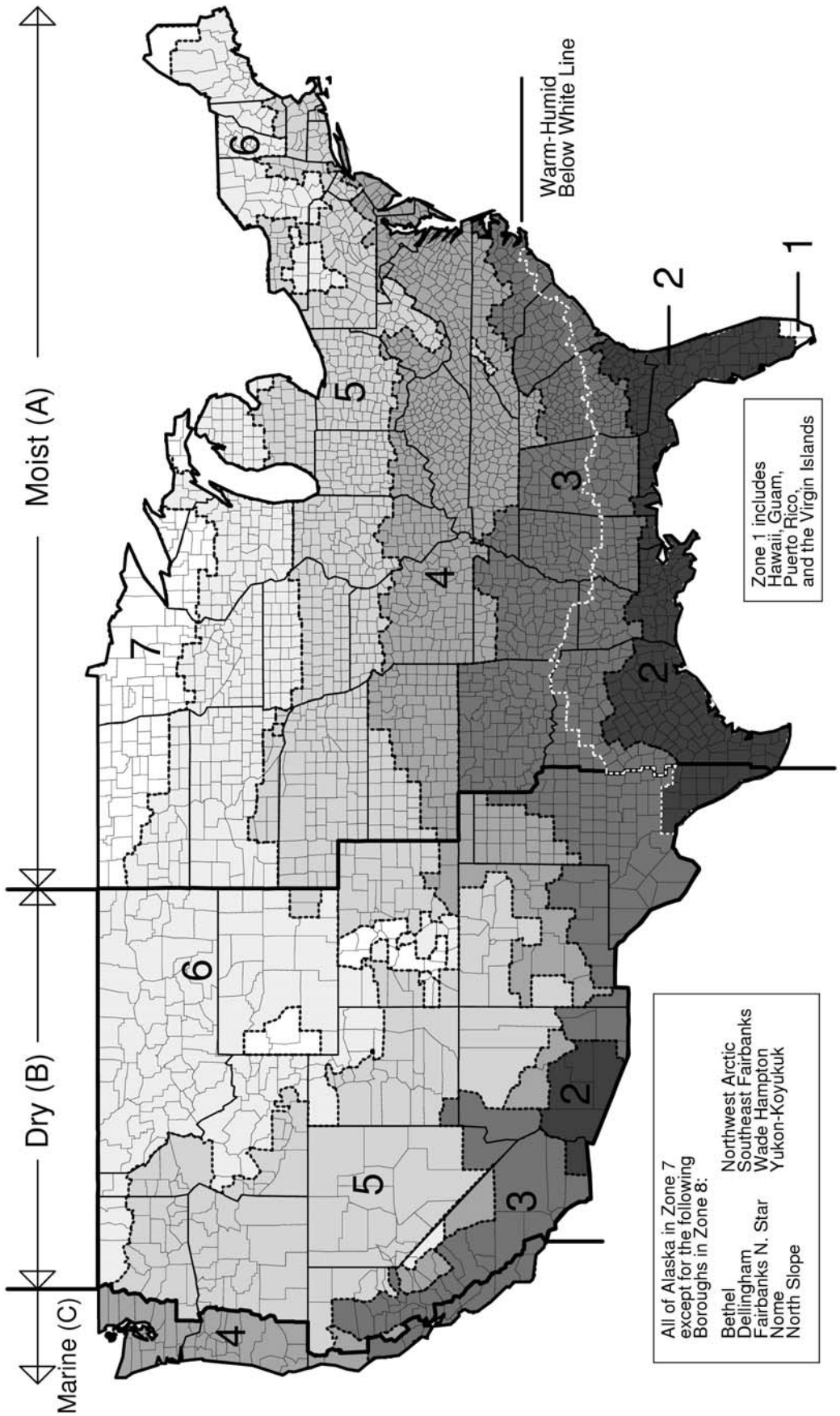

Figure 301.1. Climate Zones

Table 301.1 CLIMATE ZONES BY STATE AND COUNTY

Alabama
Zone 3 except
Zone 2
Baldwin
Mobile

Alaska
Zone 7 except
Zone 8
Bethel
Dellingham
Fairbanks North Star
Nome
North Slope
Northwest Arctic
Southeast Fairbanks
Wade Hampton
Yukon-Koyukuk

Arizona
Zone 3 except
Zone 2
La Paz
Maricopa
Pima
Pinal
Yuma
Zone 4
Gila
Yavapai
Zone 5
Apache
Coconino
Navajo

Arkansas
Zone 3 except
Zone 4
Baxter
Benton
Boone
Carroll
Fulton
Izard
Madison
Marion
Newton
Searcy
Stone
Washington

California
Zone 3 Dry except
Zone 2
Imperial
Zone 3 Marine
Alameda
Marin
Mendocino
Monterey
Napa
San Benito
San Francisco
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Sonoma
Ventura
Zone 4 Dry
Amador
Calaveras
El Dorado
Inyo
Lake
Mariposa
Trinity
Tuolumne
Zone 4 Marine
Del Norte
Humboldt
Zone 5
Lassen
Modoc
Nevada
Plumas
Sierra
Siskiyou
Zone 6
Alpine
Mono

Colorado
Zone 5 except
Zone 4
Baca
Las Animas
Otero
Zone 6
Alamosa
Archuleta
Chaffee
Conejos
Costilla
Custer
Dolores
Eagle
Moffat
Ouray
Rio Blanco
Saguache
San Miguel
Zone 7
Clear Creek
Grand
Gunnison
Hinsdale
Jackson
Lake
Mineral
Park
Pitkin
Rio Grande
Routt
San Juan
Summit

Connecticut
Zone 5

Delaware
Zone 4

Dist Of Columbia
Zone 4

Florida
Zone 2 except
Zone 1
Broward
Dade
Monroe

Georgia
Zone 3 except
Zone 2
Appling
Atkinson
Bacon
Baker
Berrien
Brantley
Brooks
Bryan
Camden
Charlton
Chatham
Clinch
Colquitt
Cook
Decatur
Echols
Effingham
Evans
Glynn
Grady
Jeff Davis
Lanier
Liberty
Long
Lowndes
McIntosh
Miller
Mitchell
Pierce
Seminole
Tattnall
Thomas
Toombs
Ware
Wayne
Zone 4
Banks
Catoosa
Chattooga
Dade
Dawson
Fannin
Floyd
Franklin
Gilmer
Gordon
Habersham
Hall
Lumpkin
Murray
Pickens
Rabun
Stephens
Towns
Union
Walker
White
Whitfield

Hawaii
Zone 1

Idaho
Zone 6 except
Zone 5
Ada
Benewah
Canyon
Cassia
Clearwater
Elmore
Gem
Gooding
Idaho
Jerome
Kootenai
Latah
Lewis
Lincoln
Minidoka
Nez Perce
Owyhee
Payette
Power
Shoshone
Twin Falls
Washington

