**Florida Supplement to the 2015 IECC**

**ICC EDIT VERSION**

**Note 1**: Throughout the document, change International Building Code to Florida Building Code, Building; change the International Energy Conservation Code tothe Florida Building Code, Energy Conservation; change the International Existing Building Code to Florida Building Code, Existing Building; change the International Fire code to Florida Fire Prevention Code; change International Fuel Gas Code to Florida Building Code, Fuel Gas; change the International Mechanical Code to Florida Building Code, Mechanical; change the International Plumbing Code to Florida Building Code, Plumbing; change the International Residential Code to Florida Building Code, Residential.

**PREFACE**

**~~Introduction~~**

**~~Development~~**

**History**

The State of Florida first mandated statewide building codes during the 1970s at the beginning of the modern construction boom. The first law required all municipalities and counties to adopt and enforce one of the four state-recognized model codes known as the “state minimum building codes.” During the early 1990s a series of natural disasters, together with the increasing complexity of building construction regulation in vastly changed markets, led to a comprehensive review of the state building code system. The study revealed that building code adoption and enforcement was inconsistent throughout the state and those local codes thought to be the strongest proved inadequate when tested by major hurricane events. The consequences of the building codes system failure were devastation to lives and economies and a statewide property insurance crisis. The response was a reform of the state building construction regulatory system that placed emphasis on uniformity and accountability.

The 1998 Florida Legislature amended Chapter 553, *Florida Statutes* (FS), Building Construction Standards, to create a single state building code that is enforced by local governments. As of March 1, 2002, the *Florida Building Code*, which is developed and maintained by the Florida Building Commission, supersedes all local building codes. The *Florida Building Code* is updated every three years and may be amended annually to incorporate interpretations and clarifications.

**Scope**

The *Florida Building Code* is based on national model building codes and national consensus standards which are amended where necessary for Florida’s specific needs. However, code requirements that address snow loads and earthquake protection are pervasive; they are left in place but should not be utilized or enforced because Florida has no snow load or earthquake threat. The code incorporates all building construction-related regulations for public and private buildings in the State of Florida other than those specifically exempted by Section 553.73, *Florida Statutes*. It has been harmonized with the *Florida Fire Prevention Code*, which is developed and maintained by the Department of Financial Services, Office of the State Fire Marshal, to establish unified and consistent standards.

The base codes for the Sixth Edition (2017) of the *Florida Building Code* include: the International Building Code®, 2015 edition; the International Plumbing Code®, 2015 edition; the International Mechanical Code®, 2015 edition; the International Fuel Gas Code®, 2015 edition; the International Residential Code®, 2015 edition; the International Existing Building Code®, 2015 edition; the International Energy Conservation Code, 2015; the National Electrical Code, 2014 edition; substantive criteria from the American Society of Heating, Refrigerating and Air-conditioning Engineers’ (ASHRAE) Standard 90.1-2013. State and local codes adopted and incorporated into the code include the *Florida Building Code, Accessibility,* and special hurricane protection standards for the High-Velocity Hurricane Zone.

The code is composed of nine main volumes: the *Florida Building Code, Building*, which also includes state regulations for licensed facilities; the *Florida Building Code, Plumbing*; the *Florida Building Code, Mechanical;* the *Florida Building Code, Fuel Gas*; the *Florida Building Code, Existing Building*; the *Florida Building Code, Residential;* the *Florida Building Code, Energy Conservation*; the *Florida Building Code, Accessibility* and the *Florida Building Code, Test Protocols for High-Velocity Hurricane Zones*. Chapter 27 of the *Florida Building Code, Building*, adopts the *National Electrical Code*, NFPA 70, by reference.

Under certain strictly defined conditions, local governments may amend requirements to be more stringent than the code. All local amendments to the *Florida Building Code* must be adopted by local ordinance and reported to the Florida Building Commission then posted on [www.floridabuilding.org](http://www.floridabuilding.org) in Legislative format for a month before being enforced. Local amendments to the *Florida Building Code* and the *Florida Fire Prevention Code* may be obtained from the Florida Building Commission web site, or from the Florida Department of Business and Professional Regulation or the Florida Department of Financial Services, Office of the State Fire Marshal, respectively.

**Adoption and Maintenance**

**[Note to editor: Replace ICC “Adoption” and “Maintenance” with the following text:]**

The *Florida Building Code* is adopted and updated with new editions triennially by the Florida Building Commission. It is amended annually to incorporate interpretations, clarifications and to update standards. Minimum requirements for permitting, plans review and inspections are established by the code, and local jurisdictions may adopt additional administrative requirements that are more stringent. Local technical amendments are subject to strict criteria established by Section 553.73, *F.S.* They are subject to Commission review and adoption into thecode or repeal when the code is updated triennially and are subject to appeal to the Commission according to the procedures established by Section 553.73, *F.S*.

Eleven Technical Advisory Committees (TACs), which are constituted consistent with American National Standards Institute (ANSI) Guidelines, review proposed code changes and clarifications of the code and make recommendations to the Commission. These TACs whose membership is constituted consistent with American National Standards Institute (ANSI) Guidelines include: Accessibility; Joint Building Fire (a joint committee of the Commission and the State Fire Marshal); Building Structural; Code Administration/ Enforcement; Electrical; Energy; Mechanical; Plumbing and Fuel Gas; Roofing; Swimming Pool; and Special Occupancy (state agency construction and facility licensing regulations).

The Commission may only issue official code clarifications using procedures of Chapter 120, *Florida Statutes*. To obtain such a clarification, a request for a Declaratory Statement (DEC) must be made to the Florida Building Commission in a manner that establishes a clear set of facts and circumstances and identifies the section of the code in question. Requests are analyzed by staff, reviewed by the appropriate Technical Advisory Committee, and sent to the Florida Building Commission for action. These interpretations establish precedents for situations having similar facts and circumstances and are typically incorporated into the code in the next code amendment cycle. Non-binding opinions are available from the Building Officials Association of Florida’s web site (www.BOAF.net) and a Binding Opinion process is available online at www.floridabuilding.org.

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

**[Note to editor: Use paragraphs 1 and 2 specific to this code through the code committee descriptors. Delete the remaining text in this section.]**

**Marginal Markings**

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2012 edition. Deletion indicators in the form of an arrow (**→**) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or table has been deleted.

A single asterisk [**\***] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [**\*\***] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code. ~~The following table indicates such relocations in the 2012 edition of the~~ *~~International Energy Conservation Code~~*~~.~~ **[Delete table]**

Dotted vertical lines in the margins within the body of the code indicate a change from the requirements of the base codes to the *Florida Building Code, 6th Edition (2017)* effective ????.

Sections deleted from the base code are designated “Reserved” in order to maintain the structure of the base code.

**Italicized Terms**

**[No change to I Code text.]**

**Acknowledgments**

The *Florida Building Code* is produced through the efforts and contributions of building designers, contractors, product manufacturers, regulators and other interested parties who participate in the Florida Building Commission’s consensus processes, Commission staff and the participants in the national model code development processes.

**[Note to Editor: Delete the following ICC text in its entirety:]**

**~~Effective Use of the …~~**

**~~Legislation~~**

**CHAPTER 1 [CE] Scope and Administration**

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| ***Section C101.1 Title. Change to read as shown:***  **C101.1 Title.** This code shall be known as the *Florida Building Code, Energy Conservation*, *~~International Energy Conservation Code~~* and shall be cited as such. It is referred to herein as “this code”. |
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| ***Section C101.4.2 Exempt buildings. Add new section to read as shown:***  **C101.4.2 Exempt buildings.** Buildings exempt from the provisions of the *Florida Building Code, Energy Conservation,* include existing buildings except those considered renovated buildings, changes of occupancy type, or previously unconditioned buildings to which comfort conditioning is added. Exempt buildings include those specified in Sections C101.4.2.1 through C101.4.2.4.  **C101.4.2.1** **Federal standards.** Any building for which federal mandatory standards preempt state energy codes  **C101.4.2.2 Historic buildings**. Any building meeting the criteria for historic buildings as defined in Chapter 2 of this Code.  **C101.4.2.3 Low energy buildings as described in Section C402.1.1.** Such buildings shall not contain electrical, plumbing or mechanical systems which have been designed to accommodate the future installation of heating or cooling equipment.  **C101.4.2.4 Buildings designed for purposes other than general space comfort conditioning.**  Any building where heating or cooling systems are provided which are designed for purposes other than general space comfort conditioning. Buildings included in this exemption include:  1. Commercial service areas where only ceiling radiant heaters or spot coolers are to be installed which will provide heat or cool only to a single work area and do not provide general heating or cooling for the space.  2. Buildings heated with a system designed to provide sufficient heat only to prevent freezing of products or systems. Such systems shall not provide heating above 50°F (10°C).  3. Pre-manufactured freezer or refrigerated storage buildings and areas where the temperature is set below 40°F (4°C) and in which no operators work on a regular basis.  4. Electrical equipment switching buildings which provide space conditioning for equipment only and in which no operators work on a regular basis except that the provisions of Section C405 shall apply.  5. Buildings containing a system(s) designed and sold for dehumidification purposes only and controlled only by a humidistat. No thermostat shall be installed on systems thus exempted from this code. |
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***Section C101.4.3 Limited or special use buildings. Add section to read as shown:***

**C101.4.3 Limited or special use buildings**. Buildings determined by the code official to have a limited energy use potential based on size, configuration or time occupied, or to have a special use requirement shall be considered limited or special use buildings ~~and shall comply with the code by Form C402~~. Code compliance requirements may be adjusted by the code official to handle such cases when nationally recognized energy analysis procedures have been used to demonstrate that the building would use less energy than a code compliant building of the same configuration**.**

***Section C101.5.1 Compliance materials. Change to read as shown:***

**C101.5.1 Compliance materials*.***The Florida Building Commission shall approve specific computer software. 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.

**C101.5.1 Alterations, renovations and building systems**. Alterations, renovations and building systems may utilize Form C402. Form C402 can be found in Appendix C.

***Section C103.1.1 Compliance certification. Add section to read as shown:***

**C103.1.1 Compliance certification.**

**C103.1.1.1 Code compliance demonstration.**

**C103.1.1.1.1 Residential**.  See *Florida Building Code, Energy Conservation*: Residential Provisions.

**C103.1.1.1.2 Commercial and multiple-family residential.** Completion of procedures demonstrating compliance with this code for commercial and multiple-family residential buildings shall be in accordance with the provisions of Section 481.229, *Florida Statutes*, or Section 471.003, *Florida Statutes.*

**Exception:** Where HVAC systems are ≤ 15 tons per system, air conditioning or mechanical contractors licensed in accordance with Chapter 489, *Florida Statutes*, or commercial building energy raters certified in accordance with Section 553.99, *Florida Statutes*, may prepare the code compliance form.

Design professionals responsible under Florida law for the design of lighting, electrical, mechanical, and plumbing systems and the building shell, shall certify compliance of those building systems with the code by signing and providing their professional registration number on the energy code form provided as part of the plans and specifications to the building department.

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| |  | | --- | | **C103.1.1.2 Code compliance certification.** The building’s owner, the owner’s architect, or other authorized agent legally designated by the owner shall certify that the building is in compliance with the code, as per Section 553.907, *Florida Statutes*, prior to receiving the permit to begin construction or renovation. | |  | | ***Sections C107Fees. Delete in its entirety and reserve to read as shown:*** | | |
| **SECTION C107**  **FEES**  **RESERVED**  ***Section C108 Stop Work Order. Change to read as shown:***  **SECTION C108**  **STOP WORK ORDER**    **C108.1 Authority.** [No change]  **C108.2 Issuance.** [No change]  **C108.3 Emergencies.** Reserved.  **C108.4 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 violation or unsafe condition, shall be subject to penalties as prescribed by law. ~~liable to a fine as set by the applicable governing authority.~~    ***Section C109 Board of Appeals. Delete in its entirety and reserve to read as shown:***  **SECTION C109**  **BOARD OF APPEALS**  **RESERVED** | |
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**Chapter 2[CE]**

**DEFINITIONS**

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| ***Add or change the following definitions as shown:***  **ADJACENT WALL, CEILING or FLOOR.** A wall, ceiling or floor of a structure that separates conditioned space from enclosed but unconditioned space, such as an unconditioned attached garage, storage or utility room.    **AEROSOL SEALANT.** A closure product for duct and plenum systems, which is delivered internally to leak sites as aerosol particles using a pressurized air stream.    **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.~~ Relating to air distribution systems, a material object(s) which impedes or restricts the free movement of air under specified conditions. For fibrous glass duct, the air barrier is its foil cladding; for flexible non-metal duct, the air barrier is the non-porous core; and for sheet metal duct and air handling units, the air barrier is the metal in contact with the air stream. For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wall board which meets ASTM C 36, or it may be a membrane which alone acts as an air barrier which is attached to a panel, such as the foil cladding of fibrous glass duct board. Relating to the building envelope, air barriers comprise the planes of primary resistance to air flow between the interior spaces of a building and the outdoors and the planes of primary air flow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building. To be classed as an air barrier, abuilding plane must be substantially leak free; that is, it shall have an air leakage rate not greater than 0.5 cfm/ft2 when subjected to an air pressure gradient of 25 pascal. In general, air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with a suitable long-life mastic. House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.    **AIR CONDITIONING.** The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.    **AIR DISTRIBUTION SYSTEM.** Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.    **ATTIC.** An enclosed unconditioned space located immediately below an uninsulated roof and immediately above the ceiling of a building.    **BTU (British Thermal Unit).** Abbreviation for British thermal unit, which is the quantity of heat required to raiser the temperature of 1 pound (454 g) of water 1oF (0.56oC)(1Btu=1055 J). ~~The standard unit for measuring heat energy, such as the heat content of fuel. It is the amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit. 1 BTU per minute = 17.6 watts.~~  **BUILDING.** Any structure used or intended for supporting or sheltering any use or occupancy. ~~including any mechanical systems, service water heating systems and electric power and lighting systems located on the building site and supporting the building.~~  For each purpose of this Code each portion of a building separated from other portions by a firewall shall be considered as a separate building. The term “building” shall be construed as if followed by the words “or part thereof.”    **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. See “Adjacent wall, ceiling or floor.”  **CONDITIONED FLOOR AREA.** The horizontal projection of ~~the floors associated with the conditioned space.~~ that portion of space which is conditioned directly or indirectly by an energy-using system.    **CONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling. See “Space.”    **CONTROL.** To regulate the operation of equipment.    **CONTROL DEVICE.** A specialized device used to regulate the operation of equipment.    **EFFICIENCY.** Performance at specified rating conditions.    **ENERGY.** The capacity for doing work. It takes a number of forms that may be transformed from one into another such as thermal (heat), mechanical (work), electrical, and chemical. Customary measurement units are British thermal units (Btu).    **EQUIPMENT.** Devices for comfort conditioning, electric power, lighting, transportation, or service water heating including, but not limited to, furnaces, boilers, air conditioners, heat pumps, chillers, water heaters, lamps, luminaires, ballasts, elevators, escalators, or other devices or installations.    **EXTERIOR WALL.** Walls including both above-grade walls and basement walls which form a boundary between a conditioned and an outdoor space.    **FENESTRATION AREA.** Total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.    **GASKETING.** A compressible, resilient elastic packing, made of foam rubber or of a synthetic foam polymer. A gasket is distinct from the components being joined and must be capable of closing all air leakage pathways between the air barriers of the joint and of creating an air-tight seal.    **HEAT.** The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.    **HORSEPOWER (HP).** Unit of power; work done at a rate equal to 745.7Watts, 550 foot lb. per second, or 33,000 foot lb. per minute.    **HVAC.** Heating, ventilating and air conditioning.    **HVAC SYSTEM.** The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building.    **INDIRECTLY CONDITIONED SPACE.** See “Space.”    **INDOOR.** Within the conditioned building envelope.    **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.~~ through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside temperature differences (stack effect), and imbalance between supply and exhaust air systems.    **INSULATION.** Material mainly used to retard the flow of heat.    **KILOWATT (kW).** The basic unit of electric power, equal to KILOWATT (kW). The basic unit of electric power, equal to 1,000 Watts.    **LIGHTING SYSTEM.** A group of luminaires circuited or controlled to perform a specific function.    **MANUFACTURER.** The company engaged in the original production and assembly of products or equipment or a company that purchases such products and equipment manufactured in accordance with company specifications.    **MECHANICAL CLOSET.** For the purposes of this code, a closet used as an air plenum which contains the blower unit or air handler of a central air conditioning or heating unit.    **OCCUPANCY.** The purpose for which a building, or part thereof, is used or intended to be used. For the purposes of determining changes of occupancy for this Code, the occupancy shall be considered the major occupancy group designations established by Chapter 3 of the Building Code, Building.    **OUTDOOR.** The environment exterior to the building structure.    **OUTDOOR (OUTSIDE) AIR.** Air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.    **OUTSIDE.** The environment exterior to the conditioned space of the building and may include attics, garages, crawlspaces, etc., but not return air plenums.    **PLENUM.** A compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building.    **POSITIVE INDOOR PRESSURE.** A positive pressure condition within a conditioned space caused by bringing in more outside air than the amount of air that is exhausted and/or lost through air leakage.    **PRESSURE ENVELOPE.** The primary air barrier of a building; that part of the envelope that provides the greatest resistance to air flow to or from the building.    **PRESSURE-SENSITIVE TAPE.** Tape used for sealing duct system components and air barriers which adheres when pressure is applied and is not heat activated.    **PROPOSED DESIGN.** A description or computer representation of the proposed building used to estimate annual energy use for determining compliance based on total building performance or design energy cost.    **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”). In public facilities, accessibility may be limited to certified personnel through locking covers or by placing equipment in locked rooms.    **Renovated Building.** A residential or nonresidential building undergoing alteration that varies or changes insulation, HVAC systems, water heating systems, or exterior envelope conditions, provided the estimated cost of renovation exceeds 30 percent of the assessed value of the structure..    **REPLACEMENT.** The installation of part or all of an existing mechanical or electrical system in an existing building.  **RESIDENTIAL BUILDING**. For the purpose of this code, includes ~~detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as Group R-2, R-3 and R-4~~ R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.    **RETROFIT.** Modification of existing equipment or systems to incorporate improved performance of operation.    **ROOF.** The upper portion of the building envelope, including opaque areas and fenestration, that is horizontal or tilted at an angle of less than 60° from horizontal. For the purposes of determining building envelope requirements, the classifications are defined as follows:   1.       Attic and other roofs: all other roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation but excluding metal building roofs.   2.       Metal building roof: a roof that is constructed with (a) a metal, structural, weathering surface, (b) has no ventilated cavity, and (c) has the insulation entirely below deck (i.e., does not include composite concrete and metal deck construction nor a roof framing system that is separated from the superstructure by a wood substrate) and whose structure consists of one or more of the following configurations: (1) metal roofing in direct contact with the steel framing members or (2) insulation between the metal roofing and the steel framing members or (3) insulated metal roofing panels installed as described in (1) or (2).   3.       Roof with insulation entirely above deck: a roof with all insulation (1) installed above (outside of) the roof structure and (2) continuous (i.e., uninterrupted by framing members).   4.       Single-rafter roof: a subcategory of attic roofs where the roof above and the ceiling below are both attached to the same wood rafter and where insulation is located in the space between these wood rafters.    **SMALL DUCT, HIGH VELOCITY SYSTEM.** A heating and cooling product that contains a blower and indoor coil combination that meets the following:  1) is designed for, and produces, at least 1.2 inches of external static pressure when operated at the certified air volume rate of 220-350 CFM per rated ton of cooling; and  2) when applied in the field, uses high velocity room outlets generally greater than 1,000 fpm that have less than 6.0 square inches of free area.  **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. (See “Fenestration area”.)    **SPACE.** An enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements.  1. Conditioned space: a cooled space, heated space, or indirectly conditioned space or unvented attic assembly defined as follows.  a. Cooled space: an enclosed space within a building that is cooled by a cooling system whose sensible output capacity exceeds 5 Btu/h·ft2 of floor area.  b. Heated space: an enclosed space within a building that is heated by a heating system whose output capacity relative to the floor area is greater than or equal to 5 Btu/h·ft2.  c. Indirectly conditioned space: an enclosed space within a building that is not a heated space or a cooled space, which is heated or cooled indirectly by being connected to adjacent space(s) provided (a) the product of the U-factor(s) and surface area(s) of the space adjacent to connected space(s) exceeds the combined sum of the product of the U-factor(s) and surface area(s) of the space adjoining the outdoors, unconditioned spaces, and to or from semiheated spaces (e.g., corridors) or (b) that air from heated or cooled spaces is intentionally transferred (naturally or mechanically) into the space at a rate exceeding 3 air changes per hour (ACH) (e.g., atria).  d. Unvented attic assembly: as defined in Section R806.4 of the Florida Building Code, Residential. These spaces shall not require supply or return outlets.  2. Semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft2 of floor area but is not a conditioned space.  3. Unconditioned space: an enclosed space within a building that is not a conditioned space or a semiheated space. Crawl spaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.  **STOREFRONT.** A nonresidential system of doors and windows mulled 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. ~~with or without mulled windows and doors.~~    **STRUCTURE.** That which is built or constructed.    **SUNROOM.** For the purposes of this code, the term “sunroom” as used herein shall be as follows and shall include conservatories, sunspaces, solariums, and porch or patio covers or enclosures.  1. A room with roof panels that includes sloped glazing that is a one-story structure added to an existing dwelling with an open or glazed area in excess of 40 percent of the gross area of the sunroom structure’s exterior walls and roof.  2. A one-story structure added to a dwelling with structural roof panels without sloped glazing. The sunroom walls may have any configuration, provided the open area of the longer wall and one additional wall is equal to at least 65 percent of the area below 6 feet 8 inches of each wall, measured from the floor.  **SYSTEM.** A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.    **TERMINAL.** A device by which energy from a system is finally delivered, e.g., registers, diffusers, lighting fixtures, faucets, etc.    **THERMAL ENVELOPE.** The primary insulation layer of a building; that part of the envelope that provides the greatest resistance to heat flow to or from the building.    **UNCONDITIONED SPACE.** See “SPACE.”  **VARIABLE REFRIGERANT FLOW MULTI-SPLIT AIR CONDITIONER.** A Unit of commercial package air-conditioning and heating equipment that is configured as a split system air conditioner incorporating a single refrigerant circuit, with one or more outdoor units, at least one variable-speed compressor or an alternate compressor combination for varying the capacity of the system by three or more steps, and multiple indoor fan coil units, each of which is individually metered and individually controlled by an integral control device and common communications network and which can operate independently in response to multiple indoor thermostats. Variable refrigerant flow implies three or more steps of capacity control on common, inter-connecting piping. |
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**CHAPTER 3 [CE]**

**GENERAL REQUIREMENTS**

***Section C301.1 General. Change to read as shown:***

**C301.1 General.**   
~~Climate zones from Figure C301.1 or~~ Table C301.1 shall be used in determining the applicable requirements from Chapter 4. Locations are ~~not in Table C301.1 (outside the United States) shall be~~ assigned a climate zone based on Section C301.3.