Illinois
Zone 5 except
Zone 4
Alexander
Bond
Christian
Clay
Clinton
Crawford
Edwards
Effingham
Fayette
Franklin
Gallatin
Hamilton
Hardin
Jackson
Jasper
Jefferson
Johnson
Lawrence
Macoupin
Madison
Marion
Massac
Monroe
Montgomery
Perry
Pope
Pulaski
Randolph
Richland
Saline
Shelby
St Clair
Union
Wabash
Washington
Wayne
White
Williamson

Indiana
Zone 5 except
Zone 4
Brown
Clark
Crawford
Daviess
Dearborn
Dubois
Floyd
Gibson
Greene
Harrison
Jackson
Jefferson
Jennings
Knox
Lawrence
Martin
Monroe
Ohio
Orange
Perry
Pike
Posey
Ripley
Scott
Spencer
Sullivan
Switzerland
Vanderburgh
Warrick
Washington

Iowa
Zone 5 except
Zone 6
Allamakee
Black Hawk
Bremer
Buchanan
Buena Vista
Butler
Calhoun
Cerro Gordo
Cherokee
Chickasaw
Clay
Clayton
Delaware
Dickinson
Emmet
Fayette
Floyd
Franklin
Grundy
Hamilton
Hancock
Hardin
Howard
Humboldt
Ida
Kossuth
Lyon
Mitchell
O'Brien
Osceola
Palo Alto
Plymouth
Pocahontas
Sac
Sioux
Webster
Winnebago
Winneshiek
Worth
Wright

Kansas
Zone 4 except
Zone 5
Cheyenne
Cloud
Decatur
Ellis
Gove
Graham
Greeley
Hamilton
Jewell
Lane
Logan
Mitchell
Ness
Norton
Osborne

Phillips
Rawlins
Republic
Rooks
Scott
Sheridan
Sherman
Smith
Thomas
Trego
Wallace
Wichita

Kentucky
Zone 4

Louisiana
Zone 2 except
Zone 3
Bienville
Bossier
Caddo
Caldwell
Catahoula
Claiborne
Concordia
De Soto
East Carroll
Franklin
Grant
Jackson
La Salle
Lincoln
Madison
Morehouse
Natchitoches
Ouachita
Red River
Richland
Sabine
Tensas
Union
Vernon
Webster
West Carroll
Winn

Maine
Zone 6 except
Zone 7
Aroostook

Maryland
Zone 4 except
Zone 5 Garrett

Massachusetts
Zone 5

Michigan
Zone 5 except
Zone 6
Alcona
Alger
Alpena
Antrim
Arenac
Benzie
Charlevoix
Cheboygan
Clare
Crawford
Delta
Dickinson
Emmet
Gladwin
Grand Traverse
Huron
Iosco
Isabella
Kalkaska
Lake
Leelanau
Manistee
Marquette
Mason
Mecosta
Menominee
Missaukee
Montmorency
Newaygo
Oceana
Ogemaw
Oscoda
Otsego
Presque Isle
Roscommon
Sanilac
Wexford
Zone 7
Baraga
Chippewa
Gogebic
Houghton
Iron
Keweenaw
Luce
Mackinac
Ontonagon
Schoolcraft

Minnesota
Zone 6 except
Zone 7
Aitkin
Becker
Beltrami
Carlton
Cass
Clay
Clearwater
Cook
Crow Wing
Grant
Hubbard
Itasca
Kanabec
Kittson
Koochiching
Lake Of The Woods
Mahnomen
Marshall
Mille Lacs
Norman
Otter Tail
Pennington
Pine
Polk
Red Lake
Roseau
St Louis
Wadena
Wilkin

Mississippi
Zone 3 except
Zone 2
Hancock
Harrison
Jackson
Pearl River
Stone

Missouri
Zone 4 except
Zone 5
Adair
Andrew
Atchison
Buchanan
Caldwell
Chariton
Clark
Clinton
Daviess
De Kalb
Gentry
Grundy
Harrison
Holt
Knox
Lewis
Linn
Livingston
Macon
Marion
Mercer
Nodaway
Pike
Putnam
Ralls
Schuyler
Scotland
Shelby
Sullivan
Worth

Montana
Zone 6

Nebraska
Zone 5

Nevada
Zone 5 except
Zone 3
Clark

New Hampshire
Zone 6 except
Zone 5
Cheshire
Hillsborough
Rockingham
Strafford

New Jersey
Zone 4 except
Zone 5
Bergen
Hunterdon
Mercer
Morris
Passaic
Somerset
Sussex
Warren

New Mexico
Zone 4 except
Zone 3
Chaves
Dona Ana
Eddy
Hidalgo
Lea
Luna
Otero
Zone 5
Catron
Cibola
Colfax
Harding
Los Alamos
McKinley
Mora
Rio Arriba
San Juan
San Miguel
Sandoval
Santa Fe
Taos
Torrance

New York
Zone 5 except
Zone 4
Bronx
Kings
Nassau
New York
Queens
Richmond
Suffolk
Westchester
Zone 6
Allegany
Broome
Cattaraugus
Chenango
Clinton
Delaware
Essex
Franklin
Fulton
Hamilton
Herkimer
Jefferson
Lewis
Madison
Montgomery
Oneida
Otsego
Schoharie
Schuyler
St Lawrence
Steuben
Sullivan
Tompkins
Ulster
Warren
Wyoming

North Carolina
Zone 3 except
Zone 4
Alamance
Alexander
Bertie
Buncombe
Burke
Caldwell
Caswell
Catawba
Chatham
Cherokee
Clay
Cleveland
Davie
Durham
Forsyth
Franklin
Gates
Graham
Granville
Guilford
Halifax
Harnett
Haywood
Henderson
Hertford
Iredell
Jackson
Lee
Lincoln
Macon
Madison
McDowell
Nash
Northampton
Orange
Person
Polk
Rockingham
Rutherford
Stokes
Surry
Swain
Transylvania
Vance
Wake
Warren
Wilkes
Yadkin
Zone 5
Alleghany
Ashe
Avery
Mitchell
Watauga
Yancey

North Dakota
Zone 7 except
Zone 6
Adams
Billings
Bowman
Burleigh
Dickey
Dunn
Emmons
Golden Valley
Grant
Hettinger
La Moure
Logan
McIntosh
McKenzie
Mercer
Morton
Oliver
Ransom
Richland
Sargent
Sioux
Slope
Stark

Ohio
Zone 5 except
Zone 4
Adams
Brown
Clermont
Gallia
Hamilton
Lawrence
Pike
Scioto
Washington

Oklahoma
Zone 3 Moist except
Zone 4 Dry
Beaver
Cimarron
Texas

Oregon
Zone 4 Marine except
Zone 5 Dry
Baker
Crook
Deschutes
Gilliam
Grant
Harney
Hood River
Jefferson
Klamath
Lake
Malheur
Morrow
Sherman
Umatilla
Union
Wallowa
Wasco
Wheeler

Pennsylvania
Zone 5 except
Zone 4
Bucks
Chester
Delaware
Montgomery
Philadelphia
York
Zone 6
Cameron
Clearfield
Elk
McKean
Potter
Susquehanna
Tioga
Wayne

Rhode Island
Zone 5

South Carolina
Zone 3

South Dakota
Zone 6 except
Zone 5
Bennett
Bon Homme
Charles Mix
Clay
Douglas
Gregory
Hutchinson
Jackson
Mellette
Todd
Tripp
Union
Yankton

Tennessee
Zone 4 except
Zone 3
Chester
Crockett
Dyer
Fayette
Hardeman
Hardin
Haywood
Henderson
Lake
Lauderdale
Madison
McNairy
Shelby
Tipton

Texas
Zone 2 Moist except
Zone 2 Dry
Bandera
Dimmit
Edwards
Kinney
La Salle
Maverick
Medina
Real
Uvalde
Val Verde
Webb
Zapata
Zavala
Zone 3 Dry
Andrews
Baylor
Borden
Brewster
Callahan
Childress
Coke
Coleman
Collingsworth
Concho
Cottle
Crane
Crockett
Crosby
Culberson
Dawson
Dickens
Ector
El Paso
Fisher
Foard
Gaines
Garza
Glasscock
Hall
Hardeman
Haskell
Hemphill
Howard
Hudspeth
Irion
Jeff Davis
Jones
Kent
Kerr
Kimble
King
Knox
Loving
Lubbock
Lynn
Martin
Mason
Mcculloch
Menard
Midland
Mitchell
Motley
Nolan
Pecos
Presidio
Reagan
Reeves
Runnels
Schleicher
Scurry
Shackelford
Sterling
Stonewall
Sutton
Taylor
Terrell
Terry
Throckmorton
Tom Green
Ward
Wheeler
Wilbarger
Winkler
Zone 3 Moist
Archer
Blanco
Bowie
Brown
Burnet
Camp
Cass
Clay
Collin
Comanche
Cooke
Dallas
Delta
Denton
Eastland
Ellis
Erath
Fannin
Franklin
Gillespie
Grayson
Gregg
Hamilton
Harrison
Henderson
Hood
Hopkins
Hunt
Jack
Johnson
Kaufman
Kendall
Lamar
Lampasas
Llano
Montague
Stephens
Wichita
Wise
Young
Marion
Mills
Morris
Nacogdoches
Navarro
Palo
Pinto
Panola
Parker
Rains
Red
River
Rockwall
Rusk
Sabine
San Augustine
San Saba
Shelby
Smith
Somervell
Tarrant
Titus
Upshur
Van Zandt
Wood
Zone 4
Armstrong
Bailey
Briscoe
Carson
Castro
Cochran
Dallam
Deaf Smith
Donley
Floyd
Gray
Hale
Hansford
Hartley
Hockley
Hutchinson
Lamb
Lipscomb
Moore
Ochiltree
Oldham
Parmer
Potter
Randall
Roberts
Sherman
Swisher
Yoakum

Utah
Zone 5 except
Zone 3
Washington
Zone 6
Box Elder
Cache
Carbon
Daggett
Duchesne
Morgan
Rich
Summit
Uintah
Wasatch

Vermont
Zone 6

Virginia
Zone 4

Washington
Zone 4 Marine except
Zone 5 Dry
Adams
Asotin
Benton
Chelan
Columbia
Douglas
Franklin
Garfield
Grant
Kittitas
Klickitat
Lincoln
San Juan
Skamania
Spokane
Walla Walla
Whitman
Yakima
Zone 6 Dry
Ferry
Okanogan
Pend
Oreille
Stevens

West Virginia
Zone 5 except
Zone 4
Berkeley
Boone
Braxton
Cabell
Calhoun
Clay
Gilmer
Jackson
Jefferson
Kanawha
Lincoln
Logan
Mason
McDowell
Mercer
Mingo
Monroe
Morgan
Pleasants
Putnam
Ritchie
Roane
Tyler
Wayne
Wirt
Wood
Wyoming

Wisconsin
Zone 6 except
Zone 7
Ashland
Bayfield
Burnett
Douglas
Florence
Forest
Iron
Langlade
Lincoln
Oneida
Price
Sawyer
Taylor
Vilas
Washburn

Wyoming
Zone 6 except
Zone 5
Goshen
Platte
Zone 7
Lincoln
Sublette
Teto

Table 301.2 Warm Humid Counties.

Alabama
Autauga
Baldwin
Barbour
Bullock
Butler
Choctaw
Clarke
Coffee
Conecuh
Covington
Crenshaw
Dale
Dallas
Elmore
Escambia
Geneva
Henry
Houston
Lowndes
Macon
Marengo
Mobile
Monroe
Montgomery
Perry
Pike
Russell
Washington
Wilcox

Arkansas
Columbia
Hempstead
Lafayette
Little River
Miller
Sevier
Union

Florida
All

Georgia
All in Zone 2
Plus
Ben Hill
Bleckley
Bulloch
Calhoun
Candler
Chattahoochee
Clay
Coffee
Crisp
Dodge
Dooly
Dougherty
Early
Emanuel
Houston
Irwin
Jenkins
Johnson
Laurens
Lee
Macon
Marion
Montgomery
Peach
Pulaski
Quitman
Randolph
Schley
Screven
Stewart
Sumter
Taylor
Telfair
Terrell
Tift
Treutlen
Turner
Twiggs
Webster
Wheeler
Wilcox
Worth

Louisiana
All in Zone 2
Plus
Bienville
Bossier
Caddo
Caldwell
Catahoula
Claiborne
Concordia
De Soto
Franklin
Grant
Jackson
La Salle
Lincoln
Madison
Natchitoches
Ouachita
Red River
Richland
Sabine
Tensas
Union
Vernon
Webster
Winn

Mississippi
All in Zone 2
Plus
Adams
Amite
Claiborne
Copiah
Covington
Forrest
Franklin
George
Greene
Hinds
Jefferson
Jefferson Davis
Jones
Lamar
Lawrence
Lincoln
Marion
Perry
Pike
Rankin
Simpson
Smith
Walthall
Warren
Wayne
Wilkinson

North Carolina
Brunswick
Carteret
Columbus
New Hanover
Onslow
Pender

South Carolina
Allendale
Bamberg
Barnwell
Beaufort
Berkeley
Charleston
Colleton
Dorchester
Georgetown
Hampton
Horry
Jasper

Texas
All in Zone 2
Plus
Blanco
Bowie
Brown
Burnet
Camp
Cass
Collin
Comanche
Dallas
Delta
Denton
Ellis
Erath
Franklin
Gillespie
Gregg
Hamilton
Harrison
Henderson
Hood
Hopkins
Hunt
Johnson
Kaufman
Kendall
Lamar
Lampasas
Llano
Marion
Mills
Morris
Nacogdoches
Navarro
Palo
Pinto
Panola
Parker
Rains
Red
River
Rockwall
Rusk
Sabine
San Augustine
San Saba
Shelby
Smith
Somervell
Tarrant
Titus
Upshur
Van Zandt
Wood

301.2 Warm humid counties. Warm humid counties are listed in Table 301.2.

301.3 International climate zones. The climate zone for any location outside the United States shall be determined by applying Table 301.2(1) and then Table 301.3(2).