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**~~FIGURE C301.1 CLIMATE ZONES~~**

**TABLE C301.1 CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY ~~STATE,~~ COUNTY ~~AND TERRITORY~~**  **Key: A – Moist~~, B – Dry, C – Marine. Absence of moisture designation indicates moisture regime is irrelevant.~~Asterisk (\*) indicates a warm-humid location.**

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| **~~US STATES~~** | | | | |
| **~~ALABAMA~~** | ~~3A Lee~~ | ~~7 Kodiak Island~~ | ~~3A Calhoun~~ | ~~3A Monroe~~ |
| ~~3A Autauga\*~~ | ~~3A Limestone~~ | ~~7 Lake and Peninsula~~ | ~~4A Carroll~~ | ~~3A Montgomery~~ |
| ~~2A Baldwin\*~~ | ~~3A Lowndes\*~~ | ~~7 Matanuska-Susitna~~ | ~~3A Chicot~~ | ~~3A Nevada~~ |
| ~~3A Barbour\*~~ | ~~3A Macon\*~~ | ~~8 Nome~~ | ~~3A Clark~~ | ~~4A Newton~~ |
| ~~3A Bibb~~ | ~~3A Madison~~ | ~~8 North Slope~~ | ~~3A Clay~~ | ~~3A Ouachita~~ |
| ~~3A Blount~~ | ~~3A Marengo\*~~ | ~~8 Northwest Arctic~~ | ~~3A Cleburne~~ | ~~3A Perry~~ |
| ~~3A Bullock\*~~ | ~~3A Marion~~ | ~~7 Prince of Wales  Outer Ketchikan~~ | ~~3A Cleveland~~ | ~~3A Phillips~~ |
| ~~3A Butler\*~~ | ~~3A Marshall~~ | ~~3A Columbia\*~~ | ~~3A Pike~~ |
| ~~3A Calhoun~~ | ~~2A Mobile\*~~ | ~~7 Sitka~~ | ~~3A Conway~~ | ~~3A Poinsett~~ |
| ~~3A Chambers~~ | ~~3A Monroe\*~~ | ~~7 Skagway-Hoonah- Angoon~~ | ~~3A Craighead~~ | ~~3A Polk~~ |
| ~~3A Cherokee~~ | ~~3A Montgomery\*~~ | ~~8 Southeast Fairbanks~~ | ~~3A Crawford~~ | ~~3A Pope~~ |
| ~~3A Chilton~~ | ~~3A Morgan~~ | ~~7 Valdez-Cordova~~ | ~~3A Crittenden~~ | ~~3A Prairie~~ |
| ~~3A Choctaw\*~~ | ~~3A Perry\*~~ | ~~8 Wade Hampton~~ | ~~3A Cross~~ | ~~3A Pulaski~~ |
| ~~3A Clarke\*~~ | ~~3A Pickens~~ | ~~7 Wrangell-Petersburg~~ | ~~3A Dallas~~ | ~~3A Randolph~~ |
| ~~3A Clay~~ | ~~3A Pike\*~~ | ~~7 Yakutat~~ | ~~3A Desha~~ | ~~3A Saline~~ |
| ~~3A Cleburne~~ | ~~3A Randolph~~ | ~~8 Yukon-Koyukuk~~ | ~~3A Drew~~ | ~~3A Scott~~ |
| ~~3A Coffee\*~~ | ~~3A Russell\*~~ | **~~ARIZONA~~** | ~~3A Faulkner~~ | ~~4A Searcy~~ |
| ~~3A Colbert~~ | ~~3A Shelby~~ | ~~3A Franklin~~ | ~~3A Sebastian~~ |
| ~~3A Conecuh\*~~ | ~~3A St. Clair~~ | ~~5B Apache~~ | ~~4A Fulton~~ | ~~3A Sevier\*~~ |
| ~~3A Coosa~~ | ~~3A Sumter~~ | ~~3B Cochise~~ | ~~3A Garland~~ | ~~3A Sharp~~ |
| ~~3A Covington\*~~ | ~~3A Talladega~~ | ~~5B Coconino~~ | ~~3A Grant~~ | ~~3A St. Francis~~ |
| ~~3A Crenshaw\*~~ | ~~3A Tallapoosa~~ | ~~4B Gila~~ | ~~3A Greene~~ | ~~4A Stone~~ |
| ~~3A Cullman~~ | ~~3A Tuscaloosa~~ | ~~3B Graham~~ | ~~3A Hempstead\*~~ | ~~3A Union\*~~ |
| ~~3A Dale\*~~ | ~~3A Walker~~ | ~~3B Greenlee~~ | ~~3A Hot Spring~~ | ~~3A Van Buren~~ |
| ~~3A Dallas\*~~ | ~~3A Washington\*~~ | ~~2B La Paz~~ | ~~3A Howard~~ | ~~4A Washington~~ |
| ~~3A DeKalb~~ | ~~3A Wilcox\*~~ | ~~2B Maricopa~~ | ~~3A Independence~~ | ~~3A White~~ |
| ~~3A Elmore\*~~ | ~~3A Winston~~ | ~~3B Mohave~~ | ~~4A Izard~~ | ~~3A Woodruff~~ |
| ~~3A Escambia\*~~ | **~~ALASKA~~** | ~~5B Navajo~~ | ~~3A Jackson~~ | ~~3A Yell~~ |
| ~~3A Etowah~~ | ~~2B Pima~~ | ~~3A Jefferson~~ | **~~CALIFORNIA~~** |
| ~~3A Fayette~~ | ~~7 Aleutians East~~ | ~~2B Pinal~~ | ~~3A Johnson~~ |
| ~~3A Franklin~~ | ~~7 Aleutians West~~ | ~~3B Santa Cruz~~ | ~~3A Lafayette\*~~ | ~~3C Alameda~~ |
| ~~3A Geneva\*~~ | ~~7 Anchorage~~ | ~~4B Yavapai~~ | ~~3A Lawrence~~ | ~~6B Alpine~~ |
| ~~3A Greene~~ | ~~8 Bethel~~ | ~~2B Yuma~~ | ~~3A Lee~~ | ~~4B Amador~~ |
| ~~3A Hale~~ | ~~7 Bristol Bay~~ | **~~ARKANSAS~~** | ~~3A Lincoln~~ | ~~3B Butte~~ |
| ~~3A Henry\*~~ | ~~7 Denali~~ | ~~3A Little River\*~~ | ~~4B Calaveras~~ |
| ~~3A Houston\*~~ | ~~8 Dillingham~~ | ~~3A Arkansas~~ | ~~3A Logan~~ | ~~3B Colusa~~ |
| ~~3A Jackson~~ | ~~8 Fairbanks North Star~~ | ~~3A Ashley~~ | ~~3A Lonoke~~ | ~~3B Contra Costa~~ |
| ~~3A Jefferson~~ | ~~7 Haines~~ | ~~4A Baxter~~ | ~~4A Madison~~ | ~~4C Del Norte~~ |
| ~~3A Lamar~~ | ~~7 Juneau~~ | ~~4A Benton~~ | ~~4A Marion~~ | ~~4B El Dorado~~ |
| ~~3A Lauderdale~~ | ~~7 Kenai Peninsula~~ | ~~4A Boone~~ | ~~3A Miller\*~~ | ~~3B Fresno~~ |
| ~~3A Lawrence~~ | ~~7 Ketchikan Gateway~~ | ~~3A Bradley~~ | ~~3A Mississippi~~ | ~~3B Glenn~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~4C Humboldt~~ | ~~3B Yuba~~ | ~~5B Morgan~~ | 2A Escambia\* | 2A Taylor\* |
| ~~2B Imperial~~ | **~~COLORADO~~** | ~~4B Otero~~ | 2A Flagler\* | 2A Union\* |
| ~~4B Inyo~~ | ~~6B Ouray~~ | 2A Franklin\* | 2A Volusia\* |
| ~~3B Kern~~ | ~~5B Adams~~ | ~~7 Park~~ | 2A Gadsden\* | 2A Wakulla\* |
| ~~3B Kings~~ | ~~6B Alamosa~~ | ~~5B Phillips~~ | 2A Gilchrist\* | 2A Walton\* |
| ~~4B Lake~~ | ~~5B Arapahoe~~ | ~~7 Pitkin~~ | 2A Glades\* | 2A Washington\* |
| ~~5B Lassen~~ | ~~6B Archuleta~~ | ~~5B Prowers~~ | 2A Gulf\* | **~~GEORGIA~~** |
| ~~3B Los Angeles~~ | ~~4B Baca~~ | ~~5B Pueblo~~ | 2A Hamilton\* |
| ~~3B Madera~~ | ~~5B Bent~~ | ~~6B Rio Blanco~~ | 2A Hardee\* | ~~2A Appling\*~~ |
| ~~3C Marin~~ | ~~5B Boulder~~ | ~~7 Rio Grande~~ | 1~~2~~A Hendry\* | ~~2A Atkinson\*~~ |
| ~~4B Mariposa~~ | ~~6B Chaffee~~ | ~~7 Routt~~ | 2A Hernando\* | ~~2A Bacon\*~~ |
| ~~3C Mendocino~~ | ~~5B Cheyenne~~ | ~~6B Saguache~~ | 2A Highlands\* | ~~2A Baker\*~~ |
| ~~3B Merced~~ | ~~7 Clear Creek~~ | ~~7 San Juan~~ | 2A Hillsborough\* | ~~3A Baldwin~~ |
| ~~5B Modoc~~ | ~~6B Conejos~~ | ~~6B San Miguel~~ | 2A Holmes\* | ~~4A Banks~~ |
| ~~6B Mono~~ | ~~6B Costilla~~ | ~~5B Sedgwick~~ | 2A Indian River\* | ~~3A Barrow~~ |
| ~~3C Monterey~~ | ~~5B Crowley~~ | ~~7 Summit~~ | 2A Jackson\* | ~~3A Bartow~~ |
| ~~3C Napa~~ | ~~6B Custer~~ | ~~5B Teller~~ | 2A Jefferson\* | ~~3A Ben Hill\*~~ |
| ~~5B Nevada~~ | ~~5B Delta~~ | ~~5B Washington~~ | 2A Lafayette\* | ~~2A Berrien\*~~ |
| ~~3B Orange~~ | ~~5B Denver~~ | ~~5B Weld~~ | 2A Lake\* | ~~3A Bibb~~ |
| ~~3B Placer~~ | ~~6B Dolores~~ | ~~5B Yuma~~ | 1~~2~~A Lee\* | ~~3A Bleckley\*~~ |
| ~~5B Plumas~~ | ~~5B Douglas~~ | **~~CONNECTICUT~~** | 2A Leon\* | ~~2A Brantley\*~~ |
| ~~3B Riverside~~ | ~~6B Eagle~~ | 2A Levy\* | ~~2A Brooks\*~~ |
| ~~3B Sacramento~~ | ~~5B Elbert~~ | ~~5A (all)~~ | 2A Liberty\* | ~~2A Bryan\*~~ |
| ~~3C San Benito~~ | ~~5B El Paso~~ | **~~DELAWARE~~** | 2A Madison\* | ~~3A Bulloch\*~~ |
| ~~3B San Bernardino~~ | ~~5B Fremont~~ | 2A Manatee\* | ~~3A Burke~~ |
| ~~3B San Diego~~ | ~~5B Garfield~~ | ~~4A (all)~~ | 2A Marion\* | ~~3A Butts~~ |
| ~~3C San Francisco~~ | ~~5B Gilpin~~ | **~~DISTRICT OF  COLUMBIA~~** | 2A Martin\* | ~~3A Calhoun\*~~ |
| ~~3B San Joaquin~~ | ~~7 Grand~~ | 1A Miami-Dade\* | ~~2A Camden\*~~ |
| ~~3C San Luis Obispo~~ | ~~7 Gunnison~~ | ~~4A (all)~~ | 1A Monroe\* | ~~3A Candler\*~~ |
| ~~3C San Mateo~~ | ~~7 Hinsdale~~ | **FLORIDA** | 2A Nassau\* | ~~3A Carroll~~ |
| ~~3C Santa Barbara~~ | ~~5B Huerfano~~ | 2A Okaloosa\* | ~~4A Catoosa~~ |
| ~~3C Santa Clara~~ | ~~7 Jackson~~ | 2A Alachua\* | 2A Okeechobee\* | ~~2A Charlton\*~~ |
| ~~3C Santa Cruz~~ | ~~5B Jefferson~~ | 2A Baker\* | 2A Orange\* | ~~2A Chatham\*~~ |
| ~~3B Shasta~~ | ~~5B Kiowa~~ | 2A Bay\* | 2A Osceola\* | ~~3A Chattahoochee\*~~ |
| ~~5B Sierra~~ | ~~5B Kit Carson~~ | 2A Bradford\* | 1~~2~~A Palm Beach\* | ~~4A Chattooga~~ |
| ~~5B Siskiyou~~ | ~~7 Lake~~ | 2A Brevard\* | 2A Pasco\* | ~~3A Cherokee~~ |
| ~~3B Solano~~ | ~~5B La Plata~~ | 1A Broward\* | 2A Pinellas\* | ~~3A Clarke~~ |
| ~~3C Sonoma~~ | ~~5B Larimer~~ | 2A Calhoun\* | 2A Polk\* | ~~3A Clay\*~~ |
| ~~3B Stanislaus~~ | ~~4B Las Animas~~ | 2A Charlotte\* | 2A Putnam\* | ~~3A Clayton~~ |
| ~~3B Sutter~~ | ~~5B Lincoln~~ | 2A Citrus\* | 2A Santa Rosa\* | ~~2A Clinch\*~~ |
| ~~3B Tehama~~ | ~~5B Logan~~ | 2A Clay\* | 2A Sarasota\* | ~~3A Cobb~~ |
| ~~4B Trinity~~ | ~~5B Mesa~~ | 1~~2~~A Collier\* | 2A Seminole\* | ~~3A Coffee\*~~ |
| ~~3B Tulare~~ | ~~7 Mineral~~ | 2A Columbia\* | 2A St. Johns\* | ~~2A Colquitt\*~~ |
| ~~4B Tuolumne~~ | ~~6B Moffat~~ | 2A DeSoto\* | 2A St. Lucie\* | ~~3A Columbia~~ |
| ~~3C Ventura~~ | ~~5B Montezuma~~ | 2A Dixie\* | 2A Sumter\* | ~~2A Cook\*~~ |
| ~~3B Yolo~~ | ~~5B Montrose~~ | 2A Duval\* | 2A Suwannee\* | ~~3A Coweta~~ |