301.3.1 Warm humid criteria. "Warm Humid" locations shall be defined as locations where either of the following conditions occur:

1) 67ºF (19.4ºC) or higher wet-bulb temperature for 3,000 or more hours during the warmest six consecutive months of the year;
2) 73ºF (22.8ºC) or higher wet-bulb temperature for 1,500 or more hours during the warmest six consecutive months of the year.

Table 301.3(1) International Climate Zone Definitions

Major Climate Type Definitions
Marine (C) Definition - Locations meeting all four criteria: 1. mean temperature of coldest month between –3ºC (27ºF) and 18ºC (65ºF) 2. warmest month mean < 22ºC (72ºF) 3. at least four months with mean temperatures over 10ºC (50ºF) 4. dry season in summer. The month with the heaviest precipitation in the cold season has at least three times as much precipitation as the month with the least precipitation in the rest of the year. The cold season is October through March in the Northern Hemisphere and April through September in the Southern Hemisphere.
Dry (B) Definition - Locations meeting the following criteria: Not Marine and $P_{in} < 0.44 \times (T_F - 19.5)$ [$P_{cm} < 2.0 \times (T_C + 7)$ in SI units] where: P = annual precipitation in inches (cm) T = annual mean temperature in ºF (ºC)
Moist (A) Definition - Locations that are not Marine and not Dry.

Table 301.3(2) International Climate Zone Definitions

Zone Number	**Thermal Criteria**	
	IP Units	**SI Units**
1	9000 < CDD50ºF	5000 < CDD10ºC
2	6300 < CDD50ºF ≤ 9000	3500 < CDD10ºC ≤ 5000
3A and 3B	4500 < CDD50ºF ≤ 6300 AND HDD65ºF ≤ 5400	2500 < CDD10ºC ≤ 3500 AND HDD18ºC ≤ 3000
4A and 4B	CDD50ºF ≤ 4500 AND HDD65ºF ≤ 5400	CDD10ºC ≤ 2500 AND HDD18ºC ≤ 3000
3C	HDD65ºF ≤ 3600	HDD18ºC ≤ 2000
4C	3600 < HDD65ºF ≤ 5400	2000 < HDD18ºC ≤ 3000
5	5400 < HDD65ºF ≤ 7200	3000 < HDD18ºC ≤ 4000
6	7200 < HDD65ºF ≤ 9000	4000 < HDD18ºC ≤ 5000
7	9000 < HDD65ºF ≤ 12600	5000 < HDD18ºC ≤ 7000
8	12600 < HDD65ºF	7000 < HDD18ºC

CHAPTER 4

RESIDENTIAL ENERGY EFFICIENCY

SECTION 401
GENERAL

401.1 Scope. This chapter applies to residential buildings.

401.2 Compliance. Compliance shall be demonstrated by meeting each of the applicable provisions of this chapter.

401.3 Certificate. A permanent certificate shall be posted inside the building on the electrical distribution panel. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; U-factors for fenestration; and, where requirements apply, the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the type and efficiency of heating, cooling and service water heating equipment.

SECTION 402
BUILDING THERMAL ENVELOPE

402.1 Insulation and fenestration criteria. The building thermal envelope shall meet the requirements of Table 402.1 based on the climate zone specified in Chapter 3.

402.1.1 R-value computation. Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component R-value. The manufacturer's settled R-value shall be used for blown insulation. Computed R-values shall not include an R-value for other building materials or air films.

402.1.2 U-factor alternative. An assembly with a U-factor equal to or less than that specified in Table 402.1.2 shall be permitted as an alternative to the R-value in Table 402.1.

402.1.3 Total UA alternative. If the total building thermal envelope UA (sum of U-factor times assembly area) is less than or equal to the total UA resulting from using the U-factors in Table 402.1.2, the building shall be considered in compliance with Table 402.1. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

402.1.4 Prescriptive trade offs. The trade offs specified in Table 402.1.4 shall be permitted as an alternative to Table 402.1.

402.2 Specific insulation requirements.

402.2.1 Ceilings with attic spaces. When Section 402.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly R-38 shall be deemed to satisfy the requirement for R-49 wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves.

402.2.2 Ceilings without attic spaces. Where Section 402.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30.

402.2.3 Mass walls. Mass walls for the purposes this Chapter shall be considered walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth), and solid timber/logs. The provisions of Section 402.1 for mass walls shall be applicable when at least 50% of the required insulation R-value is on the exterior of, or integral to, the wall. Walls that do not meet this criterion for insulation placement shall meet the wood frame wall insulation requirements of Section 402.1.

402.2.4 Steel-frame ceilings, walls and floors.

Steel-frame ceilings, walls and floors shall meet the insulation requirements of Table 402.2.4 or shall meet the wall U-factor requirements in Table 402.1.2. The calculation of the U-factor for a steel-frame wall shall use a series-parallel path calculation method.

402.2.5 Floors. Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

402.2.6 Basement walls. Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections 402.1 and 402.2.5.

402.2.7 Slab-on-grade floors. Slab-on-grade floors with a floor surface less than 12 inches below grade shall be insulated in accordance with Table 402.1. The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table 402.1 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree angle away from the exterior wall. Slab-edge insulation is not required in jurisdictions designated by the code official as having a very heavy termite infestation.

402.2.8 Crawl space walls. As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizontally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous vapor retarder. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

402.2.9 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

402.2.10 Thermally isolated sunroom insulation. The minimum ceiling insulation R-values shall be R-19 in zones 1 through 4 and R-24 in zones 5 though 8. The minimum wall R-value shall be R-13 in all zones. New wall(s) separating the sunroom from conditioned space shall meet the building thermal envelope requirements.

402.3 Fenestration.

402.3.1 U-factor. An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements.

402.3.2 Glazed fenestration SHGC. An area-weighted average of fenestration products more than 50% glazed shall be permitted to satisfy the SHGC requirements.