*~~continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~3A Crawford~~ | ~~2A Lanier\*~~ | ~~3A Taylor\*~~ | ~~5B Cassia~~ | ~~4A Crawford~~ |
| ~~3A Crisp\*~~ | ~~3A Laurens\*~~ | ~~3A Telfair\*~~ | ~~6B Clark~~ | ~~5A Cumberland~~ |
| ~~4A Dade~~ | ~~3A Lee\*~~ | ~~3A Terrell\*~~ | ~~5B Clearwater~~ | ~~5A DeKalb~~ |
| ~~4A Dawson~~ | ~~2A Liberty\*~~ | ~~2A Thomas\*~~ | ~~6B Custer~~ | ~~5A De Witt~~ |
| ~~2A Decatur\*~~ | ~~3A Lincoln~~ | ~~3A Tift\*~~ | ~~5B Elmore~~ | ~~5A Douglas~~ |
| ~~3A DeKalb~~ | ~~2A Long\*~~ | ~~2A Toombs\*~~ | ~~6B Franklin~~ | ~~5A DuPage~~ |
| ~~3A Dodge\*~~ | ~~2A Lowndes\*~~ | ~~4A Towns~~ | ~~6B Fremont~~ | ~~5A Edgar~~ |
| ~~3A Dooly\*~~ | ~~4A Lumpkin~~ | ~~3A Treutlen\*~~ | ~~5B Gem~~ | ~~4A Edwards~~ |
| ~~3A Dougherty\*~~ | ~~3A Macon\*~~ | ~~3A Troup~~ | ~~5B Gooding~~ | ~~4A Effingham~~ |
| ~~3A Douglas~~ | ~~3A Madison~~ | ~~3A Turner\*~~ | ~~5B Idaho~~ | ~~4A Fayette~~ |
| ~~3A Early\*~~ | ~~3A Marion\*~~ | ~~3A Twiggs\*~~ | ~~6B Jefferson~~ | ~~5A Ford~~ |
| ~~2A Echols\*~~ | ~~3A McDuffie~~ | ~~4A Union~~ | ~~5B Jerome~~ | ~~4A Franklin~~ |
| ~~2A Effingham\*~~ | ~~2A McIntosh\*~~ | ~~3A Upson~~ | ~~5B Kootenai~~ | ~~5A Fulton~~ |
| ~~3A Elbert~~ | ~~3A Meriwether~~ | ~~4A Walker~~ | ~~5B Latah~~ | ~~4A Gallatin~~ |
| ~~3A Emanuel\*~~ | ~~2A Miller\*~~ | ~~3A Walton~~ | ~~6B Lemhi~~ | ~~5A Greene~~ |
| ~~2A Evans\*~~ | ~~2A Mitchell\*~~ | ~~2A Ware\*~~ | ~~5B Lewis~~ | ~~5A Grundy~~ |
| ~~4A Fannin~~ | ~~3A Monroe~~ | ~~3A Warren~~ | ~~5B Lincoln~~ | ~~4A Hamilton~~ |
| ~~3A Fayette~~ | ~~3A Montgomery\*~~ | ~~3A Washington~~ | ~~6B Madison~~ | ~~5A Hancock~~ |
| ~~4A Floyd~~ | ~~3A Morgan~~ | ~~2A Wayne\*~~ | ~~5B Minidoka~~ | ~~4A Hardin~~ |
| ~~3A Forsyth~~ | ~~4A Murray~~ | ~~3A Webster\*~~ | ~~5B Nez Perce~~ | ~~5A Henderson~~ |
| ~~4A Franklin~~ | ~~3A Muscogee~~ | ~~3A Wheeler\*~~ | ~~6B Oneida~~ | ~~5A Henry~~ |
| ~~3A Fulton~~ | ~~3A Newton~~ | ~~4A White~~ | ~~5B Owyhee~~ | ~~5A Iroquois~~ |
| ~~4A Gilmer~~ | ~~3A Oconee~~ | ~~4A Whitfield~~ | ~~5B Payette~~ | ~~4A Jackson~~ |
| ~~3A Glascock~~ | ~~3A Oglethorpe~~ | ~~3A Wilcox\*~~ | ~~5B Power~~ | ~~4A Jasper~~ |
| ~~2A Glynn\*~~ | ~~3A Paulding~~ | ~~3A Wilkes~~ | ~~5B Shoshone~~ | ~~4A Jefferson~~ |
| ~~4A Gordon~~ | ~~3A Peach\*~~ | ~~3A Wilkinson~~ | ~~6B Teton~~ | ~~5A Jersey~~ |
| ~~2A Grady\*~~ | ~~4A Pickens~~ | ~~3A Worth\*~~ | ~~5B Twin Falls~~ | ~~5A Jo Daviess~~ |
| ~~3A Greene~~ | ~~2A Pierce\*~~ | **~~HAWAII~~** | ~~6B Valley~~ | ~~4A Johnson~~ |
| ~~3A Gwinnett~~ | ~~3A Pike~~ | ~~5B Washington~~ | ~~5A Kane~~ |
| ~~4A Habersham~~ | ~~3A Polk~~ | ~~1A (all)\*~~ | **~~ILLINOIS~~** | ~~5A Kankakee~~ |
| ~~4A Hall~~ | ~~3A Pulaski\*~~ | **~~IDAHO~~** | ~~5A Kendall~~ |
| ~~3A Hancock~~ | ~~3A Putnam~~ | ~~5A Adams~~ | ~~5A Knox~~ |
| ~~3A Haralson~~ | ~~3A Quitman\*~~ | ~~5B Ada~~ | ~~4A Alexander~~ | ~~5A Lake~~ |
| ~~3A Harris~~ | ~~4A Rabun~~ | ~~6B Adams~~ | ~~4A Bond~~ | ~~5A La Salle~~ |
| ~~3A Hart~~ | ~~3A Randolph\*~~ | ~~6B Bannock~~ | ~~5A Boone~~ | ~~4A Lawrence~~ |
| ~~3A Heard~~ | ~~3A Richmond~~ | ~~6B Bear Lake~~ | ~~5A Brown~~ | ~~5A Lee~~ |
| ~~3A Henry~~ | ~~3A Rockdale~~ | ~~5B Benewah~~ | ~~5A Bureau~~ | ~~5A Livingston~~ |
| ~~3A Houston\*~~ | ~~3A Schley\*~~ | ~~6B Bingham~~ | ~~5A Calhoun~~ | ~~5A Logan~~ |
| ~~3A Irwin\*~~ | ~~3A Screven\*~~ | ~~6B Blaine~~ | ~~5A Carroll~~ | ~~5A Macon~~ |
| ~~3A Jackson~~ | ~~2A Seminole\*~~ | ~~6B Boise~~ | ~~5A Cass~~ | ~~4A Macoupin~~ |
| ~~3A Jasper~~ | ~~3A Spalding~~ | ~~6B Bonner~~ | ~~5A Champaign~~ | ~~4A Madison~~ |
| ~~2A Jeff Davis\*~~ | ~~4A Stephens~~ | ~~6B Bonneville~~ | ~~4A Christian~~ | ~~4A Marion~~ |
| ~~3A Jefferson~~ | ~~3A Stewart\*~~ | ~~6B Boundary~~ | ~~5A Clark~~ | ~~5A Marshall~~ |
| ~~3A Jenkins\*~~ | ~~3A Sumter\*~~ | ~~6B Butte~~ | ~~4A Clay~~ | ~~5A Mason~~ |
| ~~3A Johnson\*~~ | ~~3A Talbot~~ | ~~6B Camas~~ | ~~4A Clinton~~ | ~~4A Massac~~ |
| ~~3A Jones~~ | ~~3A Taliaferro~~ | ~~5B Canyon~~ | ~~5A Coles~~ | ~~5A McDonough~~ |
| ~~3A Lamar~~ | ~~2A Tattnall\*~~ | ~~6B Caribou~~ | ~~5A Cook~~ | ~~5A McHenry~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~5A McLean~~ | ~~5A Boone~~ | ~~5A Miami~~ | ~~5A Appanoose~~ | ~~5A Jasper~~ |
| ~~5A Menard~~ | ~~4A Brown~~ | ~~4A Monroe~~ | ~~5A Audubon~~ | ~~5A Jefferson~~ |
| ~~5A Mercer~~ | ~~5A Carroll~~ | ~~5A Montgomery~~ | ~~5A Benton~~ | ~~5A Johnson~~ |
| ~~4A Monroe~~ | ~~5A Cass~~ | ~~5A Morgan~~ | ~~6A Black Hawk~~ | ~~5A Jones~~ |
| ~~4A Montgomery~~ | ~~4A Clark~~ | ~~5A Newton~~ | ~~5A Boone~~ | ~~5A Keokuk~~ |
| ~~5A Morgan~~ | ~~5A Clay~~ | ~~5A Noble~~ | ~~6A Bremer~~ | ~~6A Kossuth~~ |
| ~~5A Moultrie~~ | ~~5A Clinton~~ | ~~4A Ohio~~ | ~~6A Buchanan~~ | ~~5A Lee~~ |
| ~~5A Ogle~~ | ~~4A Crawford~~ | ~~4A Orange~~ | ~~6A Buena Vista~~ | ~~5A Linn~~ |
| ~~5A Peoria~~ | ~~4A Daviess~~ | ~~5A Owen~~ | ~~6A Butler~~ | ~~5A Louisa~~ |
| ~~4A Perry~~ | ~~4A Dearborn~~ | ~~5A Parke~~ | ~~6A Calhoun~~ | ~~5A Lucas~~ |
| ~~5A Piatt~~ | ~~5A Decatur~~ | ~~4A Perry~~ | ~~5A Carroll~~ | ~~6A Lyon~~ |
| ~~5A Pike~~ | ~~5A De Kalb~~ | ~~4A Pike~~ | ~~5A Cass~~ | ~~5A Madison~~ |
| ~~4A Pope~~ | ~~5A Delaware~~ | ~~5A Porter~~ | ~~5A Cedar~~ | ~~5A Mahaska~~ |
| ~~4A Pulaski~~ | ~~4A Dubois~~ | ~~4A Posey~~ | ~~6A Cerro Gordo~~ | ~~5A Marion~~ |
| ~~5A Putnam~~ | ~~5A Elkhart~~ | ~~5A Pulaski~~ | ~~6A Cherokee~~ | ~~5A Marshall~~ |
| ~~4A Randolph~~ | ~~5A Fayette~~ | ~~5A Putnam~~ | ~~6A Chickasaw~~ | ~~5A Mills~~ |
| ~~4A Richland~~ | ~~4A Floyd~~ | ~~5A Randolph~~ | ~~5A Clarke~~ | ~~6A Mitchell~~ |
| ~~5A Rock Island~~ | ~~5A Fountain~~ | ~~4A Ripley~~ | ~~6A Clay~~ | ~~5A Monona~~ |
| ~~4A Saline~~ | ~~5A Franklin~~ | ~~5A Rush~~ | ~~6A Clayton~~ | ~~5A Monroe~~ |
| ~~5A Sangamon~~ | ~~5A Fulton~~ | ~~4A Scott~~ | ~~5A Clinton~~ | ~~5A Montgomery~~ |
| ~~5A Schuyler~~ | ~~4A Gibson~~ | ~~5A Shelby~~ | ~~5A Crawford~~ | ~~5A Muscatine~~ |
| ~~5A Scott~~ | ~~5A Grant~~ | ~~4A Spencer~~ | ~~5A Dallas~~ | ~~6A O’Brien~~ |
| ~~4A Shelby~~ | ~~4A Greene~~ | ~~5A Starke~~ | ~~5A Davis~~ | ~~6A Osceola~~ |
| ~~5A Stark~~ | ~~5A Hamilton~~ | ~~5A Steuben~~ | ~~5A Decatur~~ | ~~5A Page~~ |
| ~~4A St. Clair~~ | ~~5A Hancock~~ | ~~5A St. Joseph~~ | ~~6A Delaware~~ | ~~6A Palo Alto~~ |
| ~~5A Stephenson~~ | ~~4A Harrison~~ | ~~4A Sullivan~~ | ~~5A Des Moines~~ | ~~6A Plymouth~~ |
| ~~5A Tazewell~~ | ~~5A Hendricks~~ | ~~4A Switzerland~~ | ~~6A Dickinson~~ | ~~6A Pocahontas~~ |
| ~~4A Union~~ | ~~5A Henry~~ | ~~5A Tippecanoe~~ | ~~5A Dubuque~~ | ~~5A Polk~~ |
| ~~5A Vermilion~~ | ~~5A Howard~~ | ~~5A Tipton~~ | ~~6A Emmet~~ | ~~5A Pottawattamie~~ |
| ~~4A Wabash~~ | ~~5A Huntington~~ | ~~5A Union~~ | ~~6A Fayette~~ | ~~5A Poweshiek~~ |
| ~~5A Warren~~ | ~~4A Jackson~~ | ~~4A Vanderburgh~~ | ~~6A Floyd~~ | ~~5A Ringgold~~ |
| ~~4A Washington~~ | ~~5A Jasper~~ | ~~5A Vermillion~~ | ~~6A Franklin~~ | ~~6A Sac~~ |
| ~~4A Wayne~~ | ~~5A Jay~~ | ~~5A Vigo~~ | ~~5A Fremont~~ | ~~5A Scott~~ |
| ~~4A White~~ | ~~4A Jefferson~~ | ~~5A Wabash~~ | ~~5A Greene~~ | ~~5A Shelby~~ |
| ~~5A Whiteside~~ | ~~4A Jennings~~ | ~~5A Warren~~ | ~~6A Grundy~~ | ~~6A Sioux~~ |
| ~~5A Will~~ | ~~5A Johnson~~ | ~~4A Warrick~~ | ~~5A Guthrie~~ | ~~5A Story~~ |
| ~~4A Williamson~~ | ~~4A Knox~~ | ~~4A Washington~~ | ~~6A Hamilton~~ | ~~5A Tama~~ |
| ~~5A Winnebago~~ | ~~5A Kosciusko~~ | ~~5A Wayne~~ | ~~6A Hancock~~ | ~~5A Taylor~~ |
| ~~5A Woodford~~ | ~~5A Lagrange~~ | ~~5A Wells~~ | ~~6A Hardin~~ | ~~5A Union~~ |
| **~~INDIANA~~** | ~~5A Lake~~ | ~~5A White~~ | ~~5A Harrison~~ | ~~5A Van Buren~~ |
| ~~5A La Porte~~ | ~~5A Whitley~~ | ~~5A Henry~~ | ~~5A Wapello~~ |
| ~~5A Adams~~ | ~~4A Lawrence~~ | **~~IOWA~~** | ~~6A Howard~~ | ~~5A Warren~~ |
| ~~5A Allen~~ | ~~5A Madison~~ | ~~6A Humboldt~~ | ~~5A Washington~~ |
| ~~5A Bartholomew~~ | ~~5A Marion~~ | ~~5A Adair~~ | ~~6A Ida~~ | ~~5A Wayne~~ |
| ~~5A Benton~~ | ~~5A Marshall~~ | ~~5A Adams~~ | ~~5A Iowa~~ | ~~6A Webster~~ |
| ~~5A Blackford~~ | ~~4A Martin~~ | ~~6A Allamakee~~ | ~~5A Jackson~~ | ~~6A Winnebago~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~6A Winneshiek~~ | ~~4A Haskell~~ | ~~4A Sedgwick~~ | ~~2A Iberville\*~~ | ~~6A Cumberland~~ |
| ~~5A Woodbury~~ | ~~4A Hodgeman~~ | ~~4A Seward~~ | ~~3A Jackson\*~~ | ~~6A Franklin~~ |
| ~~6A Worth~~ | ~~4A Jackson~~ | ~~4A Shawnee~~ | ~~2A Jefferson\*~~ | ~~6A Hancock~~ |
| ~~6A Wright~~ | ~~4A Jefferson~~ | ~~5A Sheridan~~ | ~~2A Jefferson Davis\*~~ | ~~6A Kennebec~~ |
| **~~KANSAS~~** | ~~5A Jewell~~ | ~~5A Sherman~~ | ~~2A Lafayette\*~~ | ~~6A Knox~~ |
| ~~4A Johnson~~ | ~~5A Smith~~ | ~~2A Lafourche\*~~ | ~~6A Lincoln~~ |
| ~~4A Allen~~ | ~~4A Kearny~~ | ~~4A Stafford~~ | ~~3A La Salle\*~~ | ~~6A Oxford~~ |
| ~~4A Anderson~~ | ~~4A Kingman~~ | ~~4A Stanton~~ | ~~3A Lincoln\*~~ | ~~6A Penobscot~~ |
| ~~4A Atchison~~ | ~~4A Kiowa~~ | ~~4A Stevens~~ | ~~2A Livingston\*~~ | ~~6A Piscataquis~~ |
| ~~4A Barber~~ | ~~4A Labette~~ | ~~4A Sumner~~ | ~~3A Madison\*~~ | ~~6A Sagadahoc~~ |
| ~~4A Barton~~ | ~~5A Lane~~ | ~~5A Thomas~~ | ~~3A Morehouse~~ | ~~6A Somerset~~ |
| ~~4A Bourbon~~ | ~~4A Leavenworth~~ | ~~5A Trego~~ | ~~3A Natchitoches\*~~ | ~~6A Waldo~~ |
| ~~4A Brown~~ | ~~4A Lincoln~~ | ~~4A Wabaunsee~~ | ~~2A Orleans\*~~ | ~~6A Washington~~ |
| ~~4A Butler~~ | ~~4A Linn~~ | ~~5A Wallace~~ | ~~3A Ouachita\*~~ | ~~6A York~~ |
| ~~4A Chase~~ | ~~5A Logan~~ | ~~4A Washington~~ | ~~2A Plaquemines\*~~ | **~~MARYLAND~~** |
| ~~4A Chautauqua~~ | ~~4A Lyon~~ | ~~5A Wichita~~ | ~~2A Pointe Coupee\*~~ |
| ~~4A Cherokee~~ | ~~4A Marion~~ | ~~4A Wilson~~ | ~~2A Rapides\*~~ | ~~4A Allegany~~ |
| ~~5A Cheyenne~~ | ~~4A Marshall~~ | ~~4A Woodson~~ | ~~3A Red River\*~~ | ~~4A Anne Arundel~~ |
| ~~4A Clark~~ | ~~4A McPherson~~ | ~~4A Wyandotte~~ | ~~3A Richland\*~~ | ~~4A Baltimore~~ |
| ~~4A Clay~~ | ~~4A Meade~~ | **~~KENTUCKY~~** | ~~3A Sabine\*~~ | ~~4A Baltimore (city)~~ |
| ~~5A Cloud~~ | ~~4A Miami~~ | ~~2A St. Bernard\*~~ | ~~4A Calvert~~ |
| ~~4A Coffey~~ | ~~5A Mitchell~~ | ~~4A (all)~~ | ~~2A St. Charles\*~~ | ~~4A Caroline~~ |
| ~~4A Comanche~~ | ~~4A Montgomery~~ | **~~LOUISIANA~~** | ~~2A St. Helena\*~~ | ~~4A Carroll~~ |
| ~~4A Cowley~~ | ~~4A Morris~~ | ~~2A St. James\*~~ | ~~4A Cecil~~ |
| ~~4A Crawford~~ | ~~4A Morton~~ | ~~2A Acadia\*~~ | ~~2A St. John~~ | ~~4A Charles~~ |
| ~~5A Decatur~~ | ~~4A Nemaha~~ | ~~2A Allen\*~~ | ~~the Baptist\*~~ | ~~4A Dorchester~~ |
| ~~4A Dickinson~~ | ~~4A Neosho~~ | ~~2A Ascension\*~~ | ~~2A St. Landry\*~~ | ~~4A Frederick~~ |
| ~~4A Doniphan~~ | ~~5A Ness~~ | ~~2A Assumption\*~~ | ~~2A St. Martin\*~~ | ~~5A Garrett~~ |
| ~~4A Douglas~~ | ~~5A Norton~~ | ~~2A Avoyelles\*~~ | ~~2A St. Mary\*~~ | ~~4A Harford~~ |
| ~~4A Edwards~~ | ~~4A Osage~~ | ~~2A Beauregard\*~~ | ~~2A St. Tammany\*~~ | ~~4A Howard~~ |
| ~~4A Elk~~ | ~~5A Osborne~~ | ~~3A Bienville\*~~ | ~~2A Tangipahoa\*~~ | ~~4A Kent~~ |
| ~~5A Ellis~~ | ~~4A Ottawa~~ | ~~3A Bossier\*~~ | ~~3A Tensas\*~~ | ~~4A Montgomery~~ |
| ~~4A Ellsworth~~ | ~~4A Pawnee~~ | ~~3A Caddo\*~~ | ~~2A Terrebonne\*~~ | ~~4A Prince George’s~~ |
| ~~4A Finney~~ | ~~5A Phillips~~ | ~~2A Calcasieu\*~~ | ~~3A Union\*~~ | ~~4A Queen Anne’s~~ |
| ~~4A Ford~~ | ~~4A Pottawatomie~~ | ~~3A Caldwell\*~~ | ~~2A Vermilion\*~~ | ~~4A Somerset~~ |
| ~~4A Franklin~~ | ~~4A Pratt~~ | ~~2A Cameron\*~~ | ~~3A Vernon\*~~ | ~~4A St. Mary’s~~ |
| ~~4A Geary~~ | ~~5A Rawlins~~ | ~~3A Catahoula\*~~ | ~~2A Washington\*~~ | ~~4A Talbot~~ |
| ~~5A Gove~~ | ~~4A Reno~~ | ~~3A Claiborne\*~~ | ~~3A Webster\*~~ | ~~4A Washington~~ |
| ~~5A Graham~~ | ~~5A Republic~~ | ~~3A Concordia\*~~ | ~~2A West Baton~~ | ~~4A Wicomico~~ |
| ~~4A Grant~~ | ~~4A Rice~~ | ~~3A De Soto\*~~ | ~~Rouge\*~~ | ~~4A Worcester~~ |
| ~~4A Gray~~ | ~~4A Riley~~ | ~~2A East Baton Rouge\*~~ | ~~3A West Carroll~~ | **~~MASSACHSETTS~~** |
| ~~5A Greeley~~ | ~~5A Rooks~~ | ~~3A East Carroll~~ | ~~2A West Feliciana~~ |
| ~~4A Greenwood~~ | ~~4A Rush~~ | ~~2A East Feliciana\*~~ | ~~3A Winn\*~~ | ~~5A (all)~~ |
| ~~5A Hamilton~~ | ~~4A Russell~~ | ~~2A Evangeline~~ | **~~MAINE~~** | **~~MICHIGAN~~** |
| ~~4A Harper~~ | ~~4A Saline~~ | ~~3A Franklin\*~~ |
| ~~4A Harvey~~ | ~~5A Scott~~ | ~~3A Grant\*~~ | ~~6A Androscoggin~~ | ~~6A Alcona~~ |
| ~~2A Iberia\*~~ | ~~7 Aroostook~~ | ~~6A Alger~~ |  |  |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~5A Allegan~~ | ~~7 Mackinac~~ | ~~6A Carver~~ | ~~7 Otter Tail~~ | ~~3A Clarke~~ |
| ~~6A Alpena~~ | ~~5A Macomb~~ | ~~7 Cass~~ | ~~7 Pennington~~ | ~~3A Clay~~ |
| ~~6A Antrim~~ | ~~6A Manistee~~ | ~~6A Chippewa~~ | ~~7 Pine~~ | ~~3A Coahoma~~ |
| ~~6A Arenac~~ | ~~6A Marquette~~ | ~~6A Chisago~~ | ~~6A Pipestone~~ | ~~3A Copiah\*~~ |
| ~~7 Baraga~~ | ~~6A Mason~~ | ~~7 Clay~~ | ~~7 Polk~~ | ~~3A Covington\*~~ |
| ~~5A Barry~~ | ~~6A Mecosta~~ | ~~7 Clearwater~~ | ~~6A Pope~~ | ~~3A DeSoto~~ |
| ~~5A Bay~~ | ~~6A Menominee~~ | ~~7 Cook~~ | ~~6A Ramsey~~ | ~~3A Forrest\*~~ |
| ~~6A Benzie~~ | ~~5A Midland~~ | ~~6A Cottonwood~~ | ~~7 Red Lake~~ | ~~3A Franklin\*~~ |
| ~~5A Berrien~~ | ~~6A Missaukee~~ | ~~7 Crow Wing~~ | ~~6A Redwood~~ | ~~3A George\*~~ |
| ~~5A Branch~~ | ~~5A Monroe~~ | ~~6A Dakota~~ | ~~6A Renville~~ | ~~3A Greene\*~~ |
| ~~5A Calhoun~~ | ~~5A Montcalm~~ | ~~6A Dodge~~ | ~~6A Rice~~ | ~~3A Grenada~~ |
| ~~5A Cass~~ | ~~6A Montmorency~~ | ~~6A Douglas~~ | ~~6A Rock~~ | ~~2A Hancock\*~~ |
| ~~6A Charlevoix~~ | ~~5A Muskegon~~ | ~~6A Faribault~~ | ~~7 Roseau~~ | ~~2A Harrison\*~~ |
| ~~6A Cheboygan~~ | ~~6A Newaygo~~ | ~~6A Fillmore~~ | ~~6A Scott~~ | ~~3A Hinds\*~~ |
| ~~7 Chippewa~~ | ~~5A Oakland~~ | ~~6A Freeborn~~ | ~~6A Sherburne~~ | ~~3A Holmes~~ |
| ~~6A Clare~~ | ~~6A Oceana~~ | ~~6A Goodhue~~ | ~~6A Sibley~~ | ~~3A Humphreys~~ |
| ~~5A Clinton~~ | ~~6A Ogemaw~~ | ~~7 Grant~~ | ~~6A Stearns~~ | ~~3A Issaquena~~ |
| ~~6A Crawford~~ | ~~7 Ontonagon~~ | ~~6A Hennepin~~ | ~~6A Steele~~ | ~~3A Itawamba~~ |
| ~~6A Delta~~ | ~~6A Osceola~~ | ~~6A Houston~~ | ~~6A Stevens~~ | ~~2A Jackson\*~~ |
| ~~6A Dickinson~~ | ~~6A Oscoda~~ | ~~7 Hubbard~~ | ~~7St. Louis~~ | ~~3A Jasper~~ |
| ~~5A Eaton~~ | ~~6A Otsego~~ | ~~6A Isanti~~ | ~~6A Swift~~ | ~~3A Jefferson\*~~ |
| ~~6A Emmet~~ | ~~5A Ottawa~~ | ~~7 Itasca~~ | ~~6A Todd~~ | ~~3A Jefferson Davis\*~~ |
| ~~5A Genesee~~ | ~~6A Presque Isle~~ | ~~6A Jackson~~ | ~~6A Traverse~~ | ~~3A Jones\*~~ |
| ~~6A Gladwin~~ | ~~6A Roscommon~~ | ~~7 Kanabec~~ | ~~6A Wabasha~~ | ~~3A Kemper~~ |
| ~~7 Gogebic~~ | ~~5A Saginaw~~ | ~~6A Kandiyohi~~ | ~~7 Wadena~~ | ~~3A Lafayette~~ |
| ~~6A Grand Traverse~~ | ~~6A Sanilac~~ | ~~7 Kittson~~ | ~~6A Waseca~~ | ~~3A Lamar\*~~ |
| ~~5A Gratiot~~ | ~~7 Schoolcraft~~ | ~~7 Koochiching~~ | ~~6A Washington~~ | ~~3A Lauderdale~~ |
| ~~5A Hillsdale~~ | ~~5A Shiawassee~~ | ~~6A Lac qui Parle~~ | ~~6A Watonwan~~ | ~~3A Lawrence\*~~ |
| ~~7 Houghton~~ | ~~5A St. Clair~~ | ~~7 Lake~~ | ~~7 Wilkin~~ | ~~3A Leake~~ |
| ~~6A Huron~~ | ~~5A St. Joseph~~ | ~~7 Lake of the Woods~~ | ~~6A Winona~~ | ~~3A Lee~~ |
| ~~5A Ingham~~ | ~~5A Tuscola~~ | ~~6A Le Sueur~~ | ~~6A Wright~~ | ~~3A Leflore~~ |
| ~~5A Ionia~~ | ~~5A Van Buren~~ | ~~6A Lincoln~~ | ~~6A Yellow~~ | ~~3A Lincoln\*~~ |
| ~~6A Iosco~~ | ~~5A Washtenaw~~ | ~~6A Lyon~~ | ~~Medicine~~ | ~~3A Lowndes~~ |
| ~~7 Iron~~ | ~~5A Wayne~~ | ~~7 Mahnomen~~ | **~~MISSISSIPPI~~** | ~~3A Madison~~ |
| ~~6A Isabella~~ | ~~6A Wexford~~ | ~~7 Marshall~~ | ~~3A Marion\*~~ |
| ~~5A Jackson~~ | **~~MINNESOTA~~** | ~~6A Martin~~ | ~~3A Adams\*~~ | ~~3A Marshall~~ |
| ~~5A Kalamazoo~~ | ~~6A McLeod~~ | ~~3A Alcorn~~ | ~~3A Monroe~~ |
| ~~6A Kalkaska~~ | ~~7 Aitkin~~ | ~~6A Meeker~~ | ~~3A Amite\*~~ | ~~3A Montgomery~~ |
| ~~5A Kent~~ | ~~6A Anoka~~ | ~~7 Mille Lacs~~ | ~~3A Attala~~ | ~~3A Neshoba~~ |
| ~~7 Keweenaw~~ | ~~7 Becker~~ | ~~6A Morrison~~ | ~~3A Benton~~ | ~~3A Newton~~ |
| ~~6A Lake~~ | ~~7 Beltrami~~ | ~~6A Mower~~ | ~~3A Bolivar~~ | ~~3A Noxubee~~ |
| ~~5A Lapeer~~ | ~~6A Benton~~ | ~~6A Murray~~ | ~~3A Calhoun~~ | ~~3A Oktibbeha~~ |
| ~~6A Leelanau~~ | ~~6A Big Stone~~ | ~~6A Nicollet~~ | ~~3A Carroll~~ | ~~3A Panola~~ |
| ~~5A Lenawee~~ | ~~6A Blue Earth~~ | ~~6A Nobles~~ | ~~3A Chickasaw~~ | ~~2A Pearl River\*~~ |
| ~~5A Livingston~~ | ~~6A Brown~~ | ~~7 Norman~~ | ~~3A Choctaw~~ | ~~3A Perry\*~~ |
| ~~7 Luce~~ | ~~7 Carlton~~ | ~~6A Olmsted~~ | ~~3A Claiborne\*~~ | ~~3A Pike\*~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~3A Pontotoc~~ | ~~5A Chariton~~ | ~~4A Mississippi~~ | ~~4A Webster~~ | ~~4A Cumberland~~ |
| ~~3A Prentiss~~ | ~~4A Christian~~ | ~~4A Moniteau~~ | ~~5A Worth~~ | ~~4A Essex~~ |
| ~~3A Quitman~~ | ~~5A Clark~~ | ~~4A Monroe~~ | ~~4A Wright~~ | ~~4A Gloucester~~ |
| ~~3A Rankin\*~~ | ~~4A Clay~~ | ~~4A Montgomery~~ | **~~MONTANA~~** | ~~4A Hudson~~ |
| ~~3A Scott~~ | ~~5A Clinton~~ | ~~4A Morgan~~ | ~~5A Hunterdon~~ |
| ~~3A Sharkey~~ | ~~4A Cole~~ | ~~4A New Madrid~~ | ~~6B (all)~~ | ~~5A Mercer~~ |
| ~~3A Simpson\*~~ | ~~4A Cooper~~ | ~~4A Newton~~ | **~~NEBRASKA~~** | ~~4A Middlesex~~ |
| ~~3A Smith\*~~ | ~~4A Crawford~~ | ~~5A Nodaway~~ | ~~4A Monmouth~~ |
| ~~2A Stone\*~~ | ~~4A Dade~~ | ~~4A Oregon~~ | ~~5A (all)~~ | ~~5A Morris~~ |
| ~~3A Sunflower~~ | ~~4A Dallas~~ | ~~4A Osage~~ | **~~NEVADA~~** | ~~4A Ocean~~ |
| ~~3A Tallahatchie~~ | ~~5A Daviess~~ | ~~4A Ozark~~ | ~~5A Passaic~~ |
| ~~3A Tate~~ | ~~5A DeKalb~~ | ~~4A Pemiscot~~ | ~~5B Carson City (city)~~ | ~~4A Salem~~ |
| ~~3A Tippah~~ | ~~4A Dent~~ | ~~4A Perry~~ | ~~5B Churchill~~ | ~~5A Somerset~~ |
| ~~3A Tishomingo~~ | ~~4A Douglas~~ | ~~4A Pettis~~ | ~~3B Clark~~ | ~~5A Sussex~~ |
| ~~3A Tunica~~ | ~~4A Dunklin~~ | ~~4A Phelps~~ | ~~5B Douglas~~ | ~~4A Union~~ |
| ~~3A Union~~ | ~~4A Franklin~~ | ~~5A Pike~~ | ~~5B Elko~~ | ~~5A Warren~~ |
| ~~3A Walthall\*~~ | ~~4A Gasconade~~ | ~~4A Platte~~ | ~~5B Esmeralda~~ | **~~NEW MEXICO~~** |
| ~~3A Warren\*~~ | ~~5A Gentry~~ | ~~4A Polk~~ | ~~5B Eureka~~ |
| ~~3A Washington~~ | ~~4A Greene~~ | ~~4A Pulaski~~ | ~~5B Humboldt~~ | ~~4B Bernalillo~~ |
| ~~3A Wayne\*~~ | ~~5A Grundy~~ | ~~5A Putnam~~ | ~~5B Lander~~ | ~~5B Catron~~ |
| ~~3A Webster~~ | ~~5A Harrison~~ | ~~5A Ralls~~ | ~~5B Lincoln~~ | ~~3B Chaves~~ |
| ~~3A Wilkinson\*~~ | ~~4A Henry~~ | ~~4A Randolph~~ | ~~5B Lyon~~ | ~~4B Cibola~~ |
| ~~3A Winston~~ | ~~4A Hickory~~ | ~~4A Ray~~ | ~~5B Mineral~~ | ~~5B Colfax~~ |
| ~~3A Yalobusha~~ | ~~5A Holt~~ | ~~4A Reynolds~~ | ~~5B Nye~~ | ~~4B Curry~~ |
| ~~3A Yazoo~~ | ~~4A Howard~~ | ~~4A Ripley~~ | ~~5B Pershing~~ | ~~4B DeBaca~~ |
| **~~MISSOURI~~** | ~~4A Howell~~ | ~~4A Saline~~ | ~~5B Storey~~ | ~~3B Dona Ana~~ |
| ~~4A Iron~~ | ~~5A Schuyler~~ | ~~5B Washoe~~ | ~~3B Eddy~~ |
| ~~5A Adair~~ | ~~4A Jackson~~ | ~~5A Scotland~~ | ~~5B White Pine~~ | ~~4B Grant~~ |
| ~~5A Andrew~~ | ~~4A Jasper~~ | ~~4A Scott~~ | **~~NEW  HAMPSHIRE~~** | ~~4B Guadalupe~~ |
| ~~5A Atchison~~ | ~~4A Jefferson~~ | ~~4A Shannon~~ | ~~5B Harding~~ |
| ~~4A Audrain~~ | ~~4A Johnson~~ | ~~5A Shelby~~ | ~~6A Belknap~~ | ~~3B Hidalgo~~ |
| ~~4A Barry~~ | ~~5A Knox~~ | ~~4A St. Charles~~ | ~~6A Carroll~~ | ~~3B Lea~~ |
| ~~4A Barton~~ | ~~4A Laclede~~ | ~~4A St. Clair~~ | ~~5A Cheshire~~ | ~~4B Lincoln~~ |
| ~~4A Bates~~ | ~~4A Lafayette~~ | ~~4A Ste. Genevieve~~ | ~~6A Coos~~ | ~~5B Los Alamos~~ |
| ~~4A Benton~~ | ~~4A Lawrence~~ | ~~4A St. Francois~~ | ~~6A Grafton~~ | ~~3B Luna~~ |
| ~~4A Bollinger~~ | ~~5A Lewis~~ | ~~4A St. Louis~~ | ~~5A Hillsborough~~ | ~~5B McKinley~~ |
| ~~4A Boone~~ | ~~4A Lincoln~~ | ~~4A St. Louis (city)~~ | ~~6A Merrimack~~ | ~~5B Mora~~ |
| ~~5A Buchanan~~ | ~~5A Linn~~ | ~~4A Stoddard~~ | ~~5A Rockingham~~ | ~~3B Otero~~ |
| ~~4A Butler~~ | ~~5A Livingston~~ | ~~4A Stone~~ | ~~5A Strafford~~ | ~~4B Quay~~ |
| ~~5A Caldwell~~ | ~~5A Macon~~ | ~~5A Sullivan~~ | ~~6A Sullivan~~ | ~~5B Rio Arriba~~ |
| ~~4A Callaway~~ | ~~4A Madison~~ | ~~4A Taney~~ | **~~NEW JERSEY~~** | ~~4B Roosevelt~~ |
| ~~4A Camden~~ | ~~4A Maries~~ | ~~4A Texas~~ | ~~5B Sandoval~~ |
| ~~4A Cape Girardeau~~ | ~~5A Marion~~ | ~~4A Vernon~~ | ~~4A Atlantic~~ | ~~5B San Juan~~ |
| ~~4A Carroll~~ | ~~4A McDonald~~ | ~~4A Warren~~ | ~~5A Bergen~~ | ~~5B San Miguel~~ |
| ~~4A Carter~~ | ~~5A Mercer~~ | ~~4A Washington~~ | ~~4A Burlington~~ | ~~5B Santa Fe~~ |
| ~~4A Cass~~ | ~~4A Miller~~ | ~~4A Wayne~~ | ~~4A Camden~~ | ~~4B Sierra~~ |
| ~~4A Cedar~~ | ~~4A Cape May~~ | ~~4B Socorro~~ |  |  |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~5B Taos~~ | ~~4A Queens~~ | ~~4A Clay~~ | ~~4A Orange~~ | ~~7 Divide~~ |
| ~~5B Torrance~~ | ~~5A Rensselaer~~ | ~~4A Cleveland~~ | ~~3A Pamlico~~ | ~~6A Dunn~~ |
| ~~4B Union~~ | ~~4A Richmond~~ | ~~3A Columbus\*~~ | ~~3A Pasquotank~~ | ~~7 Eddy~~ |
| ~~4B Valencia~~ | ~~5A Rockland~~ | ~~3A Craven~~ | ~~3A Pender\*~~ | ~~6A Emmons~~ |
| **~~NEW YORK~~** | ~~5A Saratoga~~ | ~~3A Cumberland~~ | ~~3A Perquimans~~ | ~~7 Foster~~ |
| ~~5A Schenectady~~ | ~~3A Currituck~~ | ~~4A Person~~ | ~~6A Golden Valley~~ |
| ~~5A Albany~~ | ~~6A Schoharie~~ | ~~3A Dare~~ | ~~3A Pitt~~ | ~~7 Grand Forks~~ |
| ~~6A Allegany~~ | ~~6A Schuyler~~ | ~~3A Davidson~~ | ~~4A Polk~~ | ~~6A Grant~~ |
| ~~4A Bronx~~ | ~~5A Seneca~~ | ~~4A Davie~~ | ~~3A Randolph~~ | ~~7 Griggs~~ |
| ~~6A Broome~~ | ~~6A Steuben~~ | ~~3A Duplin~~ | ~~3A Richmond~~ | ~~6A Hettinger~~ |
| ~~6A Cattaraugus~~ | ~~6A St. Lawrence~~ | ~~4A Durham~~ | ~~3A Robeson~~ | ~~7 Kidder~~ |
| ~~5A Cayuga~~ | ~~4A Suffolk~~ | ~~3A Edgecombe~~ | ~~4A Rockingham~~ | ~~6A LaMoure~~ |
| ~~5A Chautauqua~~ | ~~6A Sullivan~~ | ~~4A Forsyth~~ | ~~3A Rowan~~ | ~~6A Logan~~ |
| ~~5A Chemung~~ | ~~5A Tioga~~ | ~~4A Franklin~~ | ~~4A Rutherford~~ | ~~7 McHenry~~ |
| ~~6A Chenango~~ | ~~6A Tompkins~~ | ~~3A Gaston~~ | ~~3A Sampson~~ | ~~6A McIntosh~~ |
| ~~6A Clinton~~ | ~~6A Ulster~~ | ~~4A Gates~~ | ~~3A Scotland~~ | ~~6A McKenzie~~ |
| ~~5A Columbia~~ | ~~6A Warren~~ | ~~4A Graham~~ | ~~3A Stanly~~ | ~~7 McLean~~ |
| ~~5A Cortland~~ | ~~5A Washington~~ | ~~4A Granville~~ | ~~4A Stokes~~ | ~~6A Mercer~~ |
| ~~6A Delaware~~ | ~~5A Wayne~~ | ~~3A Greene~~ | ~~4A Surry~~ | ~~6A Morton~~ |
| ~~5A Dutchess~~ | ~~4A Westchester~~ | ~~4A Guilford~~ | ~~4A Swain~~ | ~~7 Mountrail~~ |
| ~~5A Erie~~ | ~~6A Wyoming~~ | ~~4A Halifax~~ | ~~4A Transylvania~~ | ~~7 Nelson~~ |
| ~~6A Essex~~ | ~~5A Yates~~ | ~~4A Harnett~~ | ~~3A Tyrrell~~ | ~~6A Oliver~~ |
| ~~6A Franklin~~ | **~~NORTH  CAROLINA~~** | ~~4A Haywood~~ | ~~3A Union~~ | ~~7 Pembina~~ |
| ~~6A Fulton~~ | ~~4A Henderson~~ | ~~4A Vance~~ | ~~7 Pierce~~ |
| ~~5A Genesee~~ | ~~4A Hertford~~ | ~~4A Wake~~ | ~~7 Ramsey~~ |
| ~~5A Greene~~ | ~~4A Alamance~~ | ~~3A Hoke~~ | ~~4A Warren~~ | ~~6A Ransom~~ |
| ~~6A Hamilton~~ | ~~4A Alexander~~ | ~~3A Hyde~~ | ~~3A Washington~~ | ~~7 Renville~~ |
| ~~6A Herkimer~~ | ~~5A Alleghany~~ | ~~4A Iredell~~ | ~~5A Watauga~~ | ~~6A Richland~~ |
| ~~6A Jefferson~~ | ~~3A Anson~~ | ~~4A Jackson~~ | ~~3A Wayne~~ | ~~7 Rolette~~ |
| ~~4A Kings~~ | ~~5A Ashe~~ | ~~3A Johnston~~ | ~~4A Wilkes~~ | ~~6A Sargent~~ |
| ~~6A Lewis~~ | ~~5A Avery~~ | ~~3A Jones~~ | ~~3A Wilson~~ | ~~7 Sheridan~~ |
| ~~5A Livingston~~ | ~~3A Beaufort~~ | ~~4A Lee~~ | ~~4A Yadkin~~ | ~~6A Sioux~~ |
| ~~6A Madison~~ | ~~4A Bertie~~ | ~~3A Lenoir~~ | ~~5A Yancey~~ | ~~6A Slope~~ |
| ~~5A Monroe~~ | ~~3A Bladen~~ | ~~4A Lincoln~~ | **~~NORTH DAKOTA~~** | ~~6A Stark~~ |
| ~~6A Montgomery~~ | ~~3A Brunswick\*~~ | ~~4A Macon~~ | ~~7 Steele~~ |
| ~~4A Nassau~~ | ~~4A Buncombe~~ | ~~4A Madison~~ | ~~6A Adams~~ | ~~7 Stutsman~~ |
| ~~4A New York~~ | ~~4A Burke~~ | ~~3A Martin~~ | ~~7 Barnes~~ | ~~7 Towner~~ |
| ~~5A Niagara~~ | ~~3A Cabarrus~~ | ~~4A McDowell~~ | ~~7 Benson~~ | ~~7 Traill~~ |
| ~~6A Oneida~~ | ~~4A Caldwell~~ | ~~3A Mecklenburg~~ | ~~6A Billings~~ | ~~7 Walsh~~ |
| ~~5A Onondaga~~ | ~~3A Camden~~ | ~~5A Mitchell~~ | ~~7 Bottineau~~ | ~~7 Ward~~ |
| ~~5A Ontario~~ | ~~3A Carteret\*~~ | ~~3A Montgomery~~ | ~~6A Bowman~~ | ~~7 Wells~~ |
| ~~5A Orange~~ | ~~4A Caswell~~ | ~~3A Moore~~ | ~~7 Burke~~ | ~~7 Williams~~ |
| ~~5A Orleans~~ | ~~4A Catawba~~ | ~~4A Nash~~ | ~~6A Burleigh~~ | **~~OHIO~~** |
| ~~5A Oswego~~ | ~~4A Chatham~~ | ~~3A New Hanover\*~~ | ~~7 Cass~~ |
| ~~6A Otsego~~ | ~~4A Cherokee~~ | ~~4A Northampton~~ | ~~7 Cavalier~~ | ~~4A Adams~~ |
| ~~5A Putnam~~ | ~~3A Chowan~~ | ~~3A Onslow\*~~ | ~~6A Dickey~~ | ~~5A Allen~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~5A Ashland~~ | ~~5A Mahoning~~ | ~~3A Bryan~~ | ~~3A Okfuskee~~ | ~~4C Linn~~ |
| ~~5A Ashtabula~~ | ~~5A Marion~~ | ~~3A Caddo~~ | ~~3A Oklahoma~~ | ~~5B Malheur~~ |
| ~~5A Athens~~ | ~~5A Medina~~ | ~~3A Canadian~~ | ~~3A Okmulgee~~ | ~~4C Marion~~ |
| ~~5A Auglaize~~ | ~~5A Meigs~~ | ~~3A Carter~~ | ~~3A Osage~~ | ~~5B Morrow~~ |
| ~~5A Belmont~~ | ~~5A Mercer~~ | ~~3A Cherokee~~ | ~~3A Ottawa~~ | ~~4C Multnomah~~ |
| ~~4A Brown~~ | ~~5A Miami~~ | ~~3A Choctaw~~ | ~~3A Pawnee~~ | ~~4C Polk~~ |
| ~~5A Butler~~ | ~~5A Monroe~~ | ~~4B Cimarron~~ | ~~3A Payne~~ | ~~5B Sherman~~ |
| ~~5A Carroll~~ | ~~5A Montgomery~~ | ~~3A Cleveland~~ | ~~3A Pittsburg~~ | ~~4C Tillamook~~ |
| ~~5A Champaign~~ | ~~5A Morgan~~ | ~~3A Coal~~ | ~~3A Pontotoc~~ | ~~5B Umatilla~~ |
| ~~5A Clark~~ | ~~5A Morrow~~ | ~~3A Comanche~~ | ~~3A Pottawatomie~~ | ~~5B Union~~ |
| ~~4A Clermont~~ | ~~5A Muskingum~~ | ~~3A Cotton~~ | ~~3A Pushmataha~~ | ~~5B Wallowa~~ |
| ~~5A Clinton~~ | ~~5A Noble~~ | ~~3A Craig~~ | ~~3A Roger Mills~~ | ~~5B Wasco~~ |
| ~~5A Columbiana~~ | ~~5A Ottawa~~ | ~~3A Creek~~ | ~~3A Rogers~~ | ~~4C Washington~~ |
| ~~5A Coshocton~~ | ~~5A Paulding~~ | ~~3A Custer~~ | ~~3A Seminole~~ | ~~5B Wheeler~~ |
| ~~5A Crawford~~ | ~~5A Perry~~ | ~~3A Delaware~~ | ~~3A Sequoyah~~ | ~~4C Yamhill~~ |
| ~~5A Cuyahoga~~ | ~~5A Pickaway~~ | ~~3A Dewey~~ | ~~3A Stephens~~ | **~~PENNSYLVANIA~~** |
| ~~5A Darke~~ | ~~4A Pike~~ | ~~3A Ellis~~ | ~~4B Texas~~ |
| ~~5A Defiance~~ | ~~5A Portage~~ | ~~3A Garfield~~ | ~~3A Tillman~~ | ~~5A Adams~~ |
| ~~5A Delaware~~ | ~~5A Preble~~ | ~~3A Garvin~~ | ~~3A Tulsa~~ | ~~5A Allegheny~~ |
| ~~5A Erie~~ | ~~5A Putnam~~ | ~~3A Grady~~ | ~~3A Wagoner~~ | ~~5A Armstrong~~ |
| ~~5A Fairfield~~ | ~~5A Richland~~ | ~~3A Grant~~ | ~~3A Washington~~ | ~~5A Beaver~~ |
| ~~5A Fayette~~ | ~~5A Ross~~ | ~~3A Greer~~ | ~~3A Washita~~ | ~~5A Bedford~~ |
| ~~5A Franklin~~ | ~~5A Sandusky~~ | ~~3A Harmon~~ | ~~3A Woods~~ | ~~5A Berks~~ |
| ~~5A Fulton~~ | ~~4A Scioto~~ | ~~3A Harper~~ | ~~3A Woodward~~ | ~~5A Blair~~ |
| ~~4A Gallia~~ | ~~5A Seneca~~ | ~~3A Haskell~~ | **~~OREGON~~** | ~~5A Bradford~~ |
| ~~5A Geauga~~ | ~~5A Shelby~~ | ~~3A Hughes~~ | ~~4A Bucks~~ |
| ~~5A Greene~~ | ~~5A Stark~~ | ~~3A Jackson~~ | ~~5B Baker~~ | ~~5A Butler~~ |
| ~~5A Guernsey~~ | ~~5A Summit~~ | ~~3A Jefferson~~ | ~~4C Benton~~ | ~~5A Cambria~~ |
| ~~4A Hamilton~~ | ~~5A Trumbull~~ | ~~3A Johnston~~ | ~~4C Clackamas~~ | ~~6A Cameron~~ |
| ~~5A Hancock~~ | ~~5A Tuscarawas~~ | ~~3A Kay~~ | ~~4C Clatsop~~ | ~~5A Carbon~~ |
| ~~5A Hardin~~ | ~~5A Union~~ | ~~3A Kingfisher~~ | ~~4C Columbia~~ | ~~5A Centre~~ |
| ~~5A Harrison~~ | ~~5A Van Wert~~ | ~~3A Kiowa~~ | ~~4C Coos~~ | ~~4A Chester~~ |
| ~~5A Henry~~ | ~~5A Vinton~~ | ~~3A Latimer~~ | ~~5B Crook~~ | ~~5A Clarion~~ |
| ~~5A Highland~~ | ~~5A Warren~~ | ~~3A Le Flore~~ | ~~4C Curry~~ | ~~6A Clearfield~~ |
| ~~5A Hocking~~ | ~~4A Washington~~ | ~~3A Lincoln~~ | ~~5B Deschutes~~ | ~~5A Clinton~~ |
| ~~5A Holmes~~ | ~~5A Wayne~~ | ~~3A Logan~~ | ~~4C Douglas~~ | ~~5A Columbia~~ |
| ~~5A Huron~~ | ~~5A Williams~~ | ~~3A Love~~ | ~~5B Gilliam~~ | ~~5A Crawford~~ |
| ~~5A Jackson~~ | ~~5A Wood~~ | ~~3A Major~~ | ~~5B Grant~~ | ~~5A Cumberland~~ |
| ~~5A Jefferson~~ | ~~5A Wyandot~~ | ~~3A Marshall~~ | ~~5B Harney~~ | ~~5A Dauphin~~ |
| ~~5A Knox~~ | **~~OKLAHOMA~~** | ~~3A Mayes~~ | ~~5B Hood River~~ | ~~4A Delaware~~ |
| ~~5A Lake~~ | ~~3A McClain~~ | ~~4C Jackson~~ | ~~6A Elk~~ |
| ~~4A Lawrence~~ | ~~3A Adair~~ | ~~3A McCurtain~~ | ~~5B Jefferson~~ | ~~5A Erie~~ |
| ~~5A Licking~~ | ~~3A Alfalfa~~ | ~~3A McIntosh~~ | ~~4C Josephine~~ | ~~5A Fayette~~ |
| ~~5A Logan~~ | ~~3A Atoka~~ | ~~3A Murray~~ | ~~5B Klamath~~ | ~~5A Forest~~ |
| ~~5A Lorain~~ | ~~4B Beaver~~ | ~~3A Muskogee~~ | ~~5B Lake~~ | ~~5A Franklin~~ |
| ~~5A Lucas~~ | ~~3A Beckham~~ | ~~3A Noble~~ | ~~4C Lane~~ | ~~5A Fulton~~ |
| ~~5A Madison~~ | ~~3A Blaine~~ | ~~3A Nowata~~ | ~~4C Lincoln~~ | ~~5A Greene~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~5A Huntingdon~~ | ~~3A Bamberg\*~~ | ~~5A Bennett~~ | ~~6A Minnehaha~~ | ~~4A Gibson~~ |
| ~~5A Indiana~~ | ~~3A Barnwell\*~~ | ~~5A Bon Homme~~ | ~~6A Moody~~ | ~~4A Giles~~ |
| ~~5A Jefferson~~ | ~~3A Beaufort\*~~ | ~~6A Brookings~~ | ~~6A Pennington~~ | ~~4A Grainger~~ |
| ~~5A Juniata~~ | ~~3A Berkeley\*~~ | ~~6A Brown~~ | ~~6A Perkins~~ | ~~4A Greene~~ |
| ~~5A Lackawanna~~ | ~~3A Calhoun~~ | ~~6A Brule~~ | ~~6A Potter~~ | ~~4A Grundy~~ |
| ~~5A Lancaster~~ | ~~3A Charleston\*~~ | ~~6A Buffalo~~ | ~~6A Roberts~~ | ~~4A Hamblen~~ |
| ~~5A Lawrence~~ | ~~3A Cherokee~~ | ~~6A Butte~~ | ~~6A Sanborn~~ | ~~4A Hamilton~~ |
| ~~5A Lebanon~~ | ~~3A Chester~~ | ~~6A Campbell~~ | ~~6A Shannon~~ | ~~4A Hancock~~ |
| ~~5A Lehigh~~ | ~~3A Chesterfield~~ | ~~5A Charles Mix~~ | ~~6A Spink~~ | ~~3A Hardeman~~ |
| ~~5A Luzerne~~ | ~~3A Clarendon~~ | ~~6A Clark~~ | ~~6A Stanley~~ | ~~3A Hardin~~ |
| ~~5A Lycoming~~ | ~~3A Colleton\*~~ | ~~5A Clay~~ | ~~6A Sully~~ | ~~4A Hawkins~~ |
| ~~6A McKean~~ | ~~3A Darlington~~ | ~~6A Codington~~ | ~~5A Todd~~ | ~~3A Haywood~~ |
| ~~5A Mercer~~ | ~~3A Dillon~~ | ~~6A Corson~~ | ~~5A Tripp~~ | ~~3A Henderson~~ |
| ~~5A Mifflin~~ | ~~3A Dorchester\*~~ | ~~6A Custer~~ | ~~6A Turner~~ | ~~4A Henry~~ |
| ~~5A Monroe~~ | ~~3A Edgefield~~ | ~~6A Davison~~ | ~~5A Union~~ | ~~4A Hickman~~ |
| ~~4A Montgomery~~ | ~~3A Fairfield~~ | ~~6A Day~~ | ~~6A Walworth~~ | ~~4A Houston~~ |
| ~~5A Montour~~ | ~~3A Florence~~ | ~~6A Deuel~~ | ~~5A Yankton~~ | ~~4A Humphreys~~ |
| ~~5A Northampton~~ | ~~3A Georgetown\*~~ | ~~6A Dewey~~ | ~~6A Ziebach~~ | ~~4A Jackson~~ |
| ~~5A Northumberland~~ | ~~3A Greenville~~ | ~~5A Douglas~~ | **~~TENNESSEE~~** | ~~4A Jefferson~~ |
| ~~5A Perry~~ | ~~3A Greenwood~~ | ~~6A Edmunds~~ | ~~4A Johnson~~ |
| ~~4A Philadelphia~~ | ~~3A Hampton\*~~ | ~~6A Fall River~~ | ~~4A Anderson~~ | ~~4A Knox~~ |
| ~~5A Pike~~ | ~~3A Horry\*~~ | ~~6A Faulk~~ | ~~4A Bedford~~ | ~~3A Lake~~ |
| ~~6A Potter~~ | ~~3A Jasper\*~~ | ~~6A Grant~~ | ~~4A Benton~~ | ~~3A Lauderdale~~ |
| ~~5A Schuylkill~~ | ~~3A Kershaw~~ | ~~5A Gregory~~ | ~~4A Bledsoe~~ | ~~4A Lawrence~~ |
| ~~5A Snyder~~ | ~~3A Lancaster~~ | ~~6A Haakon~~ | ~~4A Blount~~ | ~~4A Lewis~~ |
| ~~5A Somerset~~ | ~~3A Laurens~~ | ~~6A Hamlin~~ | ~~4A Bradley~~ | ~~4A Lincoln~~ |
| ~~5A Sullivan~~ | ~~3A Lee~~ | ~~6A Hand~~ | ~~4A Campbell~~ | ~~4A Loudon~~ |
| ~~6A Susquehanna~~ | ~~3A Lexington~~ | ~~6A Hanson~~ | ~~4A Cannon~~ | ~~4A Macon~~ |
| ~~6A Tioga~~ | ~~3A Marion~~ | ~~6A Harding~~ | ~~4A Carroll~~ | ~~3A Madison~~ |
| ~~5A Union~~ | ~~3A Marlboro~~ | ~~6A Hughes~~ | ~~4A Carter~~ | ~~4A Marion~~ |
| ~~5A Venango~~ | ~~3A McCormick~~ | ~~5A Hutchinson~~ | ~~4A Cheatham~~ | ~~4A Marshall~~ |
| ~~5A Warren~~ | ~~3A Newberry~~ | ~~6A Hyde~~ | ~~3A Chester~~ | ~~4A Maury~~ |
| ~~5A Washington~~ | ~~3A Oconee~~ | ~~5A Jackson~~ | ~~4A Claiborne~~ | ~~4A McMinn~~ |
| ~~6A Wayne~~ | ~~3A Orangeburg~~ | ~~6A Jerauld~~ | ~~4A Clay~~ | ~~3A McNairy~~ |
| ~~5A Westmoreland~~ | ~~3A Pickens~~ | ~~6A Jones~~ | ~~4A Cocke~~ | ~~4A Meigs~~ |
| ~~5A Wyoming~~ | ~~3A Richland~~ | ~~6A Kingsbury~~ | ~~4A Coffee~~ | ~~4A Monroe~~ |
| ~~4A York~~ | ~~3A Saluda~~ | ~~6A Lake~~ | ~~3A Crockett~~ | ~~4A Montgomery~~ |
| **~~RHODE ISLAND~~** | ~~3A Spartanburg~~ | ~~6A Lawrence~~ | ~~4A Cumberland~~ | ~~4A Moore~~ |
| ~~3A Sumter~~ | ~~6A Lincoln~~ | ~~4A Davidson~~ | ~~4A Morgan~~ |
| ~~5A (all)~~ | ~~3A Union~~ | ~~6A Lyman~~ | ~~4A Decatur~~ | ~~4A Obion~~ |
| **~~SOUTH  CAROLINA~~** | ~~3A Williamsburg~~ | ~~6A Marshall~~ | ~~4A DeKalb~~ | ~~4A Overton~~ |
| ~~3A York~~ | ~~6A McCook~~ | ~~4A Dickson~~ | ~~4A Perry~~ |
| ~~3A Abbeville~~ | **~~SOUTH DAKOTA~~** | ~~6A McPherson~~ | ~~3A Dyer~~ | ~~4A Pickett~~ |
| ~~3A Aiken~~ | ~~6A Meade~~ | ~~3A Fayette~~ | ~~4A Polk~~ |
| ~~3A Allendale\*~~ | ~~6A Aurora~~ | ~~5A Mellette~~ | ~~4A Fentress~~ | ~~4A Putnam~~ |
| ~~3A Anderson~~ | ~~6A Beadle~~ | ~~6A Miner~~ | ~~4A Franklin~~ | ~~4A Rhea~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~4A Roane~~ | ~~3B Brewster~~ | ~~3B Ector~~ | ~~3B Howard~~ | ~~3B McCulloch~~ |
| ~~4A Robertson~~ | ~~4B Briscoe~~ | ~~2B Edwards\*~~ | ~~3B Hudspeth~~ | ~~2A McLennan\*~~ |
| ~~4A Rutherford~~ | ~~2A Brooks\*~~ | ~~3A Ellis\*~~ | ~~3A Hunt\*~~ | ~~2A McMullen\*~~ |
| ~~4A Scott~~ | ~~3A Brown\*~~ | ~~3B El Paso~~ | ~~4B Hutchinson~~ | ~~2B Medina\*~~ |
| ~~4A Sequatchie~~ | ~~2A Burleson\*~~ | ~~3A Erath\*~~ | ~~3B Irion~~ | ~~3B Menard~~ |
| ~~4A Sevier~~ | ~~3A Burnet\*~~ | ~~2A Falls\*~~ | ~~3A Jack~~ | ~~3B Midland~~ |
| ~~3A Shelby~~ | ~~2A Caldwell\*~~ | ~~3A Fannin~~ | ~~2A Jackson\*~~ | ~~2A Milam\*~~ |
| ~~4A Smith~~ | ~~2A Calhoun\*~~ | ~~2A Fayette\*~~ | ~~2A Jasper\*~~ | ~~3A Mills\*~~ |
| ~~4A Stewart~~ | ~~3B Callahan~~ | ~~3B Fisher~~ | ~~3B Jeff Davis~~ | ~~3B Mitchell~~ |
| ~~4A Sullivan~~ | ~~2A Cameron\*~~ | ~~4B Floyd~~ | ~~2A Jefferson\*~~ | ~~3A Montague~~ |
| ~~4A Sumner~~ | ~~3A Camp\*~~ | ~~3B Foard~~ | ~~2A Jim Hogg\*~~ | ~~2A Montgomery\*~~ |
| ~~3A Tipton~~ | ~~4B Carson~~ | ~~2A Fort Bend\*~~ | ~~2A Jim Wells\*~~ | ~~4B Moore~~ |
| ~~4A Trousdale~~ | ~~3A Cass\*~~ | ~~3A Franklin\*~~ | ~~3A Johnson\*~~ | ~~3A Morris\*~~ |
| ~~4A Unicoi~~ | ~~4B Castro~~ | ~~2A Freestone\*~~ | ~~3B Jones~~ | ~~3B Motley~~ |
| ~~4A Union~~ | ~~2A Chambers\*~~ | ~~2B Frio\*~~ | ~~2A Karnes\*~~ | ~~3A Nacogdoches\*~~ |
| ~~4A Van Buren~~ | ~~2A Cherokee\*~~ | ~~3B Gaines~~ | ~~3A Kaufman\*~~ | ~~3A Navarro\*~~ |
| ~~4A Warren~~ | ~~3B Childress~~ | ~~2A Galveston\*~~ | ~~3A Kendall\*~~ | ~~2A Newton\*~~ |
| ~~4A Washington~~ | ~~3A Clay~~ | ~~3B Garza~~ | ~~2A Kenedy\*~~ | ~~3B Nolan~~ |
| ~~4A Wayne~~ | ~~4B Cochran~~ | ~~3A Gillespie\*~~ | ~~3B Kent~~ | ~~2A Nueces\*~~ |
| ~~4A Weakley~~ | ~~3B Coke~~ | ~~3B Glasscock~~ | ~~3B Kerr~~ | ~~4B Ochiltree~~ |
| ~~4A White~~ | ~~3B Coleman~~ | ~~2A Goliad\*~~ | ~~3B Kimble~~ | ~~4B Oldham~~ |
| ~~4A Williamson~~ | ~~3A Collin\*~~ | ~~2A Gonzales\*~~ | ~~3B King~~ | ~~2A Orange\*~~ |
| ~~4A Wilson~~ | ~~3B Collingsworth~~ | ~~4B Gray~~ | ~~2B Kinney\*~~ | ~~3A Palo Pinto\*~~ |
| **~~TEXAS~~** | ~~2A Colorado\*~~ | ~~3A Grayson~~ | ~~2A Kleberg\*~~ | ~~3A Panola\*~~ |
| ~~2A Comal\*~~ | ~~3A Gregg\*~~ | ~~3B Knox~~ | ~~3A Parker\*~~ |
| ~~2A Anderson\*~~ | ~~3A Comanche\*~~ | ~~2A Grimes\*~~ | ~~3A Lamar\*~~ | ~~4B Parmer~~ |
| ~~3B Andrews~~ | ~~3B Concho~~ | ~~2A Guadalupe\*~~ | ~~4B Lamb~~ | ~~3B Pecos~~ |
| ~~2A Angelina\*~~ | ~~3A Cooke~~ | ~~4B Hale~~ | ~~3A Lampasas\*~~ | ~~2A Polk\*~~ |
| ~~2A Aransas\*~~ | ~~2A Coryell\*~~ | ~~3B Hall~~ | ~~2B La Salle\*~~ | ~~4B Potter~~ |
| ~~3A Archer~~ | ~~3B Cottle~~ | ~~3A Hamilton\*~~ | ~~2A Lavaca\*~~ | ~~3B Presidio~~ |
| ~~4B Armstrong~~ | ~~3B Crane~~ | ~~4B Hansford~~ | ~~2A Lee\*~~ | ~~3A Rains\*~~ |
| ~~2A Atascosa\*~~ | ~~3B Crockett~~ | ~~3B Hardeman~~ | ~~2A Leon\*~~ | ~~4B Randall~~ |
| ~~2A Austin\*~~ | ~~3B Crosby~~ | ~~2A Hardin\*~~ | ~~2A Liberty\*~~ | ~~3B Reagan~~ |
| ~~4B Bailey~~ | ~~3B Culberson~~ | ~~2A Harris\*~~ | ~~2A Limestone\*~~ | ~~2B Real\*~~ |
| ~~2B Bandera\*~~ | ~~4B Dallam~~ | ~~3A Harrison\*~~ | ~~4B Lipscomb~~ | ~~3A Red River\*~~ |
| ~~2A Bastrop\*~~ | ~~3A Dallas\*~~ | ~~4B Hartley~~ | ~~2A Live Oak\*~~ | ~~3B Reeves~~ |
| ~~3B Baylor~~ | ~~3B Dawson~~ | ~~3B Haskell~~ | ~~3A Llano\*~~ | ~~2A Refugio\*~~ |
| ~~2A Bee\*~~ | ~~4B Deaf Smith~~ | ~~2A Hays\*~~ | ~~3B Loving~~ | ~~4B Roberts~~ |
| ~~2A Bell\*~~ | ~~3A Delta~~ | ~~3B Hemphill~~ | ~~3B Lubbock~~ | ~~2A Robertson\*~~ |
| ~~2A Bexar\*~~ | ~~3A Denton\*~~ | ~~3A Henderson\*~~ | ~~3B Lynn~~ | ~~3A Rockwall\*~~ |
| ~~3A Blanco\*~~ | ~~2A DeWitt\*~~ | ~~2A Hidalgo\*~~ | ~~2A Madison\*~~ | ~~3B Runnels~~ |
| ~~3B Borden~~ | ~~3B Dickens~~ | ~~2A Hill\*~~ | ~~3A Marion\*~~ | ~~3A Rusk\*~~ |
| ~~2A Bosque\*~~ | ~~2B Dimmit\*~~ | ~~4B Hockley~~ | ~~3B Martin~~ | ~~3A Sabine\*~~ |
| ~~3A Bowie\*~~ | ~~4B Donley~~ | ~~3A Hood\*~~ | ~~3B Mason~~ | ~~3A San Augustine\*~~ |
| ~~2A Brazoria\*~~ | ~~2A Duval\*~~ | ~~3A Hopkins\*~~ | ~~2A Matagorda\*~~ | ~~2A San Jacinto\*~~ |
| ~~2A Brazos\*~~ | ~~3A Eastland~~ | ~~2A Houston\*~~ | ~~2B Maverick\*~~ | ~~2A San Patricio\*~~ |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~3A San Saba\*~~ | ~~3A Young~~ | ~~4C Clark~~ | ~~4A Gilmer~~ | **~~WISCONSIN~~** |
| ~~3B Schleicher~~ | ~~2B Zapata\*~~ | ~~5B Columbia~~ | ~~5A Grant~~ | ~~6A Adams~~ |
| ~~3B Scurry~~ | ~~2B Zavala\*~~ | ~~4C Cowlitz~~ | ~~5A Greenbrier~~ | ~~7 Ashland~~ |
| ~~3B Shackelford~~ | **~~UTAH~~** | ~~5B Douglas~~ | ~~5A Hampshire~~ | ~~6A Barron~~ |
| ~~3A Shelby\*~~ | ~~6B Ferry~~ | ~~5A Hancock~~ | ~~7 Bayfield~~ |
| ~~4B Sherman~~ | ~~5B Beaver~~ | ~~5B Franklin~~ | ~~5A Hardy~~ | ~~6A Brown~~ |
| ~~3A Smith\*~~ | ~~6B Box Elder~~ | ~~5B Garfield~~ | ~~5A Harrison~~ | ~~6A Buffalo~~ |
| ~~3A Somervell\*~~ | ~~6B Cache~~ | ~~5B Grant~~ | ~~4A Jackson~~ | ~~7 Burnett~~ |
| ~~2A Starr\*~~ | ~~6B Carbon~~ | ~~4C Grays Harbor~~ | ~~4A Jefferson~~ | ~~6A Calumet~~ |
| ~~3A Stephens~~ | ~~6B Daggett~~ | ~~4C Island~~ | ~~4A Kanawha~~ | ~~6A Chippewa~~ |
| ~~3B Sterling~~ | ~~5B Davis~~ | ~~4C Jefferson~~ | ~~5A Lewis~~ | ~~6A Clark~~ |
| ~~3B Stonewall~~ | ~~6B Duchesne~~ | ~~4C King~~ | ~~4A Lincoln~~ | ~~6A Columbia~~ |
| ~~3B Sutton~~ | ~~5B Emery~~ | ~~4C Kitsap~~ | ~~4A Logan~~ | ~~6A Crawford~~ |
| ~~4B Swisher~~ | ~~5B Garfield~~ | ~~5B Kittitas~~ | ~~5A Marion~~ | ~~6A Dane~~ |
| ~~3A Tarrant\*~~ | ~~5B Grand~~ | ~~5B Klickitat~~ | ~~5A Marshall~~ | ~~6A Dodge~~ |
| ~~3B Taylor~~ | ~~5B Iron~~ | ~~4C Lewis~~ | ~~4A Mason~~ | ~~6A Door~~ |
| ~~3B Terrell~~ | ~~5B Juab~~ | ~~5B Lincoln~~ | ~~4A McDowell~~ | ~~7 Douglas~~ |
| ~~3B Terry~~ | ~~5B Kane~~ | ~~4C Mason~~ | ~~4A Mercer~~ | ~~6A Dunn~~ |
| ~~3B Throckmorton~~ | ~~5B Millard~~ | ~~6B Okanogan~~ | ~~5A Mineral~~ | ~~6A Eau Claire~~ |
| ~~3A Titus\*~~ | ~~6B Morgan~~ | ~~4C Pacific~~ | ~~4A Mingo~~ | ~~7 Florence~~ |
| ~~3B Tom Green~~ | ~~5B Piute~~ | ~~6B Pend Oreille~~ | ~~5A Monongalia~~ | ~~6A Fond du Lac~~ |
| ~~2A Travis\*~~ | ~~6B Rich~~ | ~~4C Pierce~~ | ~~4A Monroe~~ | ~~7Forest~~ |
| ~~2A Trinity\*~~ | ~~5B Salt Lake~~ | ~~4C San Juan~~ | ~~4A Morgan~~ | ~~6A Grant~~ |
| ~~2A Tyler\*~~ | ~~5B San Juan~~ | ~~4C Skagit~~ | ~~5A Nicholas~~ | ~~6A Green~~ |
| ~~3A Upshur\*~~ | ~~5B Sanpete~~ | ~~5B Skamania~~ | ~~5A Ohio~~ | ~~6A Green Lake~~ |
| ~~3B Upton~~ | ~~5B Sevier~~ | ~~4C Snohomish~~ | ~~5A Pendleton~~ | ~~6A Iowa~~ |
| ~~2B Uvalde\*~~ | ~~6B Summit~~ | ~~5B Spokane~~ | ~~4A Pleasants~~ | ~~7 Iron~~ |
| ~~2B Val Verde\*~~ | ~~5B Tooele~~ | ~~6B Stevens~~ | ~~5A Pocahontas~~ | ~~6A Jackson~~ |
| ~~3A Van Zandt\*~~ | ~~6B Uintah~~ | ~~4C Thurston~~ | ~~5A Preston~~ | ~~6A Jefferson~~ |
| ~~2A Victoria\*~~ | ~~5B Utah~~ | ~~4C Wahkiakum~~ | ~~4A Putnam~~ | ~~6A Juneau~~ |
| ~~2A Walker\*~~ | ~~6B Wasatch~~ | ~~5B Walla Walla~~ | ~~5A Raleigh~~ | ~~6A Kenosha~~ |
| ~~2A Waller\*~~ | ~~3B Washington~~ | ~~4C Whatcom~~ | ~~5A Randolph~~ | ~~6A Kewaunee~~ |
| ~~3B Ward~~ | ~~5B Wayne~~ | ~~5B Whitman~~ | ~~4A Ritchie~~ | ~~6A La Crosse~~ |
| ~~2A Washington\*~~ | ~~5B Weber~~ | ~~5B Yakima~~ | ~~4A Roane~~ | ~~6A Lafayette~~ |
| ~~2B Webb\*~~ | **~~VERMONT~~** | **~~WEST VIRGINIA~~** | ~~5A Summers~~ | ~~7 Langlade~~ |
| ~~2A Wharton\*~~ | ~~5A Taylor~~ | ~~7 Lincoln~~ |
| ~~3B Wheeler~~ | ~~6A (all)~~ | ~~5A Barbour~~ | ~~5A Tucker~~ | ~~6A Manitowoc~~ |
| ~~3A Wichita~~ | **~~VIRGINIA~~** | ~~4A Berkeley~~ | ~~4A Tyler~~ | ~~6A Marathon~~ |
| ~~3B Wilbarger~~ | ~~4A Boone~~ | ~~5A Upshur~~ | ~~6A Marinette~~ |
| ~~2A Willacy\*~~ | ~~4A (all)~~ | ~~4A Braxton~~ | ~~4A Wayne~~ | ~~6A Marquette~~ |
| ~~2A Williamson\*~~ | **~~WASHINGTON~~** | ~~5A Brooke~~ | ~~5A Webster~~ | ~~6A Menominee~~ |
| ~~2A Wilson\*~~ | ~~4A Cabell~~ | ~~5A Wetzel~~ | ~~6A Milwaukee~~ |
| ~~3B Winkler~~ | ~~5B Adams~~ | ~~4A Calhoun~~ | ~~4A Wirt~~ | ~~6A Monroe~~ |
| ~~3A Wise~~ | ~~5B Asotin~~ | ~~4A Clay~~ | ~~4A Wood~~ | ~~6A Oconto~~ |
| ~~3A Wood\*~~ | ~~5B Benton~~ | ~~5A Doddridge~~ | ~~4A Wyoming~~ | ~~7 Oneida~~ |
| ~~4B Yoakum~~ | ~~5B Chelan~~ | ~~5A Fayette~~ | ~~6A Outagamie~~ |  |
| ~~4C Clallam~~ |  |  |  |  |