402.3.3 Glazed fenestration exemption. Up to 15 ft^2 of glazed fenestration per dwelling unit shall be permitted to be exempt from U-factor and SHGC requirements in Section 402.1.

402.3.4 Opaque door exemption. One opaque door assembly is exempted from the U-factor requirement in Section 402.1.

402.3.5 Thermally isolated sunroom U-factor. For zones 4 through 8 the maximum fenestration U-factor shall be 0.50 and the maximum skylight U-factor shall be 0.75. New windows and doors separating the sunroom from conditioned space shall meet the building thermal envelope requirements.

402.3.4 Replacement fenestration. Where some or all of an existing fenestration unit is replaced with a new fenestration product, including frame, sash, and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and SHGC in Table 402.1.

402.3.5 Impact resistant fenestration. Jurisdictions in zones 1 through 4 that require impact resistant fenestration that meets ASTM E-

1886, ASTM E-1996, or other approved impact standard shall be exempt from the fenestration U-factor requirement. Fenestration so exempted shall be listed and labeled by the manufacturer as meeting the approved impact standard.

402.4 Air leakage.

402.4.1 Building thermal envelope. The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material.

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating the garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Other sources of infiltration.

402.4.2 Fenestration air leakage. Windows, skylights and sliding-glass doors shall have an air infiltration rate of no more than 0.3 cfm/ft^2, and swinging doors no more than 0.5 cfm/ft2, when tested according to NFRC 400, 101/I.S.2, or 101/I.S.2/NAFS by an accredited, independent laboratory, and listed and labeled by the manufacturer.

Exemptions: Site-built windows, skylights and doors.

402.4.3 Recessed lighting. Recessed lighting fixtures installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces by being:

1. IC-rated and labeled with enclosures that are sealed or gasketed to prevent air leakage to the ceiling cavity or unconditioned space; or
2. IC-rated and labeled as meeting ASTM E 283 when tested at 1.57 psi (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the conditioned space to the ceiling cavity; or
3. located inside an airtight sealed box with clearances of at least 0.5 inches (12.7 mm) from combustible material and 3 inches (76mm) from insulation.

402.5 Moisture control. The building design shall not create conditions of accelerated deterioration from moisture condensation. Frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.

Exceptions:

1. In construction where moisture or its freezing will not damage the materials.
2. Frame walls, floors and ceilings in jurisdictions in Zones 1 through 5. (Crawl space floor vapor retarders are not exempted.)
3. Where other approved means to avoid condensation are provided.

402.5.1 Maximum fenestration U-factor. The maximum fenestration U-factor permitted using trade offs from Section 402.1.3 or Section 404 in zones 6 through 8 shall be 0.55.

SECTION 403
SYSTEMS

403.1 Controls. At least one thermostat shall be provided for each separate heating and cooling system.

403.2 Ducts.

403.2.1 Insulation. Supply and return ducts shall be insulated to a minimum of R-8. Ducts in floor trusses shall be insulated to a minimum of R-6.

Exception: Ducts or portions thereof located completely inside the building thermal envelope or within the building thermal envelope and separated from the exterior of the building thermal enveloped with at least R-8 insulation.

403.2.2 Sealing. All ducts, air handlers, filter boxes, and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.3.1 of the International Residential Code.

403.2.3 Building cavities. Building framing cavities shall not be used as supply ducts.

403.3 Mechanical system piping insulation. Mechanical system piping capable of carrying fluids above 105 ºF or below 55 ºF shall be insulated to a minimum of R-2.

403.4 Circulating hot water systems. All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not in use.

403.5 Mechanical ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

403.6 Equipment sizing. Heating and cooling equipment shall be sized in accordance with Section M1401.3 of the International Residential Code.

SECTION 404
SIMULATED PERFORMANCE ALTERNATIVE

404.1 Scope. This section establishes criteria for compliance using simulated energy performance analysis. Such analysis shall include heating, cooling, and service water heating energy only.

404.2 Mandatory requirements. Compliance with this Section requires that the criteria of Sections 401, 402.4, 402.5 and 403 be met.

404.3 Performance based compliance. Compliance based on simulated energy performance requires that a proposed residence (proposed design) be shown to have an annual energy cost that is less than or equal to the annual energy cost of the standard reference design. Energy prices shall be taken from a source approved by the code official, such as the Department of Energy, Energy Information Administration's State Energy Price and Expenditure Report. Code officials shall be permitted to require time-of-use pricing in energy cost calculations.

Exception: Jurisdictions that require site energy (1kWh = 3,413 Btu) rather than energy cost as the metric of comparison.

404.4 Documentation

404.4.1 Compliance software tools. Documentation verifying that the methods and accuracy of the compliance software tool conform to the provisions of this Section shall be provided to the code official.

404.4.2 Compliance report. Compliance software tools shall generate a report that documents that the proposed design has annual energy costs less than or equal to the annual energy costs of the standard reference design. The compliance documentation shall include the following information:

a. Address of the residence;
b. An inspection checklist documenting the building component characteristics of the proposed design as listed in Table 404.5.2(1). The inspection checklist shall show the estimated annual energy cost for both the standard reference design and the proposed design;
c. Name of individual completing the compliance report;
d. Name and version of the compliance software tool.

404.4.3 Additional documentation. The code official shall be permitted to require the following documents:

a) Documentation of the building component characteristics of the standard reference design.
b) A certification signed by the builder providing the building component characteristics of the proposed design as given in Table 404.5.2(1).

404.5 Calculation procedure.

404.5.1 General. Except as specified by this Section, the standard reference design and proposed design shall be configured and analyzed using identical methods and techniques.

404.5.2 Residence specifications. The standard reference design and proposed design shall be configured and analyzed as specified by Table 404.5.2(1). Table 404.5.2(1) shall include by reference all notes contained in Table 402.1.

404.6 Calculation software tools.

404.6.1 Minimum capabilities. Calculation procedures used to comply with this Section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the standard reference design and the proposed design and shall include the following capabilities:

a. Computer generation of the standard reference design using only the input for the proposed design. The calculation procedure shall not allow the user to directly modify the building component characteristics of standard reference design.
b. Calculation of whole-building (as a single zone) sizing for the heating and cooling equipment in the standard reference design residence in accordance with Section M1401.3 of the International Residential Code.
c. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air conditioning equipment based on climate and equipment sizing.
d. Printed code official inspection checklist listing each of the proposed design component characteristics from Table 404.5.2(1) determined by the analysis to provide compliance along with their respective performance ratings (e.g. R-Value, U-Factor, SHGC, HSPF, AFUE, SEER, EF, etc.).

404.6.2 Approved tools. Performance analysis tools shall be approved. Tools may be approved based on meeting a specified threshold for a jurisdiction, such as an accredited home energy rating system (HERS) tool. The code official shall be permitted to approve tools for a specified application or limited scope.