*~~(continued)~~*  **~~TABLE C301.1—continued CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY~~**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ~~6A Ozaukee~~ | ~~7 Taylor~~ | ~~6B Big Horn~~ | ~~6B Sheridan~~ | **~~NORTHERN  MARIANA  ISLANDS~~** |
| ~~6A Pepin~~ | ~~6A Trempealeau~~ | ~~6B Campbell~~ | ~~7 Sublette~~ |
| ~~6A Pierce~~ | ~~6A Vernon~~ | ~~6B Carbon~~ | ~~6B Sweetwater~~ | ~~1A (all)\*~~ |
| ~~6A Polk~~ | ~~7 Vilas~~ | ~~6B Converse~~ | ~~7 Teton~~ | **~~PUERTO RICO~~** |
| ~~6A Portage~~ | ~~6A Walworth~~ | ~~6B Crook~~ | ~~6B Uinta~~ |
| ~~7 Price~~ | ~~7 Washburn~~ | ~~6B Fremont~~ | ~~6B Washakie~~ | ~~1A (all)\*~~ |
| ~~6A Racine~~ | ~~6A Washington~~ | ~~5B Goshen~~ | ~~6B Weston~~ | **~~VIRGIN ISLANDS~~** |
| ~~6A Richland~~ | ~~6A Waukesha~~ | ~~6B Hot Springs~~ | **~~US TERRITORIES~~** |
| ~~6A Rock~~ | ~~6A Waupaca~~ | ~~6B Johnson~~ | ~~1A (all)\*~~ |
| ~~6A Rusk~~ | ~~6A Waushara~~ | ~~6B Laramie~~ | **~~AMERICAN  SAMOA~~** |  |
| ~~6A Sauk~~ | ~~6A Winnebago~~ | ~~7 Lincoln~~ |  |
| ~~7 Sawyer~~ | ~~6A Wood~~ | ~~6B Natrona~~ | ~~1A (all)\*~~ |  |
| ~~6A Shawano~~ | **~~WYOMING~~** | ~~6B Niobrara~~ | **~~GUAM~~** |  |
| ~~6A Sheboygan~~ | ~~6B Park~~ |  |
| ~~6A St. Croix~~ | ~~6B Albany~~ | ~~5B Platte~~ | ~~1A (all)\*~~ |  |

***Section C304. Add a section to read as shown:***

**SECTION C304**

**MATERIALS TESTING AND THERMAL PROPERTIES**

**C304.1 Building material thermal properties, general.**

**C304.1.1 Commercial and residential high rise.**R-values for *building materials* used to demonstrate code compliance with Chapter C4 shall be taken from ASHRAE 90.1 Normative Appendix A, from manufacturer’s product literature or from other nationally recognized engineering sources. Assembly U-factor calculations shall follow the procedure(s) detailed in Section C304.3 or be tested in accordance with procedures(s) described in Section C304.2.

Concrete block R-values shall be calculated using the isothermal planes method or a two-dimensional calculation program, thermal conductivities from ASHRAE 90.1 Normative Appendix A and dimensions from ASTM C90. The parallel path calculation method is not acceptable.

**Exception:** R-values for *building materials* or thermal conductivities determined from testing in accordance with Section C304.2.

**C304.2 Testing of Building Materials Thermal Properties.**

**C304.2.1 Single materials.**If *building material* R-values or thermal conductivities are determined by testing, one of the following test procedures shall be used:

a. ASTM C177

b. ASTM C236

c. ASTM C518

For concrete, the oven-dried conductivity shall be multiplied by 1.2 to reflect the moisture content as typically installed.

**C304.2.2 Assembly U-factors.** If assembly *U-factors* are determined by testing, ASTM C1363 shall be used. Product samples tested shall be production line material or representative of material as purchased by the consumer or contractor. If the assembly is too large to be tested at one time in its entirety, then either a representative portion shall be tested or different portions shall be tested separately and a weighted average determined. To be representative, the portion tested shall include edges of panels, joints with other panels, typical framing percentages, and thermal bridges.

**C304.3 Calculation procedures and assumptions.** The following procedures and assumptions shall be used for all Chapter 4 code calculations. R-values for air films, insulation, and *building materials* shall be taken from Sections C304.3.1 or C304.3.2, respectively.  In addition, the appropriate assumptions listed, including framing factors, shall be used.

**C304.3.1 Air Films:** Prescribed R-values for air films shall be as follows:

**R-Value             Condition**

0.17                    All exterior surfaces

0.46                    All semi-exterior surfaces

0.61                    Interior horizontal surfaces, heat flow up

0.92                    Interior horizontal surfaces, heat flow down

0.68                    Interior vertical surfaces

**C304.3.1.1** Exterior surfaces are areas exposed to the wind.

**C304.3.1.2** Semi-exterior surfaces are protected surfaces that face attics, crawl spaces, and parking garages with natural or mechanical ventilation.

**C304.3.1.3** Interior surfaces are surfaces within enclosed spaces.

**C304.3.1.4** The R-value for cavity airspaces shall be taken from ASHRAE 90.1 Normative Appendix A. No credit shall be given for airspaces in cavities that contain any insulation or less than 0.5 inch (12.7 mm). The values for 3.5 inch (84 mm) cavities shall be used for cavities of that width and greater.

**C304.3.2 Assembly U-Factor, C-Factor and F-Factor Calculation**

**C304.3.2.1 Pre-calculated assembly U-factors, C-factors, F-factors, or heat capacities.** The *U-factors*, *C-factors, F-factors,* and *heat capacities* for typical construction assemblies from ASHRAE 90.1 Normative Appendix A shall be used for all calculations unless otherwise allowed by applicant-determined assembly U-factors, C-factors, F-factors, or heat capacities. Interpolation between values for *rated R-values of insulation*, including insulated sheathing is allowed; extrapolation beyond values in the ASHRAE 90.1 Normative Appendix A tables is not.

**C304.3.2.2 Applicant-determined assembly U-factors, C-factors, F-factors, or heat capacities.** If the *building official* determines that the proposed construction assembly is not adequately represented in the appropriate table of ASHRAE 90.1 Normative Appendix A, the applicant shall determine appropriate values for the assembly using the assumptions in ASHRAE 90.1 Normative Appendix A. An assembly is deemed to be adequately represented if:

a. the interior structure, hereafter referred to as the base assembly, for the *class of construction* is the same as described in Normative Appendix A *and*

b. changes in exterior or interior surface *building materials* added to the base assembly do not increase or decrease the R-value by more than 2 from that indicated in the descriptions in ASHRAE 90.1 Normative Appendix A.

Insulation, including insulated sheathing, is not considered a *building material.*

**Chapter 4 [CE]**

**COMMERCIAL ENERGY EFFICIENCY**

***Section C402.5.9. Add a section to read as shown:***

**C402.5.9 Building cavities.**

**C402.5.9.1 Vented dropped ceiling cavities.** Where vented dropped ceiling cavities occur over conditioned spaces, the ceiling shall be considered to be both the upper thermal envelope and pressure envelope of the building and shall contain a continuous air barrier between the conditioned space and the vented unconditioned space that is also sealed to the air barrier of the walls. See the definition of air barrier in Section C202.

**C402.5.9.2 Unvented dropped ceiling cavities.** Where unvented dropped ceiling cavities occur over conditioned spaces that do not have an air barrier between the conditioned and unconditioned space (such as T-bar ceilings), they shall be completely sealed from the exterior environment (at the roof plane) and adjacent spaces by a continuous air barrier that is also sealed to the air barrier of the walls. In that case, the roof assembly shall constitute both the upper thermal envelope and pressure envelope of the building.

**C402.5.9.3** **Separate tenancies.** Unconditioned spaces above separate tenancies shall contain dividing partitions between the tenancies to form a continuous air barrier that is sealed at the ceiling and roof to prevent air flow between them.

**C402.5.9.4 Air distribution system components.** Building cavities designed to be air distribution system components shall be sealed according to the criteria for air ducts, plenums, etc. in Section C403.2.7.

***Section C403.2.1 Calculation of heating and cooling loads. Change to read as shown:***

**C403.2.1 Calculation of heating and cooling loads.** Design loads associated with heating, ventilating and air conditioning of the building shall be determined in accordance with ANSI/ASHRAE/ACCA Standard 183 or ACCA Manual N or by an *approved* equivalent computational procedure using the design parameters specified in Chapter 3. Heating and cooling loads shall be adjusted to account for load reductions that are achieved where energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE *HVAC Systems and Equipment Handbook* by an approved equivalent computational procedure. Design loads shall be attached to the code compliance form submitted to the building department when the building is permitted or, in the event the mechanical permit is obtained at a later time, the sizing calculation shall be submitted with the application for the mechanical permit

**Exception:** Where mechanical systems are designed by a registered engineer, the engineer has the option of submitting a signed and sealed summary sheet to the building department in lieu of the complete sizing calculation(s). Such summary sheet shall include the following (by zone):

1. Project name/owner

2. Project address

3. Area in square feet

4. Sizing method used

5. Outdoor dry bulb use

6. Indoor dry bulb

7. Outdoor wet bulb used

8. Grains water (difference)

9. Total sensible gain

10. Total latent gain

11. Relative humidity

12. Total cooling required with outside air

13. Total heating required with outside air

***Table C403.2.3(4) Warm Air Furnaces and Combination Warm Air Furnaces/Air-Conditioning Units, Warm Air Duct Furnaces and Unit Heaters. Change to read as shown:***

**TABLE C403.2.3(4)**

**WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS,**

**WARM AIR DUCT FURNACES AND UNIT HEATERS**

**Minimum Efficiency Requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment Type** | **Size Category** | **Subcategory or Rating Condition** | **Minimum Efficiencyd,e** | **Test Procedurea** |
| Warm Air Furnace, Gas-Fired  Non-weatherized      Weatherized gas furnace | <225,000 Btu/h | --- | 80 ~~78~~% AFUE   or 80% Etc    81% AFUE (Effective 1/1/15) | DOE 10 CFR, Part 430 or Section 2.39, Thermal Efficiency of ANSI Z 21.47 |
| ≥225,000 Btu/h | Maximum Capacityc | 80% Ecf | Section 2.39, Thermal Efficiency of ANSI Z21.47 |
| Warm Air Furnace, Oil-Fired  Non-weatherized      Weatherized oil-fired furnace | <225,000 Btu/h | --- | 83 ~~78~~% AFUE or 80% Etc    78% AFUE (Effective 1/1/15) | DOE 10 CFR, Part 430 or Section 42, Combustion, of UL 727 |
| ≥225,000 Btu/h | Maximum Capacityb | 81% Etg | Section 42, Combustion, of UL 727 |
| Warm Air Duct Furnaces, Gas-Fired | All Capacities | Maximum Capacityb | 80% Ec | Section 2.10, Efficiency of ANSI Z83.8 |
| Warm Air Unit Heaters, Gas-Fired | All Capacities | Maximum Capacityb | 80% Ec | Section 2.10, Efficiency of ANSI Z83.8 |
| Warm Air Unit Heaters, Oil-Fired | All Capacities | Maximum Capacityb | 80% Ec | Section 40, Combustion, of UL 731 |
| Mobile home furnace, gas-fired | <225,000 Btu/h | --- | 80 % AFUE  (Effective 1/1/15) | DOE 10 CFR, Part 430 |
| Mobile home furnace, oil-fired | <225,000 Btu/h | --- | 75 % AFUE  (Effective 1/1/15) | DOE 10 CFR, Part 430 |

For SI: 1 British thermal unit per hour = 0.2931 W.

a Chapter 5, ~~6 of the r~~Referenced ~~s~~Standards contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b Minimum and maximum ratings as provided for and allowed by the unit’s controls.

c Combination units not covered by NAECA (3 phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating.

d Et = Thermal efficiency. See test procedure for detailed discussion

e Ec= Combustion efficiency (100% less flue losses). See test procedure for detailed discussion.

f Ec = Combustion efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

g Et = Thermal efficiency. Units must also include an IID, have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

***Add a table for variable refrigerant flow multi-split air conditioners and heat pumps as shown. Define this equipment and add to Chapter 5, Referenced Standards as shown.***

**TABLE C403.2.3(11)**

**MINIMUM EFFICIENCY REQUIREMENTS**

**VARIABLE REFRIGERANT FLOW MULTI-SPLIT AIR CONDITIONERS AND HEAT PUMPS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment Type** | **Size Category** | **Heating Typea** | **Minimum Efficiency** | **Test Procedureb** |
| VRF Multi-Split Air Conditioners (Air-cooled) | <65,000 Btu/h | All | 13.0 SEER | AHRI 1230 (omit sections 5.1.2 and 6.6) |
| ≥65,000 Btu/h and  <135,000 Btu/h | Electric resistance (or none) | 11.2 EER |
| All other | 11.0 EER |
| ≥240,000 Btu/h and  <760,000 Btu/h | Electric resistance (or none) | 10.0 EER |
| All other | 9.8 EER |
| ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | 11.0 EER |
| All other | 10.8 EER |
| ≥240,000 Btu/h and  < 760,000 Btu/h | Electric resistance (or none) | 10.0 EER |
| All other | 9.8 EER |
| VRF Multi-Split Heat Pumps   (Air-cooled) | <65,000 Btu/h | All | 13.0 SEER  7.7 HSPF |
| ≥65,000 Btu/h and  <135,000 Btu/h | Electric resistance (or none) | 11.0 EER  3.3 COP |
| All other | 10.8 EER  3.3 COP |
| ≥135,000 Btu/h and <240,000 Btu/h | Electric resistance (or none) | 10.6 EER  3.2 COP |
| All other | 10.4 EER  3.2 COP |
| ≥240,000 Btu/h and  < 760,000 Btu/h | Electric resistance (or none) | 9.5 EER  3.2 COP |
| All other | 9.8 EER |
| VRF Multi-Split Air Conditioners (Water-source) | <17,000 Btu/h | Without heat recovery | 12.0 EER  4.2 COP |
| With heat recovery | 11.8 EER  4.2 COP |
| ≥17,000 Btu/h and  <65,000 Btu/h | All | 12.0 EER  4.2 COP |
| ≥65,000 Btu/h and  <135,000 Btu/h | All | 12.0 EER  4.2 COP |
| ≥135,000 Btu/h and <760,000 Btu/h | Without heat recovery | 10.0 EER  3.9 COP |
| With heat recovery | 9.8 EER  3.9 COP |

For SI : 1 British thermal unit per hour = 0.2931 W, oC = [(oF) – 32]/1.8

a VRAF Multi-Split Heat Pumps (air-cooled) with heat recovery fall under the category of “All Other Types of Heating” unless they also have electric resistance heating, in which case it falls under the category for “No Heating or Electric Resistance Heating.”

b Chapter 5, Referenced Standards, contains a complete specification of the referenced test procedure, including the reference year version of the test procedure.