404.6.3 Input values. When calculations require input values not specified by Sections 402, 403 and 404, those input values shall be taken from an approved source.

Table 402.1. Insulation and Fenestration Requirements by Component[a]

Climate Zone	Fenestration U-Factor	Skylight[b] U-Factor	Glazed Fenestration SHGC	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value	Floor R-Value	Basement[c] Wall R-Value	Slab[d] R-Value & Depth	Crawl Space[c] Wall R-Value
1	1.20	1.60	0.40	30	13	6	13	0	0	0
2	0.80	1.05	0.40	30	13	6	13	0	0	0
3	0.60	0.90	0.40[e]	30	13	6	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	8	19	10 / 13	10, 2 ft	10 / 13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5[g]	13	25[f]	10 / 13	10, 2 ft	10 / 13
6	0.35	0.60	NR	49	19 or 13+5[g]	15	30[f]	10 / 13	10, 4 ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	21	30[f]	15 / 21	15, 4 ft	10 / 13

(a) R-values are minimums. U-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2x6 cavity.
(b) The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
(c) The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
(d) R-5 shall be added to the required slab edge R-values for heated slabs.
(e) There are no SHGC requirements in the Marine zone.
(f) Or insulation sufficient to fill the framing cavity, R-19 minimum.
(g) "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

Table 402.1.2. Equivalent U-Factors[a]

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
1	1.20	1.60	0.035	0.082	0.110	0.064	0.360	0.477
2	0.80	1.05	0.035	0.082	0.110	0.064	0.360	0.477
3	0.60	0.90	0.035	0.082	0.110	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.099	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.037	0.059	0.065
6	0.35	0.60	0.026	0.060	0.077	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.041	0.057

(a) Non-fenestration U-factors shall be obtained from measurement, calculation or an approved source.

Table 402.2.4. Steel-Frame Ceiling, Wall and Floor Insulation (R-Value)

Wood Frame R-Value Requirement	Cold-Formed Steel Equivalent R –Value[1]
Steel Truss Ceilings[2]	
R-30	R-38 or R-30+3 or R-26+5
R-38	R-49 or R-38+3
R-49	R-38+5
Steel Joist Ceilings[2]	
R-30	R-38 in 2x4 or 2x6 or 2x8 R-49 in any framing
R-38	R-49 in 2x4 or 2x6 or 2x8 or 2x10
Steel Framed Wall	
R-13	R-13+5 or R-15+4 or R-21+3
R-19	R-13+9 or R-19+8 or R-25+7
R-21	R-13+10 or R-19+9 or R-25+8
Steel Joist Floor	
R-13	R-19 in 2x6 R-19+R6 in 2x8 or 2x10
R-19	R-19+R-6 in 2x6 R-19+R-12 in 2x8 or 2x10

Notes:
1. Cavity insulation R-value is listed first, followed by continuous insulation R-value.
2. Insulation exceeding the height of the framing shall cover the framing.

CD#:		Date Rec'd.:		Log No.:		Proposal No.:	

Table 402.1.4. HVAC System Tradeoffs

Climate Zone(s)	Required Improvement for HVAC System	Allowed Alternatives for Insulation/Fenestration[1]
2	SEER 13 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	Any fenestration U-factor
3	SEER 13 with AFUE 90 **OR** SEER 13 with HSPF 7.9 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	Double pane window with any U-factor
4 or 5	SEER 12 with AFUE 92 **OR** SEER 12 with HSPF 8.2 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	R-0 unconditioned basement R-0 slab R-19 floor
5	SEER 12 with AFUE 92 **OR** SEER 12 with HSPF 8.2 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	R-13 wall R-19 floor
6	SEER 12 with AFUE 92 **OR** SEER 12 with HSPF 8.2 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	R-38 ceiling R-13 wall
7	AFUE 92 **OR** HSPF 8.2 **OR** Ducts & HVAC in conditioned space **OR** Ground source heat pump	R-38 ceiling R-15 wall

Notes:

1. Table 402.1 requirements not stated remain the same. All footnotes of Table 402.1 apply.
2. After the year 2006 the SEER shall be increased by 2 from the value in this table; HSPF shall increase from 7.9 to 8.5 and from 8.2 to 8.8.
3. In zones 3 through 8 dwelling units with electric resistance heating are not eligible to use this table.
4. "Ducts & HVAC in conditioned space" includes air-handler and furnace being in conditioned space. Factory-sealed air handlers tested, listed and labeled by the manufacturer as having a 2% or less leakage rate at 1.0 inch water gauge shall meet the requirement for air handler being in conditioned space.
5. For the uninsulated unconditioned basements trade off in Zones 4 and 5, at most one foot of the basement wall can be above grade. Any combination of the foundation insulation specified shall be permitted.
6. Slabs with uninsulated hot water pipes, uninsulated air distribution ducts or electric heating cables installed within or under the slab are not eligible for this tradeoff of slab-edge insulation.
7. Evaporative cooling shall meet the SEER requirement if code official has deemed evaporative cooling appropriate to the climate of the jurisdiction.
8. Marine zone residences without mechanical air conditioning shall be exempt from the SEER requirement in this table.

Table 404.5.2(1) Specifications for the Standard Reference and Proposed Designs

Building Component	Standard Reference Design	Proposed Design
Above grade walls:	*Type: wood frame* *Gross area: same as proposed* *U-Factor: from Table 402.1.2* Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Basement and crawlspace walls:	*Type: same as proposed* *Gross area: same as proposed* *U-Factor: from Table 402.1.2 with insulation layer on interior side of walls*	As proposed As proposed As proposed
Above grade floors:	*Type: wood frame* *Gross area: same as proposed* *U-Factor: from Table 402.1.2*	As proposed As proposed As proposed
Ceilings:	Type: wood frame Gross area: same as proposed U-Factor: from Table 402.1.2	As proposed As proposed As proposed
Roofs:	Type: composition shingle on wood sheathing Gross area: same as proposed Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed
Attics:	Type: vented with aperture = 1ft^2 per 300 ft^2 ceiling area	As proposed
Foundations:	Type: same as proposed	As proposed
Doors:	Area: 40 ft^2 Orientation: North U-factor: same as fenestration from Table 402.1.2	As proposed As proposed As proposed
Glazing: [a]	Total area [b] =18% of conditioned floor area Orientation: equally distributed to four cardinal compass orientations (N, E, S, &W) U-factor: from Table 402.1.2 SHGC: from Table 402.1 except that for climates with no requirement (NR) SHGC = 0.55 shall be used Interior shade fraction: Summer (all hours when cooling is required) = 0.70 Winter (all hours when heating is required) = 0.85 External shading: none	As proposed As proposed As proposed As proposed Same as standard reference design [c] As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air exchange rate	Specific Leakage Area (SLA) [d] = 0.00048 assuming no energy recovery	*For residences that are not tested, the same as the standard reference*