***Section C403.2.4.2.4. Add a section to read as shown:***

**C403.2.4.3.4 Humidistatic control.** Where humidification, or dehumidification, or both is provided, the following shall be met:

1. At least one humidity control device shall be provided for each humidity control system.

2. Controls shall be provided capable of preventing simultaneous operation of humidification and dehumidification equipment.

**Exceptions:**

1. Zones served by desiccant systems, used with direct evaporative cooling in series.

2. Systems serving zones where specific humidity levels are required, such as computer rooms, museums and hospitals, as approved by the building official.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Section C403.2.9 Duct and plenum insulation and sealing. Change to read as shown:***  **C403.2.9 Duct and plenum insulation, construction and sealing (Mandatory).**  ~~Supply and return air ducts and plenums shall be insulated with a minimum of R-6 insulation where located in unconditioned spaces and where located outside the building with a minimum of R-8 insulation in~~ *~~Climate Zones~~* ~~1 through 4 and a minimum of R-12 insulation in~~ *~~Climate Zones~~* ~~5~~  ~~through 8. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation in~~ *~~Climate Zones~~* ~~1 through 4 and a minimum of R-12 insulation in~~ *~~Climate Zones~~* ~~5 through 8.~~  **~~Exceptions:~~**  ~~1. Where located within equipment.~~  ~~2. Where the design temperature difference between the interior and exterior of the duct or plenum is~~  ~~not greater than 15°F (8°C).~~  ~~Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the~~ *~~International Mechanical Code~~*~~.~~  **C403.2.9.1 Insulation.**  **C403.2.9.1.1 Insulation required.** All supply and return air ducts and plenums shall be insulated to the levels shown in Table C403.2.9.1.  **Exceptions:**  1. When located within equipment.  2. When the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).  3. For runouts less than 10 feet (3048 mm) in length to air terminals or air outlets, the rated R-value of insulation need not exceed R-5.  4. Backs of air outlets and outlet plenums exposed to unconditioned or indirectly conditioned spaces with face areas exceeding 5 square feet (.46 m2) need not exceed R-2; those 5 square feet (.46 m2) or smaller need not be insulated.  5. Return air ducts meeting all the requirements for building cavities which will be used as return air plenums.    **TABLE C403.2.9.1**  **MINIMUM DUCT INSULATION R-VALUES,**  **HEATING AND COOLING SUPPLY AND RETURN DUCTS**     |  |  |  | | --- | --- | --- | | **Location** | **Supply Duct** | **Return Duct** | | Exterior of building  Ventilated Attic  Unvented attic above insulated ceiling | R-6  R-6  R-6 | R-4.2  R-4.2  R-4.2 | | Unvented attic with roof insulation | R-4.2 | None | | Unconditioned spaces1  Indirectly conditioned spaces2  Conditioned spaces  Buried | R-4.2  None  None  R-4.2 | R-4.2  None  None  None |   1 Includes crawl spaces, both ventilated and non-ventilated.  2 Includes return air plenums with or without exposed roofs above.  **C403.2.9.1.2 Insulation protection.** Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind, but not limited to the following:  1. Insulation exposed to weather shall be suitable for outdoor service, e.g., protected by aluminum, sheet metal, painted canvas, or plastic cover. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.  2. Insulation covering cooling ducts located outside the conditioned space shall include a vapor retardant located outside the insulation (unless the insulation is inherently vapor retardant), all penetrations and joints of which shall be sealed.  **C403.2.9.1.3 Condensation control.** Additional insulation with vapor barrier shall be provided where the minimum duct insulation requirements of Section C403.2.7.1.1 are determined to be insufficient to prevent condensation.  **~~C403.2.9.1 Duct construction.~~**  ~~Ductwork shall be constructed and erected in accordance with the~~ *~~International Mechanical Code~~*~~.~~  **~~C403.2.9.1.1 Low-pressure duct systems.~~**  ~~All longitudinal and transverse joints, seams and connections of supply and return ducts operating at a static pressure less than or equal to 2 inches water gauge (w.g.) (500 Pa) shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturer’s installation instructions. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the~~ *~~International Mechanical Code~~*~~.~~  **~~Exception:~~** ~~Locking-type longitudinal joints and seams, other than the snap-lock and button- lock types, need not be sealed as specified in this section.~~  **~~C403.2.9.1.2 Medium-pressure duct systems.~~** ~~All ducts and plenums designed to operate at a static pressure greater than 2 inches water gauge (w.g.) (500 Pa) but less than 3 inches w.g. (750 Pa) shall be insulated and sealed in accordance with Section C403.2.7. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the~~ *~~International Mechanical Code~~*~~.~~  **~~C403.2.9.1.3 High-pressure duct systems.~~** ~~Ducts and plenums designed to operate at static pressures~~  ~~greater than 3 inches water gauge (747 Pa) shall be insulated and sealed in accordance with Section~~  ~~C403.2.8. In addition, ducts and plenums shall be leak tested in accordance with the SMACNA~~ *~~HVAC~~*  *~~Air Duct Leakage Test Manual~~* ~~and shown to have a rate of air leakage (CL) less than or equal to 4.0 as determined in accordance with Equation 4-8.~~  *~~CL~~* ~~=~~ *~~F/P~~*~~0.65~~ **~~(Equation 4-8)~~**  ~~where:~~  *~~F~~* ~~= The measured leakage rate in cfm per 100~~  ~~square feet of duct surface.~~  *~~P~~* ~~= The static pressure of the test.~~  ~~Documentation shall be furnished by the designer demonstrating that representative sections totaling at~~  ~~least 25 percent of the duct area have been tested and that all tested sections comply with the requirements of this section.~~  **C403.2.9.2 Duct construction.** All ducts, air handlers, filter boxes, building cavities, mechanical closets and enclosed support platforms that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers and shall be constructed and erected in accordance with Table C403.2.9.2 and with Chapter 6 of the *Florida Building Code*, ~~International~~ *Mechanical* ~~Code~~. Ducts shall be constructed, braced, reinforced and installed to provide structural strength and durability. All transverse joints, longitudinal seams and fitting connections shall be securely fastened in accordance with the applicable standards of this section.  **TABLE C403.2.9.2**  **DUCT SYSTEM CONSTRUCTION AND SEALING**     |  |  |  |  | | --- | --- | --- | --- | | **DUCT TYPE/**  **CONNECTION** | **SEALING REQUIREMENTS** | **MECHANICAL ATTACHMENT** | **TEST STANDARD** | | **Metal duct, rigid and flexible** |  |  |  | | **Pressures less than 1-inch water gauge** | Closure systems as described in Section C403.2.9.3:  1. Continuous welds.  2. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.  3. Mastic, mastic-plus-embedded fabric, or mastic ribbons.  4. Gaskets.  5. Pressure-sensitive tape.  6. Aerosol sealant | Mechanical attachments approved:  1. Continuous welds.  2. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams and all other rolled mechanical seams.  Crimp joints for round metal ducts shall have a contact lap of at least 1½ inches (38 mm).  Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. 1 | SMACNA HVAC Air Duct Leakage Test Manual | | **Pressures 1-inch water gauge or greater** | Closure systems as described in Section C403.2.9.3:  1. Continuous welds.  2. Mastic or mastic-plus-embedded fabric systems.  3. Gaskets. | Mechanical attachments approved:  Continuous welds.  Round metal ducts shall be mechanically fastened by means of at least three sheet-metal screws or rivets equally spaced around the joint. 1 | SMACNA HVAC Air Duct Leakage Test Manual | | **High pressure duct systems designed to operate at pressures greater than 3-inch water gauge (4-inch water gauge pressure class)** | The tested duct leakage class, at a test pressure equal to the design duct pressure class rating, shall be equal to or less than Leakage Class 6. Leakage testing may be limited to representative sections of the duct system but in no case shall such tested sections include less than 25 percent of the total installed duct area for the designated pressure class. |  | SMACNA HVAC Air Duct Leakage Test Manual | | **Plastic duct** | See Section 603.8.3 of the *Florida Building Code, Mechanical.* | Joints between plastic ducts and plastic fittings shall be made in accordance with the manufacturer’s installation instructions. | ASTM D 2412 | | **Fibrous glass duct, rigid.** | All joints, seams and duct wall penetrations between sections of duct and between duct and other distribution system components shall be sealed with  closure systems as described in Section C403.2.9.3:  1. Heat-activated tapes.  2. Pressure-sensitive tapes.  3. Mastics or mastic-plus-embedded fabric systems. | Mechanically fastened per standard to secure the sections independent of the closure system(s).    Attachments of ductwork to air-handling equipment shall be by mechanical fasteners. Where access is limited, two fasteners on one side shall be acceptable. | NAIMA Fibrous Glass Duct Construction Standards.    UL 181  UL 181A | | **Flexible duct systems, nonmetal.** | All duct collar fittings shall have a minimum 5/8 inch (16 mm) integral flange for sealing to other components and a minimum 3-inch (76 mm) shaft for insertion into the inner duct core.  Flexible ducts having porous inner cores shall not be used.  Exception: Ducts having a nonporous liner between the porous inner core and the outer jacket. Fastening and sealing requirements shall be applied to such intermediate liners. | Flexible nonmetal ducts shall be joined to all other air distribution system components by either terminal or intermediate fittings.  Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C.   See Section 603.10 of the *Florida Building Code, Mechanical,*for duct support requirements. | UL 181  UL 181B        ADC FDPIS | | **Duct core to duct fitting** | The reinforced lining shall be sealed to the duct fitting using one of the following sealing materials which conforms to the approved closure and mechanical attachment requirements of Section C403.2.9.3:  1. Gasketing.  2. Mastic, mastic-plus-embedded fabric, or mastic ribbons.  3. Pressure-sensitive tape.  4. Aerosol sealants, provided that their use is consistent with UL 181. | The reinforced core shall be mechanically attached to the duct fitting by a drawband installed directly over the wire-reinforced core and the duct fitting. The duct fitting shall extend a minimum of 2 inches (51 mm) into each section of duct core. When the flexible duct is larger than 12 inches (303 mm) in diameter or the design pressure exceeds 1-inch water gauge, the drawband shall be secured by a raised bead or indented groove on the fitting. |  | | **Duct outer jacket to duct collar fitting** | The outer jacket of a flexible duct section shall be secured at the juncture of the air distribution system component and intermediate or terminal fitting in such a way as to prevent excess condensation. The outer jacket of a flexible duct section shall not be interposed between the flange of the duct fitting and the flexible duct, rigid fibrous glass duct board, or sheet metal to which it is mated. |  |  | | **Duct collar fitting to rigid duct** | The duct collar fitting’s integral flange shall be sealed to the rigid duct board or sheet metal using one of the following closure systems/materials which conforms to the approved closure and mechanical attachment standards of Section C403.2.9.3:  1.  Gasketing.  2. Mastic or mastic-plus-embedded fabric systems.  3. Mastic ribbons when used to attach a duct collar to sheet metal.  4. Pressure-sensitive tape.  5. Aerosol sealants, provided that their use is consistent with UL 181. | The duct collar fitting shall be mechanically attached to the rigid duct board or sheet metal by appropriate mechanical fasteners, either screws, spin-in flanges, or dovetail flanges. |  | | **Terminal and intermediate fittings.**  **Fittings and joints between dissimilar duct types**                **Terminal fittings and air ducts to building envelope components** | Approved closure systems shall be as designated by air distribution system component material type in Section C403.2.9.3.  Exception: When the components of a joint are fibrous glass duct board and metal duct, including collar fittings and metal equipment housings, the closure systems approved for fibrous glass duct shall be used.  Terminal fittings and air ducts which penetrate the building envelope shall be mechanically attached to the structure and sealed to the envelope component penetrated and shall use one of the following closure systems/materials which conform to the approved closure and mechanical application requirements of Section C403.2.9.3:  1. Mastics or mastic-plus-embedded fabrics.  2. Gaskets used in terminal fitting/grille assemblies which compress the gasket material between the fitting and the wall, ceiling or floor sheathing. |  |  | | **Air-handling units.** | Air-handling units located outside the conditioned space shall be sealed using approved closure systems described in Section C403.2.9.3 for metallic ducts. | All air-handling units shall be mechanically attached to other air distribution system components. |  | | **Return plenums.** | Building cavities which will be used as return air plenums shall be lined with a continuous air barrier made of durable nonporous materials. All penetrations to the air barrier shall be sealed with a suitable long-life mastic material.  Exception: Surfaces between the plenum and conditioned spaces from which the return/mixed air is drawn.  Roof decks above building cavities used as a return air plenum shall be insulated to at least R-19. |  |  | | **Mechanical closets.** | All joints between the air barriers of walls, ceiling, floor and door framing and all penetrations of the air barrier shall be sealed to the air barrier with approved closure systems. Through-wall, through-floor and through-ceiling air passageways into the closet shall be framed and sealed to form an air-tight passageway.  Exception: Air passageways into the closet from conditioned space that are specifically designed for return air flow.    The following air barriers are approved for use in mechanical closets:  1. One-half-inch-thick (12.7 mm) or greater gypsum wallboard, taped and sealed with joint compound over taped joints between gypsum wallboard panels.  2. Other panelized materials having inward facing surfaces with an air porosity no greater than that of a duct product meeting Section 22 of UL 181 which are sealed on all interior surfaces to create a continuous air barrier by one of the following:  a. Sealants complying with the product and application standards of this table for fibrous glass ductboard or  b. A suitable long-life caulk or mastic for all applications. |  |  | | **Enclosed support platforms in unconditioned spaces.** | Enclosed support platforms located between the return air inlet(s) from conditioned space and the inlet of the air-handling unit or furnace, shall contain a duct section constructed entirely of rigid metal, rigid fibrous glass duct board, or flexible duct which is constructed and sealed according to the respective requirements of Section C403.2.9.2 and insulated according to the requirements of Section C403.2.9.1.  1. No portion of the building structure, including adjoining walls, floors and ceilings, shall be in contact with the return air stream or function as a component of this duct section  2. The duct section shall not be penetrated by a refrigerant line, chase, refrigerant line, wiring, pipe or any object other than a component of the air distribution system.  3. Through-wall, through-floor and through ceiling penetrations into the duct system shall contain a branch duct fabricated of rigid fibrous glass duct board or rigid metal and shall extend to and be sealed by both the duct section and the grille side wall surface. | The branch duct shall be fabricated and attached to the duct insert in accordance with requirements for the duct type used. |  |   1 Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.  **C403.2.9.3 Sealing, general (Mandatory).** All ducts, air handlers, filter boxes, building cavities, mechanical closets and enclosed support platforms that form the primary air containment passageways for air distribution systems shall be sealed in accordance with the applicable criteria of this section and Table C403.2.9.2.  **C403.2.9.3.1 Mechanical fastening.** All joints between sections of air ducts and plenums, between intermediate and terminal fittings and other components of air distribution systems, and between subsections of these components shall be mechanically fastened to secure the sections independently of the closure system(s).  **C403.2.9.3.2 Sealing.** Air distribution system components shall be sealed with approved closure systems.  **C403.2.9.3.3 Space provided.** Sufficient space shall be provided adjacent to all mechanical components located in or forming a part of the air distribution system to assure adequate access for: (1) construction and sealing in accordance with the requirements of Section C403.2.7; (2) inspection; and (3) cleaning and maintenance. A minimum of 4 inches (102 mm) is considered sufficient space around air-handling units.  **Exception:** Retrofit or replacement units not part of a renovation.  **C403.2.9.3.4 Product application.** Closure products shall be applied to the air barriers of air distribution system components being joined in order to form a continuous barrier or they may be applied in accordance with the manufacturer’s instructions or appropriate industry installation standard where more restrictive.  **C403.2.9.3.5 Surface preparation.** The surfaces upon which closure products are to be applied shall be clean and dry in accordance with the manufacturer’s installation instructions.  **C403.2.9.3.6 Approved mechanical attachments.** Approved mechanical attachments for air distribution system components include screws, rivets, welds, interlocking joints crimped and rolled, staples, twist in (screw attachment), and compression systems created by bend tabs or screw tabs and flanges or by clinching straps. Mechanical attachments shall be selected from Table C403.2.9.2 to be appropriate to the duct system type.  **C403.2.9.3.7 Approved closure systems.** The following closure systems and materials are approved for air distribution construction and sealing for the applications and pressure classes shown in Table C403.2.9.2  1. Metal closures.  a. Welds applied continuously along metal seams or joints through which air could leak.  b. Snaplock seams, and grooved, standing, double-corner, single-corner and Pittsburgh-lock seams, as defined by SMACNA, as well as all other rolled mechanical seams. All seams shall be rolled or crimped.  2. Gasketing, which achieves a 25/50 flame spread/smoke-density-development rating under ASTME 84 or UL 723, provided that it is used only between mated surfaces which are mechanically fastened with sufficient force to compress the gasket and to fill all voids and cracks through which air leakage would otherwise occur.  3. Mastic closures. Mastics shall be placed over the entire joint between mated surfaces. Mastics shall not be diluted. Approved mastics include the following:  a. Mastic or mastic-plus-embedded fabric systems applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part III.  b. Mastic or mastic-plus-embedded fabric systems applied to nonmetal flexible duct that are listed and labeled in accordance with UL 181B, Part II.  c. Mastic ribbons, which achieve a 25/50 flame spread/smoke density development rating under ASTME 84 or UL 723, provided that they may be used only in flange-joints and lap-joints, such that the mastic resides between two parallel surfaces of the air barrier and that those surfaces are mechanically fastened.  4. Tapes. Tapes shall be applied such that they extend not less than 1 inch onto each of the mated surfaces and shall totally cover the joint. When used on rectangular ducts, tapes shall be used only on joints between parallel rigid surfaces and on right angle joints. Approved tapes include the following:    a. Pressure-sensitive tapes.  i.) Pressure-sensitive tapes applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part I.  ii.) Pressure-sensitive tapes applied to nonmetal flexible duct that are listed and labeled in accordance with UL 181B, Part I.  b. Heat-activated tapes applied to fibrous glass ductboard that are listed and labeled in accordance with UL 181A, Part II.  5. Aerosol sealant. Such sealants shall be installed by manufacturer-certified installers following manufacturer instructions and shall achieve 25/50 flame spread/smoke-density-development ratings under ASTM E 84 or UL 723.  **C403.2.9.4 Cavities of the building structure.** Cavities in framed spaces, such as dropped soffits and walls, shall not be used to deliver air from or return air to the conditioning system unless they contain an air duct insert which is insulated in accordance with Section C403.2.9.1 and constructed and sealed in accordance with the requirements of Section C403.2.9.2 appropriate for the duct materials used.  **Exception:** Return air plenums beneath a roof deck that is insulated to at least R-19.  **C403.2.9.5 Air distribution system sizing and design.** All air distribution systems shall be sized and designed in accordance with recognized engineering standards such as ACCA Manual D or other standards based on the following:  1. Calculation of the supply air for each room shall be based on the greater of the heating load or sensible cooling load for that room.  2. Duct size shall be determined by the supply air requirements of each room, the available static pressure and the total equivalent length of the various duct runs.  3. Friction loss data shall correspond to the type of material used in duct construction.  **C403.2.9.6 Air-handling units.** Air-handling units shall not be allowed in attics of commercial buildings. | |
|  | |
|  | |
| ***Section C403.5.3 Add a section to read as shown:***  **C403.5.3 Condensing coils installed in cool air stream of another air-conditioning unit.** The condensing coil of one air-conditioning unit shall not be installed in the cool air stream of another air-conditioning unit.  **Exceptions:**  1. Where condenser heat reclaim is used in a properly designed system including enthalpy control devices to achieve requisite humidity control for process, special storage or equipment spaces and occupant comfort within the criteria of Standard ASHRAE Standard 55. Such systems shall result in less energy use than other appropriate options.  2. For computer or clean rooms whose location precludes the use of systems which would not reject heat into conditioned spaces.  ***Table C404.2 . Add section to read as shown. No change to rest of table:***  **TABLE C404.2**  **MINIMUM PERFORMANCE OF WATER-HEATING EQUIPMENT**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Equipment Type** | **Size Category (input)** | **Subcategory or Rating Condition** | **Performance Requireda,b** | **Test Procedure** | | Pool heaters, Gas and Oil | All | -- | 82% Et | ASHRAE 146 | | Heat pump pool heaters | All | --- | 4.0 COP  At low air temperature | AHRI 1160e,f |   For SI: 1 Btu/h=.2931W, oC=[(oF) – 32]/1.8    a - c [No change]  eTest report from independent laboratory is required to verify procedure compliance.  fGeothermal swimming pool heat pumps are not required to meet this standard.    **C404.9.3 Covers.** Outdoor heated swimming pools and outdoor permanent spas shall be equipped ~~provided~~ with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss. ~~or other approved vapor-retardant means~~.  **Exception:** no change.  ***Section C404.12. Add section to read as shown:***  **C404.12 Water flow rate controls.**  **C404.12.1 Showers.** Showers used for other than safety reasons shall be equipped with flow control devices to limit the water discharge to a maximum of 2.5 gpm (.16 L/S) per shower head at a distribution pressure of 80 psig (552 kPa) when tested in accordance with the procedures of ANSI A112.18.1M. Flow restricting inserts used as a component part of a showerhead shall be mechanically retained at the point of manufacture. |
|  |
| **C404.12.2 Lavatories or restrooms of public facilities.** Lavatories or restrooms of public facilities shall:  1. Be equipped with outlet devices which limit the flow of hot water to a maximum of 0.5 gpm (.03 L/S) or be equipped with self-closing valves that limit delivery to a per cycle maximum of 0.25 gallons (.95 L) of hot water for recirculating systems and to a maximum of 0.50 gallons (1.9 L) for non-recirculating systems.  **Exception:** Separate lavatories for physically handicapped persons shall not be equipped with self-closing valves.  2. Be equipped with devices which limit the outlet temperature to a maximum of 110°F (43°C).  3. Meet the provisions of 42 CFR 6295 (k), Standards for Water Closets and Urinals.   |  | | --- | | ***Section C405.6 Electrical energy consumption. Change to read as shown:***  **~~C405.7 Electrical energy consumption (Mandatory).~~**  ~~Each dwelling unit located in a Group R-2 building shall have a separate electrical meter.~~  **C405.6 Electrical power (Mandatory)**  **C405.6.1 Applicability.** This section applies to all building power distribution systems. The provisions for electrical distribution for all sections of this code are subject to the design conditions in ASHRAE Standard 90.1.  **C405.6.2 Electrical metering.** In buildings having individual dwelling units, provisions shall be made to determine the electrical energy consumed by each tenant by separately metering individual dwelling units.  **C405.6.3 Voltage drop.**  **C405.6.3.1 Feeders and customer owned service conductors**. Feeder and customer owned service conductors shall be sized for a maximum voltage drop of 2 percent at design load.  **C405.6.3.2 Branch Circuits.** Branch circuit conductors shall be sized for a maximum voltage drop of 3 percent at design load.  **C405.6.4 Completion requirements.**  **C405.6.4.1 Drawings.** Construction documents shall require that within 30 days after the date of system acceptance, record drawings of the actual installation shall be provided to the building owner, including:  1. a single-line diagram of the building electrical distribution system and  2. floor plans indicating location and area served for all distribution.  **C405.6.4.2 Manuals**. Construction documents shall require that an operating manual and maintenance manual be provided to the building owner. The manuals shall include, at a minimum, the following:  1. Submittal data stating equipment rating and selected options for each piece of equipment requiring maintenance.  2. Operation manuals and maintenance manuals for each piece of equipment requiring maintenance. Required routine maintenance actions shall be clearly identified.  3. Names and addresses of at least one qualified service agency.  Note: Enforcement agencies should only check to be sure that the construction documents require this information to be transmitted to the owner and should not expect copies of any of the materials.  ***Section C407.2.1. Add section to read as shown:***  **C407.2.1 Roof/ceiling thermal envelope**. The roof or ceiling which functions as the building's thermal envelope shall be insulated to an R-value of at least R-10. Multiple-family residential roofs/ceilings shall be insulated to an R-value of at least R-19, space permitting. Where cavities beneath a roof deck are ventilated, the ceiling shall be considered the envelope component utilized in the Commission approved compliance software tools. | |  |   ***Section C407.3 Performance-based compliance. Change section to read as shown:***  **C407.3 Performance-based compliance.** Compliance based on total building performance requires that a proposed building (*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 used in the total building performance compliance calculation shall be those contained in software  approved by the Florida Building Commission. ~~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.~~ Nondepletable energy collected off site shall be treated and priced the same as purchased energy. Energy from nondepletable energy sources collected on site shall be omitted from the annual energy cost of the *proposed design.*  ***Section C407.4 Documentation. Change to read as shown:***  **C407.4 Documentation.** Documentation verifying that the methods and accuracy of compliance software tools conform to the provisions of this section shall be provided to the Florida Building Commission ~~code official~~. Computer software utilized for demonstration of code compliance shall have been approved by the Florida Building Commission in accordance with requirements of this code.  **C407.4.1 Compliance report.** Compliance software tools used to demonstrate code compliance by Section C407 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:  1. Address of the building;  2*.* An inspection checklist documenting the building component characteristics of the *proposed design* as *listed* in Table C407.5.1(1). The inspection checklist shall show the estimated annual energy cost for both the *standard reference design* and the *proposed design;*  3. Name of individual completing the compliance report; and  4. Name and version of the compliance software tool.  **C407.4.2 Additional documentation.** The *code official* shall be permitted to require the following documents:  ~~1.      Documentation of the building component characteristics of the~~ *~~standard reference design;~~*  1~~2~~*.* Thermal zoning diagrams consisting of floor plans showing the thermal zoning scheme for *standard reference design* and *proposed design;*  2~~3~~. Input and output report(s) from the energy analysis simulation program containing the complete input and output files, as applicable. The output file shall include energy use totals and energy use by energy source and end-use served, total hours that space conditioning loads are not met and any errors or warning messages generated by the simulation tool as applicable;  3~~4~~. An explanation of any error or warning messages appearing in the simulation tool output; and  4~~5~~. A certification signed by the builder providing the building component characteristics of the *proposed design* as given in Table C407.5.1(1).  ***Table C407.5.1(1) [in part]. Specifications for the Standard Reference and Proposed Designs. Change categories identified to read as shown:***  **TABLE C407.5.1(1)—continued**  **SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**     |  |  |  |  | | --- | --- | --- | --- | | Heating System | | Fuel type: same as proposed design  Equipment typea: from Tables C407.5.1(2) and C407.5.1(3)  Efficiency: from Tables C403.2.3(4),  and C403.2.3(5)      Capacityb: sized proportionally to the capacities in the proposed design based on sizing runs~~, and shall be established such that no smaller number of unmet heating load hours and no larger heating capacity safety factors are provided than in the proposed design.~~ | As proposed  As proposed  As proposed | | Cooling System | Fuel type: same as proposed design  Equipment typec: from Tables C407.5.1(2) and C407.5.1(3)  Efficiency: from Tables C403.2.3(1),  C403.2.3(2) and C403.2.3(3)  Capacityb: sized proportionally to the capacities in the proposed design based on sizing runs~~, and shall be established such that no smaller number of unmet heating load hours and no larger cooling capacity safety factors are provided than in the proposed design.~~ | | As proposed  As proposed  As proposed |     ***Section C407.5.2.4. Add a section to read as shown:***  **C407.5.2.4 Requirements specific to credit options.** Credit may be claimed in the compliance calculation for technologies that meet the criteria for various options specified below.  **C407.5.2.4.1 Vegetative roofs.**Credit may be claimed in whole building performance method calculations for the area of a proposed building's roof that is covered with a vegetative roof that is designed and installed in accordance with ANSI/SPRI VF-1, with a minimum growth media depth of 4 inches. The credit shall provide a 45% reduction in the heating and cooling roof heat flux rates for the roof area covered with the vegetative roof. Minimum roof/ceiling insulation levels shall be code minimums as per Section C407.2.1.    **C407.5.2.4.2 Enthalpy Recovery Ventilation systems (ERVs).**  Credit may be claimed in the whole building performance method calculations for Enthalpy Recovery Ventilation systems used in the proposed building. This credit is applicable for buildings in which every HVAC system has a design supply air flow of less than 5,000 CFM. The credit shall also be applicable to buildings where one or more HVAC system in the building has a design supply flow equal to 5,000 CFM or greater but shall have minimum outdoor air supply to be less than 70 percent of the design supply air flow for that HVAC system.    The credit shall provide for a reduction of 6 percent of total HVAC annual energy use for buildings located in Climate Zone 1 and 4 percent of total HVAC annual energy use for buildings located in Climate Zone 2**.**   |  |  | | --- | --- | | |  | | --- | |  | | | ***Section C407.6.1. Specific approval. Change to read as shown:*** |   **C407.6.1 Specific approval.** Performance analysis tools meeting the applicable subsection of Section C407 and tested according to ASHRAE Standard 140 shall be permitted to be approved by the Florida Building Commission. ~~Tools are permitted to be approved based on meeting a specified threshold for a jurisdiction.~~ The code official shall be permitted to approve tools for a specified application or limited scope in accordance with Section C101.4.3, Limited and special use buildings.  ***Section C408.2.2 Systems adjusting and balancing. Delete and replace to read as shown:***  **~~C408.2.2 Systems adjusting and balancing.~~** ~~HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specificati4ons. Test and balance activities shall include air system and hydronic system balancing.~~  **C408.2.2 Air distribution system testing, adjusting and balancing.** Construction documents shall require that a written balance report be provided to the owner or the designated representative of the building owner for HVAC systems serving zones with a total conditioned area exceeding 5000 square feet (465 m2). Air distribution systems shall be tested, adjusted, and balanced by a licensed engineer or a company or individual holding a current certification from a recognized testing and balancing agency organization in accordance with generally accepted engineering standards.  **Exceptions:**  1. Buildings with cooling or heating system capacities of 15 tons or less per system may be tested and balanced by a mechanical contractor licensed to design and install such system(s).  2. Buildings with cooling or heating system capacities of 65,000 Btu/h or less per system are exempt from the requirements of this section.  **C408.2.2.1 Air systems balancing.** Air system balancing shall be accomplished in a manner to first minimize throttling losses, then for fans with fan system power greater than 1 hp, fan speeds shall be adjusted to meet design flow conditions. Balancing procedures shall be in accordance with the National Environmental Balancing Bureau (NEBB) Procedural Standards, the Associated Air Balance Council (AABC) National Standards, or equivalent procedures.  **Exception**: Damper throttling may be used for air system balancing with fan motors of 1 hp or less, or if throttling results in no greater than 1/3 hp fan horsepower draw above that required if the fan speed were adjusted.  **Notes:**  1. Building envelope pressurization should be either neutral or positive to prevent infiltration of excess latent load.  2. Commercial kitchen hood exhaust cfm should be sized to prevent depressurization. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 10 horsepower (hp) (7.5 kW) and larger.  ~~Each supply air outlet and~~ *~~zone~~* ~~terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the~~ *~~International Mechanical Code~~*~~. Discharge dampers used for air-system balancing are prohibited on constant-volume fans and variable volume~~  ~~fans with motors 10 hp (18.6 kW) and larger.~~  ~~Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp (0.746 kW), fan speed shall be adjusted to meet design flow conditions.~~  **~~Exception:~~** ~~Fans with fan motors of 1 hp (0.74 kW) or less are not required to be provided with a means for air balancing.~~ | |
| **CHAPTER 5 CE**  **Existing Building** | |