Building Component	Standard Reference Design	Proposed Design
		design For residences without mechanical ventilation that are tested in accordance with ASHRAE Standard 119, Section 5.1, the measured air exchange rate[e] but not less than 0.35 ach. For residences with mechanical ventilation that are tested in accordance with ASHRAE Standard 119, Section 5.1, the measured air exchange rate[e] combined with the mechanical ventilation rate,[f] which shall not be less than 0.01 x CFA + 7.5 x (N_{br}+1). where: CFA = conditioned floor area N_{br} = number of bedrooms
Mechanical ventilation:	*None, except where mechanical ventilation is specified by the proposed design, in which case:* Annual vent fan energy use: kWh/yr = 0.03942*CFA + 29.565*(N_{br}+1) where: CFA = conditioned floor area N_{br} = number of bedrooms	As proposed
Internal gains:	IGain = 17,900 + 23.8*CFA + 4104*N_{br} (Btu/day per dwelling unit)	Same as standard reference design
Internal mass:	An internal mass for furniture and contents of 8 pounds per square foot of floor area.	Same as standard reference design, plus any additional mass specifically designed as a thermal storage element [g] but not integral to the building envelope or structure.
Structural mass:	For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air; For masonry basement walls, as proposed, but with insulation required by Table 402.1.2 located on the interior side of the walls; For other walls, for ceilings, floors, and interior walls, wood frame construction.	As proposed As proposed As proposed
Heating systems [h],[i]	*Fuel type: same as proposed design* Efficiencies: Electric: air-source heat pump with prevailing federal minimum efficiency Non electric furnaces: natural gas furnace with prevailing federal minimum efficiency	As proposed [i] As proposed As proposed

Building Component	Standard Reference Design	Proposed Design
	Non electric boilers: natural gas boiler with prevailing federal minimum efficiency Capacity: sized in accordance with Section M1401.3 of the International Residential Code.	As proposed As proposed
Cooling systems [h],[k]	Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section M1401.3 of the International Residential Code.	As proposed [k] As proposed As proposed
Service Water Heating	Fuel type: same as proposed design Efficiency: in accordance with prevailing Federal minimum standards Use (gal/day): $30 + 10*N_{br}$ Tank temperature: 120 F	As proposed As proposed Same as standard reference Same as standard reference
Thermal distribution systems:	A thermal distribution system efficiency (DSE) of 0.80 shall be applied to both the heating and cooling system efficiencies.	Same as standard reference design, except as specified by Table 404.5.2(2).
Thermostat	Type: manual, cooling temperature set point = 78 F; heating temperature set point = 68 F	Same as standard reference design

Notes:

(a) Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50% of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

(b) For residences with conditioned basements, R-2 and R-4 residences, and townhouses, the following formula shall be used to determine glazing area:

$$\mathbf{A_F = 0.18 \times A_{FL} \times F_A \times F}$$

where:

A_F = Total glazing area.

A_{FL} = Total floor area of directly conditioned space.

F_A = (Above grade thermal boundary gross wall area)/(above grade boundary wall area + 0.5 x below grade boundary wall area).

F = (Above grade thermal boundary wall area)/(above grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

(c) For fenestrations facing within 15 degrees of true south that are directly coupled to thermal storage mass, the winter interior shade fraction shall be permitted to be increased to 0.95 in the proposed design.

(d) Where Leakage Area (L) is defined in accordance with Section 5.1 of ASHRAE Standard 119 and where:

SLA = L / CFA

where L and CFA are in the same units.

(e) Tested envelope leakage shall be determined and documented by an independent party approved by the code official. Hourly calculations as specified in the 2001 ASHRAE Handbook of Fundamentals, Chapter 26, page 26.21, equation 40 (Sherman-Grimsrud model) or the equivalent shall be used to determine the energy loads

resulting from infiltration.

(f) The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with equation 43 of 2001 ASHRAE Handbook of Fundamentals page 26.24 and the" Whole-house Ventilation" provisions of 2001 ASHRAE Handbook of Fundamentals, page 26.19 for intermittent mechanical ventilation.

(g) Thermal Storage Element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

(h) For a proposed design with multiple heating, cooling or water heating systems using different fuel types, then the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

(i) For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design. For electric heating systems the prevailing federal minimum efficiency air-source heat pump shall be use for the standard reference design.

(k) For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

(l) For a proposed design with a non-storage type water heater, a 40-gallon storage-type water heater with the prevailing Federal minimum Energy Factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

Table 404.5.2(2) Default Distribution System Efficiencies for Proposed Designs [(a)]

Distribution System Configuration and Condition:	Forced Air Systems	Hydronic Systems [(b)]
Distribution system components located in *unconditioned* space	0.80	0.95
Distribution systems entirely located in *conditioned* space [(c)]	0.88	1.00
Proposed "leak free" with entire air distribution system located in the *conditioned* space [(d)]	0.96	
Proposed "leak free" air distribution system with components located in the *unconditioned* space	0.88	
"Ductless" systems [(e)]	1.00	

Notes:

(a) Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

(b) Hydronic Systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed loop piping and that do not depend on ducted, forced air flows to maintain space temperatures.

(c) Entire system in conditioned space shall mean that no component of the distribution system, including the air handler unit, is located outside of the conditioned space.

(d) Proposed "leak free" shall mean leakage to outdoors not greater than 3 cfm per 100 ft^2 of conditioned floor area and total leakage not greater than 9 cfm per 100 ft^2 of conditioned floor area at a pressure differential of 25 Pascal across the entire system, including the manufacturer's air handler enclosure. Total leakage of not greater than 3

cfm per 100 ft^2 of conditioned floor area at a pressure difference of 25 Pascal across the entire system, including the manufacturer's air handler enclosure, shall be deemed to meet this requirement without measurement of leakage to outdoors. This performance shall be specified as required in the construction documents and confirmed through field-testing of installed systems as documented by an approved independent party.

(e) Ductless systems may have forced airflow across a coil but shall not have any ducted airflows external to the manufacturer's air handler enclosure.

8) SUPPORTING INFORMATION (State purpose and reason, and provide substantiation to support proposed change):

The purpose of this proposal to the International Energy Conservation Code (IECC) and the International Residential Code (IRC) is to further the usability of the energy codes. The U.S. Department of Energy has for the past decade worked to promote the IECC in numerous ways—assisting states and localities in adopting and implementing IECC-based codes, developing and deploying user-friendly code compliance tools, hosting workshops and training sessions, operating an energy codes hotline, assembling and distributing information via a dedicated web site and email list, and proposing helpful changes to the IECC through the ICC code development process.

As DOE has promoted the adoption and use of the IECC, builders and code officials have repeatedly echoed one consistent comment—that the residential portion of the IECC is difficult to understand, complicated to adopt and implement, and expensive to enforce. This comment has been widespread in spite of the availability of very easy-to-use—and free—code compliance software. In evaluating the causes for these comments, DOE has identified a number of specific characteristics that make the IECC difficult to use, especially by jurisdictions with limited staff and budget. In no particular order, these include:

- Because the thermal criteria (insulation and windows requirements) are a function of heating degree-days (HDD), and any particular location may have multiple sources of HDD data or be equally distant from more than one source, there is sometimes ambiguity as to what the code requires. Further, the HDD framework makes it difficult to properly accommodate cooling concerns in the code. Finally, the HDD basis, which is used only in some of the IECC's compliance paths, differs from the county-defined zones used in some other compliance paths (including some commercial sections) of the IECC.
- Because envelope stringency is a function of glazing area as a percentage of wall area, the code behaves irrationally in some ways. For example, the code tends to permit a less efficient envelope for larger houses and for houses with inefficient aspect ratios or ceiling heights. In apparent contradiction, low-window-area homes (e.g., low-budget starter homes) can have wall and window requirements that are unreasonably inefficient.
- The code's requirements are very nonuniform, making it difficult or impossible for builders and code officials (and homebuyers) to develop a sense of the code's baseline requirements in a jurisdiction. For example, the HDD-based requirements vary from location to location within a jurisdiction, and often result in unexpected differences between adjacent jurisdictions that are part of a larger community or metropolitan area. Further, because envelope efficiency requirements vary with building geometry, the code's requirements cannot be known until a design is finalized, which makes change orders after construction has begun difficult and expensive, sometimes resulting in noncompliance even when the new design would use less energy. Also, different building types generally have different requirements. Finally, the combination of HDD-based criteria and county-based zones results in apparent ambiguities and sometimes jurisdictional confusion between residential and commercial sections.
- The code is frequently cited as being difficult to read and understand due to its length and apparent lack of integration between compliance paths.

For all the reasons listed above, DOE finds that enforcement of the code is inconsistent at best, and very rare for some important building elements such as glazing area, which has a large influence on the required R-values

and U-factors for a given house.

DOE has therefore developed a proposal that rewrites the residential sections of the IECC. The intent is to transform the code to a format that is easy to understand, easy for builders and inspectors to remember, relatively unchanging within jurisdictional boundaries, unambiguous, and inexpensive to adopt and enforce. The format we have chosen is exemplified by a single provision that was introduced to the IECC in 1998—the SHGC requirement for windows in southern locations. That code provision, in contrast to the bulk of the code, has been well understood, readily implemented, and has generated little if any confusion. DOE's current code change proposal follows that model in several ways, focusing on clear and unambiguous specifications even at the expense of some precision. (The SHGC requirement is a uniform 0.40 over a very large geographical area and never changes regardless of the building type, size, shape, orientation, or any other factor.)

This code change proposal reformats the IECC's residential provisions without substantially affecting the overall stringency of the code. Note, however, that with any change in format, especially one that changes the geo-climatic basis for the requirements, some specific locations will experience modest stringency changes.

Another key goal of this proposal is to produce efficiency prescriptions that are easily memorized by builders and code officials in any particular jurisdiction, as codes of this nature are observed to experience considerably higher compliance rates than codes for which each and every house has different requirements. Despite its historical length and complexity, the IECC actually has provisions for only a handful of residential energy efficiency measures—primarily the building envelope components and HVAC distribution systems. DOE's primary intent is to provide very simple, clear, and fair requirements for these measures.

Following the philosophy discussed above, DOE's change proposal has the following major characteristics:

- The climate basis of the proposed requirements has been changed from simple HDD to geographical zones that are based on multiple climate variables (so that both heating and cooling considerations are accommodated). Further, within the U.S., the zones are completely defined by political boundaries (county lines) so that code users will never have to choose from disparate climate data sources to determine local requirements. The proposed new climate zones were developed in an open process, in consultation with relevant standards committees of the American Society of Heating Refrigerating, and Air Conditioning Engineers (ASHRAE). The proposed zones are designed to be an appropriate foundation for both residential and commercial codes, and may be useful in other contexts as well. A thorough discussion of the zones' development can be found at http://www.energycodes.gov/implement/pdfs/climate_paper_review_draft_rev.pdf
- The proposed code's prescriptive envelope requirements are not a function of window area. Eliminating this dependency has a number of beneficial effects on the code's usability and enforceability. DOE has analyzed the potential drawbacks of this approach and has concluded that the benefits outweigh them. This analysis is available for review at http://www.energycodes.gov/implement/pdfs/wwr_elimination.pdf
- The proposed code is designed to accommodate local practices and preferences, eliminating common local hurdles to code compliance. For example, the proposal accommodates some coastal regions' need for glazing with high wind ratings and high-termite regions' need for easy compliance without slab-edge insulation.
- The proposed code is designed to increase consumer awareness of a home's energy features, by making baseline requirements more uniform within a jurisdiction and by requiring a disclosure of each house's R-values, U-factors, and HVAC efficiencies.
- The proposed code is designed, to the extent practicable, to incorporate aspects of the latest building science regarding energy efficiency and its effects on moisture control and durability. For example, the proposed code contains provisions related to unvented crawlspaces, modifies vapor retarder requirements, requires sealing of air handlers in garages, and limits worst-case glazing U-factors in

locations where moisture condensation can be a serious problem.

- The proposed code greatly simplifies and streamlines the text, eliminates unused definitions, brings other definitions into agreement with those in other ICC codes, and eliminates many inadvertent loopholes that have resulted from unintended interactions between compliance paths.
- The proposed code has a new energy performance section that more explicitly defines the standard reference house and eliminates some ambiguities present in the existing IECC Chapter 4.

In preparing this change proposal, DOE has worked for two years with numerous interested parties, including builders, code officials, manufacturers, efficiency advocates, energy simulation experts, and building scientists. DOE has worked openly; making successive drafts of the change proposal available for review via DOE's energy codes web site (http://www.energycodes.gov/). Over one hundred individuals and entities provided hundreds of helpful comments. DOE reviewed all comments carefully and tried to craft a proposal that fairly balances all viewpoints without compromising the overall goal of increased usability. Parts of the proposal were developed in consultation with experts from ASHRAE's 90.1 standard committee.

DOE believes this proposed change, if adopted, will result in a much easier to use code, easier and hence more widespread adoption of IECC-based state codes, easier and less expensive enforcement, and more consistent compliance even in jurisdictions with minimal enforcement infrastructure. We urge the ICC to consider this proposal on those merits.

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL

SUBMITTAL AS A DOCUMENT ATTACHMED TO AN E-MAIL IS PREFERRED
(SEE REVERSE FOR DIRECTIONS ON WHERE TO SEND PROPOSALS)