***Section C501.7 Building systems and components. Add section to read as shown:***

**C501.7 Building systems and components.** Thermal efficiency standards are set for the following building systems and components where new products are installed or replaced in existing buildings, and for which a permit must be obtained. New products shall meet the minimum efficiencies allowed by this code for the following systems and components:

          Heating, ventilating or air conditioning systems;

          Service water or pool heating systems;

          Lighting systems.

Replacement Fenestration.

**Exceptions:**

1. Where part of a functional unit is repaired or replaced. For example, replacement of an entire HVAC system is not required because a new compressor or other part does not meet code when installed with an older system.

2.   If the unit being replaced is itself a functional unit, such as a condenser, it does not constitute a repair. Outdoor and indoor units that are not designed to be operated together must meet the U.S. Department of Energy certification requirements contained in Section R303.1.2. Matched systems are required; this match may be verified by any one of the following means:

a. AHRI data

b. Accredited laboratory

c. Manufacturer’s letter

d. Letter from registered P.E. State of Florida

3. Where existing components are utilized with a replacement system, such as air distribution system ducts or electrical wiring for lights, such components or controls need not meet code if meeting code would require that component’s replacement.

4. Replacement equipment that would require extensive revisions to other systems, equipment or elements of a building where such replacement is a like-for-like replacement, such as through-the-wall condensing units and PTACs, chillers, and cooling towers in confined spaces.

**C501.7.1 Existing equipment efficiencies.** Existing cooling and heating equipment in residential applications need not meet the minimum equipment efficiencies, including system sizing and duct sealing.

**CHAPTER 6**

**REFERENCED STANDARDS**

***Add or revise the following referenced standards in the IECC base document as shown:***

**AABC**

Associated Air Balance Council,

1518 K Street, Suite 503,

Washington, DC 20005

Standard Reference in code

referenced number                    Title                                                                                                     section number

AABC, 1989            Associated Air Balance Council National Standard . . . . .. . . . . . . . . . . . . . . . . . . . . . . C408.2.2.1

A**CCA**

Air Conditioning Contractors of America

2800 Shirlington Road, Suite 300

Arlington, VA 22206

Standard Reference in code

referenced number                    Title                                                                                                     section number

ACCA Manual D-1995             Residential Duct Systems. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .C403.2.7.5

ACCA Manual N-2005             Commercial Load Calculation . . . . . . . . . . . . . . . . . . . . . . . . . . . .. ..C403.2.1

ANSI/ASHRAE/ Peak Cooling and Heating Load Calculations in Buildings

ACCA 183-2007  Except Low-rise Residential Buildings . .. . . . . . . . . . . . . . . . . C403.2.1

**ADC**

Air Diffusion Council

1000 E. Woodfield Rd., Suite 102

Schaumburg, IL 60173-5921

Standard Reference in code

referenced number                    Title                                                                                                     section number

ADC 2003                             Flexible Duct Performance & Installation Standards, Fourth Edition.                   C403.2.7.2

**AHRI**

AHRI 1230-2010        Performance Rating of Variable Refrigerant Flow (VRF)

Multi-Split Air-Conditioning and Heat Pump Equipment

With Addendum 1                                         Table C403.2.3(11)

**ANSI**

American National Standards Institute

25 West 43rd Street

Fourth Floor

New York, NY 10036

Standard Reference in code

referenced number                    Title                                                                                                     section number

A 112.18.1M-1999  Finished and Rough Brass Plumbing Fixture Fittings . . . . . . . . . . . . . . . . . . . .. .C404.8.1

**ASHRAE**

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

Standard Reference in code

referenced number                    Title                                                                                                     section number

ANSI/ASHRAE Std. 55-1992      Thermal Environmental Conditions for Human Occupancy. . . . . . C403.4.8

ANSI/ASHRAE/IESNA    Energy Standard for Buildings Except Low-rise   C304.1,1, C304.3.1.4

  90.1—2013       Residential Buildings C304.3.2.1, C304.3.2.2, C405.7.1,

127-07 Method of Testing for Raining Computer and Data Processing

Room Unitary Air Conditioners                                              Table C403.2.3(10

ASHRAE—2008    HVAC Systems and Equipment Handbook . . . . . . . . .  . . . . . . . . . . . . . . . C403.2.1

**ASTM**

ASTM International

100 Barr Harbor Drive

West Conshohocken, PA 19428-2959

Standard Reference in code

referenced number                    Title                                                                                                     section number

C36/C36M-03         Standard Specification for Gypsum Wallboard                                                          202

C 177-04                 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission

Properties by Means of the Guarded-Hot-Plate Apparatus                                       C304.2.1

C236-89 (1993el)   Test Method for Steady State Thermal Performance of Building Assemblies

by Means of a Guarded Hot Box     C304.2.1

C 518-04                 Test Method for Steady-State Thermal Transmission Properties by Means

of the Heat Flow Meter Apparatus.                          . . . . . . . . . . . . . . . . . . . .          C304.2.1

C1363-05                Standard Test Method for Thermal Performance of Building Materials and

Envelope Assemblies by Means of a Hot Box Apparatus . . . . . . . . . . . . . . . .         C304.2.2

D2412-02(2008)      Test Method for Determination of External Loading Characteristics of

Plastic Pipe by Parallel Pipe Loading  . . . . . . . . . . Table C403.2.7.2

E 84-09                    Test Method for Surface Burning Characteristics of Building Materials     202, C403.2.7.3.7

***Change to replace the ICC codes with Florida codes and add or delete the following Florida references to the list as shown:***

**Florida Codes**

Building Codes and Standards Office

Florida Department of Business and Professional Regulation

1940 N Monroe Street, Suite 90A

Tallahassee, FL 32399-0772  

Standard Reference in code

referenced number                    Title                                                                                                     section number

FBC-M- Sixth Edition (2017) Florida Building Code, Mechanical ~~C403.2.7, C403.2.7.1, C403.2.7.1.1,~~

FBC-M – Sixth Edition (2017)

FBC-P – Sixth Edition (2017)

FFPC – Sixth Edition (2017)

~~C403.2.7.1.2,~~ C403.2.7.2, Table C403.2.7.2

FBC-R- Sixth Edition (2017) Florida Building Code, Residential C202

FS 2013               Florida Statutes                                                                                                     C103.1.1.2, C103.1.1.2

**NAIMA**

North American Insulation Manufacturers Association

44 Canal Center Plaza, Suite 310,

Alexandria, VA 22314            

Standard Reference in code

referenced number                    Title                                                                                                     section number

NAIMA 2002                           Fibrous Glass Duct Construction Standards, Fifth Edition                     Table C403.2.7.2

**NEBB**

National Environmental Balancing Bureau

8575 Grovemont Circle

Gaithersburg, MD 20877-4121

Standard Reference in code

referenced number                    Title                                                                                                     section number

NEBB, 2005                       Procedural Standards For Testing Adjusting Balancing of

Environmental Systems, Seventh Edition.                                                      C408.2.2.1

**SMACNA**

Sheet Metal and Air Conditioning Contractors National Association, Inc.

4021 Lafayette Center Drive

Chantilly, VA 20151-1209

Standard Reference in code

referenced number                    Title                                                                                                     section number

SMACNA—2012      HVAC Air Duct Leakage Test Manual. . . . . . . . . . . . . . . . . . .~~C403.2.7.1.2,, C403.2.7.1.3,~~

Table C403.2.7.2, C403.2.7.3.7.

**SPRI**

Single Ply Roofing Industry

411 Waverley Oaks Road, Ste 331

Waltham, MA 02452

Standard Reference in code

referenced number                    Title                                                                                                     section number

ANSI/SPRI VF-1 2010             External Fire Design Standard for Vegetative Roofs. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . C407.5.2.4.1

**UL**

Underwriters Laboratories Inc.

333 Pfingsten Road

Northbrook, IL 60062-2096

Standard Reference in code

referenced number                    Title                                                                                                     section number

181-05                 Standard for Factory-Made Air Ducts and Air Connectors with revisions

through December 1998.                                                                                                     Table C403.2.7.2

181A-05               Closure Systems for Use With Rigid Air Ducts and Air Connectors,

with revisions through December 1998.                                                     C403.2.7.3.7, Table C403.2.7.2

181B-05               Closure Systems for Use With Flexible Air Ducts and Air Connectors with

revisions through May 2000.                                                                      C403.2.7.3.7, Table C403.2.7.2

723-03                  Standard for Test for Surface Burning Characteristics of Building Materials.                      C403.2.7.3.7

**.**

***Add Appendix C to read as follows:***

**APPENDIX CA**

**FORMS**

***Revise Form C402-2017 for use with alterations, renovations and building systems as shown:***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***FLORIDA BUILDING CODE, ENERGY CONSERVATION***  **CHAPTER C4 – COMMERCIAL ENERGY EFFICIENCY** | | | | | | | | | |
| **Form C402-2017 ALTERATIONS, RENOVATIONS and BUILDING SYSTEMS**  **Climate Zone:** | | | | | | | | | |
| Project Name: | | | | Occupancy type: | | | | | |
| Address: | | | | Alteration□ Renovation □ Building System □ | | | | | |
| City, Zip Code: | | | | Building Permit No.: | | | | | |
| Builder: | | | | Permitting Office: | | | | | |
| Owner: | | | | ~~Jurisdiction No.:~~ | | | | | |
| **BUILDING ENVELOPE INFORMATION (Where changed)** | | | | | | | | | |
| **Envelope Component** | **Description** | **Requirement** | | | | **Efficiency** | | | |
| **Location** | | | **Unit** | **Required** | | **Installed** | |
| Roof type |  | Table C402.1.2 or Table C402.2 | | | ≤U-factor or ≥R-value |  | |  | |
| Roof reflectance/  Emittance  (low slope roofs) |  | Table C402.2.1.1 | | | ≥Solar Reflectance, ≥Thermal emittance |  | |  | |
| Wall type, above grade |  | Table C402.1.2 or Table C402.2 | | | ≤U-factor or ≥R-value |  | |  | |
| Wall, below grade |  |  | |  | |
| Floor type |  |  | |  | |
| Vertical fenestrations |  | Table C402.3 | | | ≤U-factor |  | |  | |
| ≤SHGC |  | |  | |
| Skylights |  | ≤U-factor |  | |  | |
| ≤SHGC |  | |  | |
| **BUILDING SYSTEMS INFORMATION (for HVAC, service hot water or pool heating, lighting systems, and replacement fenestration (C101.4.7)** | | | | | | | | | |
| **System** | **Type (describe system)** | **Requirement** | | | | **Efficiency** | | | |
| **Location** | | | **Unit** | **Required** | | **Installed** | |
| Air-conditioning system |  | Tables C403.2.3  (1-3, 6-8, 10-11) | | | SEER or  EER, IEER |  | |  | |
| Heating system |  | Tables C403.2.3  (2-6) | | | HSPF or COP  AFUE,  Et or Ec |  | |  | |
| Ventilation/air handling system |  | Tables C403.2.10.1  (1-2) | | | Fan Power (cfm)~~:~~ |  | |  | |
| Ducts | Location: | Table C403.2.7.1 | | | R-value |  | |  | |
| Piping | Fluid design operating temp: | Table C403.2.8 | | | Inches |  | |  | |
| Hot water |  | Table C404.2 | | | EF, Et, COP |  | |  | |
| Lighting | Space types: (append list) | Table C405.5.2  (1 or 2) | | | Lighting power density | |  | |  |
| Fenestrations: Enter information in BUILDING ENVELOPE INFORMATION box above. | | | | | | | | | |
| Other: |  |  | | |  | |  | |  |
|  | | | | | | | | | |
| **COMPLIANCE IS BY ANSI/ASHRAE/IESNA 90.1** □  **(Submit alternate form or append documents as needed)** | | | | | | | | | |
| I hereby certify that the plans and specifications covered by the calculation are in compliance with the *Florida Building Code, Energy Conservation ~~Code~~.*  PREPARED BY: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  DATE: \_\_\_\_\_\_\_\_\_  I hereby certify that this building is in compliance with the *Florida Building Code, Energy Conservation ~~Code~~*:  OWNER/AGENT:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  DATE:\_\_\_\_\_\_\_\_ | | | Review of plans and specifications covered by this calculation indicates compliance with the *Florida Building Code, Energy Conservation ~~Code~~*. Before construction is completed, this building will be inspected for compliance in accordance with Section 553.908, F.S.  BUILDING OFFICIAL:\_\_\_\_\_­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  DATE: \_\_\_\_\_\_\_\_\_\_\_ | | | | | | |

**FLORIDA BUILDING CODE, ENERGY CONSERVATION**

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| **RESIDENTIAL CODE PROVISIONS**  **CHAPTER 1**  **SCOPE AND ADMINISTRATION [RE]**  ***Section R101.1 Title. Change to read as shown:***  **R101.1 Title.** This code shall be known as the *Florida Building Code, Energy Conservation*, *~~International Energy Conservation Code~~* and shall be cited as such. It is referred to herein as “this code”. | | |
| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | ***Section R101.4.2. Add section to read as shown:***  **R101.4.2 Exempt buildings.** Buildings exempt from the provisions of the *Florida Building Code, Energy Conservation,* include **e**xisting buildings except those considered renovated buildings, changes of occupancy type, or previously unconditioned buildings to which comfort conditioning is added. Exempt buildings include those specified in Sections R101.4.2.1 through R101.4.2.4.  **R101.4.2.1** **Federal standards.** Any building for which federal mandatory standards preempt state energy codes  **R101.4.2.2 Hunting or recreational buildings < 1,000 square feet.** Any building of less than l,000 square feet (93 m2) whose primary use is not as a principal residence and which is constructed and owned by a natural person for hunting or similar recreational purposes is exempt from this code; however, no such person may build more than one exempt building in any 12-month period.  **R101.4.2.3 Historic buildings**. Any building meeting the criteria for historic buildings as defined in Chapter 2 of this Code.  **R101.4.2.4 Low energy buildings as described in Section R402.1.** Such buildings shall not contain electrical, plumbing or mechanical systems which have been designed to accommodate the future installation of heating or cooling equipment.  ***Section R101.5.1 Compliance materials. Change to read as shown:***  **R101.5.1 Compliance materials.**The Florida Building Commission ~~code official~~ shall ~~be permitted to~~ approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code. Commission approved code compliance demonstration forms can be found in Table R101.5.1.  **R101.5.1.1 Residential** ≤ **3 stories.**  **R101.5.1.1.1 Building thermal envelope alternative.** An accurately completed Residential Building Form R402 shall be submitted to the code official to demonstrate code compliance by this method.  Alternatively, a Florida REScheck computer printout may be submitted to demonstrate compliance by Sections R402, R403 and R404.  **R101.5.1.1.2 Simulated performance alternative**. An accurately completed Residential Building Form R405 (generated by Commission approved software) demonstrating that code compliance has been achieved shall be submitted to the building official for compliance by Section R405.  **R101.5.1.2 Commercial and residential >3 stories.** See *Florida Building Code, Energy Conservation*: Commercial Provisions. |   **TABLE R101.5.1**  **INDEX TO CODE COMPLIANCE FORMS**   |  |  | | --- | --- | | **FORM** | **WHERE FOUND** | | Form R402  Florida REScheck computer printout  Form R405 (Commission approved software printout) | Appendix C |   ***Section R103.1.1. Add a new section to read as shown:***  **R103.1.1 Compliance certification.**  **R103.1.1.1 Code compliance demonstration.**  **R103.1.1.1.1 Residential**. No license or registration is required to prepare the code compliance form for single-family residential dwellings, duplexes and townhouses.  **R103.1.1.1.2 Commercial and multiple-family residential.** Completion of procedures demonstrating compliance with this code for multiple-family residential building shall be in accordance with the provisions of Section 481.229, *Florida Statutes*, or Section 471.003, *Florida Statutes.*  **Exception:** Where HVAC systems are nominal 15 tons per system or smaller, commercial building energy raters certified in accordance with Section 553.99, *Florida Statutes*, or as authorized by *Florida Statutes*, may prepare the code compliance form.  **R103.1.1.2 Code compliance certification.** The building’s owner, the owner’s architect, or other authorized agent legally designated by the owner shall certify that the building is in compliance with the code, as per Section 553.907, *Florida Statutes*, prior to receiving the permit to begin construction or renovation.     |  |  |  |  | | --- | --- | --- | --- | | |  | | --- | | ***Section R107 Fees. Delete and reserve to read as shown:***  **SECTION R107**  **FEES**  **RESERVED**  ***Section R108 Stop Work Order. Change to read as shown:***  **SECTION 108**  **STOP WORK ORDER**  **R108.1 Authority.** [No change]  **R108.2 Issuance.** [No change]  **R108.3 Emergencies.** Reserved.  **R108.4 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 violation or unsafe condition, shall be subject to penalties as prescribed by law  ~~a fine as set by the applicable governing authority.~~    ***Section R109 Board of Appeals. Delete text and reserve to read as shown:***  **SECTION R109**  **BOARD OF APPEALS**  **RESERVED** | |  | | | | |  | |  | | |  | |   **Chapter 2 [RE]**  **DEFINITIONS**  ***Section R202 General Definition. Add or change the following definitions:***   |  | | --- | | **ADJACENT WALL, CEILING or FLOOR.** A wall, ceiling or floor of a structure that separates conditioned space from enclosed but unconditioned space, such as an unconditioned attached garage, storage or utility room.  **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.~~ Relating to air distribution systems, a material object(s) which impedes or restricts the free movement of air under specified conditions. For fibrous glass duct, the air barrier is its foil cladding; for flexible non-metal duct, the air barrier is the non-porous core; and for sheet metal duct and air handling units, the air barrier is the metal in contact with the air stream. For mechanical closets, the air barrier may be a uniform panelized material such as gypsum wall board which meets ASTM C 36, or it may be a membrane which alone acts as an air barrier which is attached to a panel, such as the foil cladding of fibrous glass duct board.  Relating to the building envelope, air barriers comprise the planes of primary resistance to air flow between the interior spaces of a building and the outdoors and the planes of primary air flow resistance between adjacent air zones of a building, including planes between adjacent conditioned and unconditioned air spaces of a building. To be classed as an air barrier, a building plane must be substantially leak free; that is, it shall have an air leakage rate not greater than 0.5 cfm/ft2 when subjected to an air pressure gradient of 25 pascal. In general, air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with a suitable long-life mastic. House wraps and taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.  **AIR CONDITIONING.** The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.  **AIR DISTRIBUTION SYSTEM.** Any system of ducts, plenums and air-handling equipment that circulates air within a space or spaces and includes systems made up of one or more air-handling units.  **AIR-HANDLING UNIT.** The fan unit of a furnace and the fan-coil unit of a split-system, packaged air conditioner or heat pump.  **ATTIC.** An enclosed unconditioned space located immediately below an uninsulated roof and immediately above the ceiling of a building. For the roof to be considered insulated, roof insulation shall be at least the R-value required to meet Section R405.2.1.  **BUILDING.** Any structure used or intended for supporting or sheltering any use or occupancy. ~~including any mechanical systems, service water heating systems and electric power and lighting systems located on the building site and supporting the building.~~  For each purpose of this Code each portion of a building separated from other portions by a firewall shall be considered as a separate building. The term “building” shall be construed as if followed by the words “or part thereof.”  **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. See “Adjacent wall, ceiling or floor.”  **CONDITIONED FLOOR AREA.** The horizontal projection of ~~the floors associated with the conditioned space.~~ that portion of space which is conditioned directly or indirectly by an energy-using system.  **CONDITIONED SPACE CONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and that is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or  where they contain uninsulated ducts, piping or other sources of heating or cooling.. See “Space.”  **DRAWBAND**. A fastener which surrounds and fastens a duct fitting with either the inner lining or the outer jacket of flexible ducts. Tension ties, clinch bands, draw ties, and straps are considered drawbands.  **EFFICIENCY.** Performance at specified rating conditions.  **ENERGY.** The capacity for doing work. It takes a number of forms that may be transformed from one into another such as thermal (heat), mechanical (work), electrical, and chemical. Customary measurement units are British thermal units (Btu).  **EQUIPMENT.** Devices for comfort conditioning, electric power, lighting, transportation, or service water heating including, but not limited to, furnaces, boilers, air conditioners, heat pumps, chillers, water heaters, lamps, luminaires, ballasts, elevators, escalators, or other devices or installations.  **EXISTING BUILDING.** A building or portion thereof that was previously occupied or approved for occupancy by the authority having jurisdiction.  **EXTERIOR WALL.** Walls including both above-grade walls and basement walls which form a boundary between a conditioned and an outdoor space.  **FENESTRATION AREA.** Total area of the fenestration measured using the rough opening and including the glazing, sash, and frame. For doors where the glazed vision area is less than 50% of the door area, the fenestration area is the glazed vision area. For all other doors, the fenestration area is the door area.  **HEAT.** The form of energy that is transferred by virtue of a temperature difference or a change in the state of a material.  **HVAC.** Heating, ventilating and air conditioning.  **HVAC SYSTEM.** The equipment, distribution systems, and terminals that provide, either collectively or individually, the processes of heating, ventilating, or air conditioning to a building or portion of a building.  **INDOOR.** Within the conditioned building envelope.  **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.~~ through cracks and crevices in any building element and around windows and doors of a building caused by pressure differences across these elements due to factors such as wind, inside and outside temperature differences (stack effect), and imbalance between supply and exhaust air systems.  **INSULATION.** Material mainly used to retard the flow of heat. See Section R303.1.4.  **MANUFACTURER.** The company engaged in the original production and assembly of products or equipment or a company that purchases such products and equipment manufactured in accordance with company specifications.  **MECHANICAL CLOSET**. For the purposes of this code, a closet used as an air plenum which contains the blower unit or air handler of a central air conditioning or heating unit.  **OUTDOOR.** The environment exterior to the building structure.  **OUTDOOR (OUTSIDE) AIR.** Air that is outside the building envelope or is taken from outside the building that has not been previously circulated through the building.  **OUTSIDE.** The environment exterior to the conditioned space of the building and may include attics, garages, crawlspaces, etc., but not return air plenums.  **PLENUM.** A compartment or chamber to which one or more ducts are connected, that forms a part of the air distribution system, and that is not used for occupancy or storage. A plenum often is formed in part or in total by portions of the building.  **POSITIVE INDOOR PRESSURE.** A positive pressure condition within a conditioned space caused by bringing in more outside air than the amount of air that is exhausted and/or lost through air leakage.  **PROPOSED DESIGN.** A description or computer representation of the proposed building used to estimate annual energy use for determining compliance based on total building performance or design energy cost.  **RENOVATED BUILDING.** A residential or nonresidential building undergoing alteration that varies or changes insulation, HVAC systems, water heating systems, or exterior envelope conditions, provided the estimated cost of renovation exceeds 30 percent of the assessed value of the structure.  **REPLACEMENT.** The installation of part or all of an existing mechanical or electrical system in an existing building.  **SEAL or SEALING – AIR DUCT**. The use of closure products, either welds, mastic, mastic plus embedded fabric, adhesives, caulking, gaskets, pressure sensitive tapes, heat-activated tapes or combinations thereof as allowed by specific sections of this code, to close cracks, joints, seams, and other openings in the air barriers of air duct, air handling units, and plenum chambers for the purpose of preventing air leakage. No joining of opening from which a closure product is absent shall be considered sealed unless considered otherwise in specific cases identified by this code. Closeness of fit between mated parts alone shall not be considered a seal.  **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. (See “Fenestration area”.)  **SPACE.** An enclosed space within a building. The classifications of spaces are as follows for the purpose of determining building envelope requirements.  1. Conditioned space: a cooled space, heated space, or indirectly conditioned space or unvented attic assembly defined as follows.  a. Cooled space: an enclosed space within a building that is cooled by a cooling system whose sensible output capacity exceeds 5 Btu/h·ft2 of floor area.  b. Heated space: an enclosed space within a building that is heated by a heating system whose output capacity relative to the floor area is greater than or equal to 5 Btu/h·ft2.  c. Indirectly conditioned space: an enclosed space within a building that is not a heated space or a cooled space, which is heated or cooled indirectly by being connected to adjacent space(s) provided (a) the product of the U-factor(s) and surface area(s) of the space adjacent to connected space(s) exceeds the combined sum of the product of the U-factor(s) and surface area(s) of the space adjoining the outdoors, unconditioned spaces, and to or from semiheated spaces (e.g., corridors) or (b) that air from heated or cooled spaces is intentionally transferred (naturally or mechanically) into the space at a rate exceeding 3 air changes per hour (ACH) (e.g., atria).  d. Unvented attic assembly: as defined in Section R806.5 of the Florida Building Code, Residential. These spaces shall not require supply or return outlets.  2. Semiheated space: an enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h·ft2 of floor area but is not a conditioned space.  3. Unconditioned space: an enclosed space within a building that is not a conditioned space or a semiheated space. Crawl spaces, attics, and parking garages with natural or mechanical ventilation are not considered enclosed spaces.  **STRUCTURE.** That which is built or constructed.  **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.~~ For the purposes of this code, the term “sunroom” as used herein shall be as follows and shall include conservatories, sunspaces, solariums, and porch or patio covers or enclosures.   1. A room with roof panels that includes sloped glazing that is a one-story structure added to an existing dwelling with an open or glazed area in excess of 40 percent of the gross area of the sunroom structure’s exterior walls and roof.  2. A one-story structure added to a dwelling with structural roof panels without sloped glazing. The sunroom walls may have any configuration, provided the open area of the longer wall and one additional wall is equal to at least 65 percent of the area below 6 feet 8 inches of each wall, measured from the floor.  **SYSTEM.** A combination of equipment and auxiliary devices (e.g., controls, accessories, interconnecting means, and terminal elements) by which energy is transformed so it performs a specific function such as HVAC, service water heating, or lighting.  **THERMAL ENVELOPE.** The primary insulation layer of a building; that part of the envelope that provides the greatest resistance to heat flow to or from the building.  **UNCONDITIONED SPACE.** See “SPACE.”  **WALL.** That portion of the building envelope, including opaque area and fenestration, that is vertical or tilted at an angle of 60 degrees from horizontal or greater. This includes above and below-grade walls, between floor spandrels, peripheral edges of floors, and foundation walls. For the purposes of determining building envelope requirements, the classifications are defined as follows:  1. Above-grade wall: a wall that is not a below-grade wall.  2. Below-grade wall: that portion of a wall in the building envelope that is entirely below the finish grade and in contact with the ground.  3. Mass wall: a wall with a heat capacity exceeding (1) 7 Btu/ft2·°F or (2) 5 Btu/ft2·°F provided that the wall has a material unit weight not greater than 120 lb/ft3.  4. Metal building wall: a wall whose structure consists of metal spanning members supported by steel structural members (i.e., does not include spandrel glass or metal panels in curtain wall systems).  5. Steel-framed wall: a wall with a cavity (insulated or otherwise) whose exterior surfaces are separated by steel framing members (i.e., typical steel stud walls and curtain wall systems).  6. Wood-framed and other walls: all other wall types, including wood stud walls. |     **Chapter 3 [RE]**  **General Requirements**  ***Section R301.1 General. Change to read as shown:*** | |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **R301.1 General.**  ~~Climate zones from Figure R301.1 or~~ Table R301.1 shall be used in determining the applicable requirements from Chapter 4. Locations are ~~not in Table R301.1 (outside the United States) shall be~~ assigned a climate zone based on Section R301.3.   |  | | --- | |  |   **~~FIGURE R301.1 CLIMATE ZONES~~**  **TABLE R301.1 CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY ~~STATE,~~ COUNTY ~~AND TERRITORY~~**  **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 Lee~~ | | | | | | | | | | | ~~7 Kodiak Island~~ | | | | | | | | | ~~3A Calhoun~~ | | | | | | | | | ~~3A Monroe~~ | | | | | | | | | | | ~~3A Autauga\*~~ | | | | | | ~~3A Limestone~~ | | | | | | | | | | | ~~7 Lake and Peninsula~~ | | | | | | | | | ~~4A Carroll~~ | | | | | | | | | ~~3A Montgomery~~ | | | | | | | | | | | ~~2A Baldwin\*~~ | | | | | | ~~3A Lowndes\*~~ | | | | | | | | | | | ~~7 Matanuska-Susitna~~ | | | | | | | | | ~~3A Chicot~~ | | | | | | | | | ~~3A Nevada~~ | | | | | | | | | | | ~~3A Barbour\*~~ | | | | | | ~~3A Macon\*~~ | | | | | | | | | | | ~~8 Nome~~ | | | | | | | | | ~~3A Clark~~ | | | | | | | | | ~~4A Newton~~ | | | | | | | | | | | ~~3A Bibb~~ | | | | | | ~~3A Madison~~ | | | | | | | | | | | ~~8 North Slope~~ | | | | | | | | | ~~3A Clay~~ | | | | | | | | | ~~3A Ouachita~~ | | | | | | | | | | | ~~3A Blount~~ | | | | | | ~~3A Marengo\*~~ | | | | | | | | | | | ~~8 Northwest Arctic~~ | | | | | | | | | ~~3A Cleburne~~ | | | | | | | | | ~~3A Perry~~ | | | | | | | | | | | ~~3A Bullock\*~~ | | | | | | ~~3A Marion~~ | | | | | | | | | | | ~~7~~ | | | | | | | | | ~~3A Cleveland~~ | | | | | | | | | ~~3A Phillips~~ | | | | | | | | | | | ~~3A Butler\*~~ | | | | | | ~~3A Marshall~~ | | | | | | | | | | | ~~3A Columbia\*~~ | | | | | | | | | ~~3A Pike~~ | | | | | | | | | | | ~~3A Calhoun~~ | | | | | | ~~2A Mobile\*~~ | | | | | | | | | | | ~~7 Sitka~~ | | | | | | | | | ~~3A Conway~~ | | | | | | | | | ~~3A Poinsett~~ | | | | | | | | | | | ~~3A Chambers~~ | | | | | | ~~3A Monroe\*~~ | | | | | | | | | | | ~~7 Skagway-Hoonah- Angoon~~ | | | | | | | | | ~~3A~~ | | | | | | | | | ~~3A Polk~~ | | | | | | | | | | | ~~3A Cherokee~~ | | | | | | ~~3A Montgomery\*~~ | | | | | | | | | | | ~~8 Southeast Fairbanks~~ | | | | | | | | | ~~3A Crawford~~ | | | | | | | | | ~~3A Pope~~ | | | | | | | | | | | ~~3A Chilton~~ | | | | | | ~~3A Morgan~~ | | | | | | | | | | | ~~7 Valdez-Cordova~~ | | | | | | | | | ~~3A Crittenden~~ | | | | | | | | | ~~3A Prairie~~ | | | | | | | | | | | ~~3A Choctaw\*~~ | | | | | | ~~3A Perry\*~~ | | | | | | | | | | | ~~8 Wade Hampton~~ | | | | | | | | | ~~3A Cross~~ | | | | | | | | | ~~3A Pulaski~~ | | | | | | | | | | | ~~3A Clarke\*~~ | | | | | | ~~3A Pickens~~ | | | | | | | | | | | ~~7 Wrangell-Petersburg~~ | | | | | | | | | ~~3A Dallas~~ | | | | | | | | | ~~3A Randolph~~ | | | | | | | | | | | ~~3A Clay~~ | | | | | | ~~3A Pike\*~~ | | | | | | | | | | | ~~7 Yakutat~~ | | | | | | | | | ~~3A Desha~~ | | | | | | | | | ~~3A Saline~~ | | | | | | | | | | | ~~3A Cleburne~~ | | | | | | ~~3A Randolph~~ | | | | | | | | | | | ~~8 Yukon-Koyukuk~~ | | | | | | | | | ~~3A Drew~~ | | | | | | | | | ~~3A Scott~~ | | | | | | | | | | | ~~3A Coffee\*~~ | | | | | | ~~3A Russell\*~~ | | | | | | | | | | | **~~ARIZONA~~** | | | | | | | | | ~~3A Faulkner~~ | | | | | | | | | ~~4A Searcy~~ | | | | | | | | | | | ~~3A Colbert~~ | | | | | | ~~3A Shelby~~ | | | | | | | | | | | ~~3A Franklin~~ | | | | | | | | | ~~3A Sebastian~~ | | | | | | | | | | | ~~3A Conecuh\*~~ | | | | | | ~~3A St. Clair~~ | | | | | | | | | | | ~~5B Apache~~ | | | | | | | | | ~~4A Fulton~~ | | | | | | | | | ~~3A Sevier\*~~ | | | | | | | | | | | ~~3A Coosa~~ | | | | | | ~~3A Sumter~~ | | | | | | | | | | | ~~3B Cochise~~ | | | | | | | | | ~~3A Garland~~ | | | | | | | | | ~~3A Sharp~~ | | | | | | | | | | | ~~3A Covington\*~~ | | | | | | ~~3A Talladega~~ | | | | | | | | | | | ~~5B Coconino~~ | | | | | | | | | ~~3A Grant~~ | | | | | | | | | ~~3A St. Francis~~ | | | | | | | | | | | ~~3A Crenshaw\*~~ | | | | | | ~~3A Tallapoosa~~ | | | | | | | | | | | ~~4B Gila~~ | | | | | | | | | ~~3A Greene~~ | | | | | | | | | ~~4A Stone~~ | | | | | | | | | | | ~~3A Cullman~~ | | | | | | ~~3A Tuscaloosa~~ | | | | | | | | | | | ~~3B Graham~~ | | | | | | | | | ~~3A Hempstead\*~~ | | | | | | | | | ~~3A Union\*~~ | | | | | | | | | | | ~~3A Dale\*~~ | | | | | | ~~3A Walker~~ | | | | | | | | | | | ~~3B Greenlee~~ | | | | | | | | | ~~3A~~ | | | | | | | | | ~~3A Van Buren~~ | | | | | | | | | | | ~~3A Dallas\*~~ | | | | | | ~~3A Washington\*~~ | | | | | | | | | | | ~~2B La Paz~~ | | | | | | | | | ~~3A Howard~~ | | | | | | | | | ~~4A Washington~~ | | | | | | | | | | | ~~3A DeKalb~~ | | | | | | ~~3A Wilcox\*~~ | | | | | | | | | | | ~~2B Maricopa~~ | | | | | | | | | ~~3A Independence~~ | | | | | | | | | ~~3A White~~ | | | | | | | | | | | ~~3A Elmore\*~~ | | | | | | ~~3A Winston~~ | | | | | | | | | | | ~~3B Mohave~~ | | | | | | | | | ~~4A Izard~~ | | | | | | | | | ~~3A Woodruff~~ | | | | | | | | | | | ~~3A~~ | | | | | | **~~ALASKA~~** | | | | | | | | | | | ~~5B Navajo~~ | | | | | | | | | ~~3A Jackson~~ | | | | | | | | | ~~3A Yell~~ | | | | | | | | | | | ~~3A Etowah~~ | | | | | | ~~2B Pima~~ | | | | | | | | | ~~3A Jefferson~~ | | | | | | | | | **~~CALIFORNIA~~** | | | | | | | | | | | ~~3A Fayette~~ | | | | | | ~~7 Aleutians East~~ | | | | | | | | | | | ~~2B Pinal~~ | | | | | | | | | ~~3A Johnson~~ | | | | | | | | | | ~~3A Franklin~~ | | | | | | ~~7 Aleutians West~~ | | | | | | | | | | | ~~3B Santa Cruz~~ | | | | | | | | | ~~3A Lafayette\*~~ | | | | | | | | | ~~3C Alameda~~ | | | | | | | | | | | ~~3A Geneva\*~~ | | | | | | ~~7 Anchorage~~ | | | | | | | | | | | ~~4B Yavapai~~ | | | | | | | | | ~~3A Lawrence~~ | | | | | | | | | ~~6B Alpine~~ | | | | | | | | | | | ~~3A Greene~~ | | | | | | ~~8 Bethel~~ | | | | | | | | | | | ~~2B Yuma~~ | | | | | | | | | ~~3A Lee~~ | | | | | | | | | ~~4B Amador~~ | | | | | | | | | | | ~~3A Hale~~ | | | | | | ~~7 Bristol Bay~~ | | | | | | | | | | | **~~ARKANSAS~~** | | | | | | | | | ~~3A Lincoln~~ | | | | | | | | | ~~3B Butte~~ | | | | | | | | | | | ~~3A Henry\*~~ | | | | | | ~~7 Denali~~ | | | | | | | | | | | ~~3A Little River\*~~ | | | | | | | | | ~~4B~~ | | | | | | | | | | | ~~3A Houston\*~~ | | | | | | ~~8 Dillingham~~ | | | | | | | | | | | ~~3A Arkansas~~ | | | | | | | | | ~~3A Logan~~ | | | | | | | | | ~~3B Colusa~~ | | | | | | | | | | | ~~3A Jackson~~ | | | | | | ~~8 Fairbanks North Star~~ | | | | | | | | | | | ~~3A Ashley~~ | | | | | | | | | ~~3A Lonoke~~ | | | | | | | | | ~~3B Contra Costa~~ | | | | | | | | | | | ~~3A Jefferson~~ | | | | | | ~~7 Haines~~ | | | | | | | | | | | ~~4A Baxter~~ | | | | | | | | | ~~4A Madison~~ | | | | | | | | | ~~4C Del Norte~~ | | | | | | | | | | | ~~3A Lamar~~ | | | | | | ~~7 Juneau~~ | | | | | | | | | | | ~~4A Benton~~ | | | | | | | | | ~~4A Marion~~ | | | | | | | | | ~~4B El Dorado~~ | | | | | | | | | | | ~~3A Lauderdale~~ | | | | | | ~~7 Kenai Peninsula~~ | | | | | | | | | | | ~~4A Boone~~ | | | | | | | | | ~~3A Miller\*~~ | | | | | | | | | ~~3B Fresno~~ | | | | | | | | | | | ~~3A Lawrence~~ | | | | | | ~~7 Ketchikan Gateway~~ | | | | | | | | | | | ~~3A Bradley~~ | | | | | | | | | ~~3A Mississippi~~ | | | | | | | | | ~~3B Glenn~~ | | | | | | | | | | | *(continued)* ~~4C Humboldt~~ | | | | | | | ~~3B Yuba~~ | | | | | ~~5B Morgan~~ | | | | | | | | | | | | | | | 2A Escambia\* | | | | | | | | | 2A Taylor\* | | | | | | | | | | ~~2B Imperial~~ | | | | | | | **~~COLORADO~~** | | | | | ~~4B Otero~~ | | | | | | | | | | | | | | | 2A Flagler\* | | | | | | | | | 2A Union\* | | | | | | | | | | ~~4B Inyo~~ | | | | | | | ~~6B Ouray~~ | | | | | | | | | | | | | | | 2A Franklin\* | | | | | | | | | 2A Volusia\* | | | | | | | | | | ~~3B Kern~~ | | | | | | | ~~5B Adams~~ | | | | | ~~7 Park~~ | | | | | | | | | | | | | | | 2A Gadsden\* | | | | | | | | | 2A Wakulla\* | | | | | | | | | | ~~3B Kings~~ | | | | | | | ~~6B Alamosa~~ | | | | | ~~5B Phillips~~ | | | | | | | | | | | | | | | 2A Gilchrist\* | | | | | | | | | 2A Walton\* | | | | | | | | | | ~~4B Lake~~ | | | | | | | ~~5B Arapahoe~~ | | | | | ~~7 Pitkin~~ | | | | | | | | | | | | | | | 2A Glades\* | | | | | | | | | 2A Washington\* | | | | | | | | | | ~~5B Lassen~~ | | | | | | | ~~6B Archuleta~~ | | | | | ~~5B Prowers~~ | | | | | | | | | | | | | | | 2A Gulf\* | | | | | | | | | **~~GEORGIA~~** | | | | | | | | | | ~~3B Los Angeles~~ | | | | | | | ~~4B Baca~~ | | | | | ~~5B Pueblo~~ | | | | | | | | | | | | | | | 2A Hamilton\* | | | | | | | | | | ~~3B Madera~~ | | | | | | | ~~5B Bent~~ | | | | | ~~6B Rio Blanco~~ | | | | | | | | | | | | | | | 2A Hardee\* | | | | | | | | | ~~2A Appling\*~~ | | | | | | | | | | ~~3C Marin~~ | | | | | | | ~~5B Boulder~~ | | | | | ~~7 Rio Grande~~ | | | | | | | | | | | | | | | 1A Hendry\* | | | | | | | | | ~~2A Atkinson\*~~ | | | | | | | | | | ~~4B Mariposa~~ | | | | | | | ~~6B Chaffee~~ | | | | | ~~7 Routt~~ | | | | | | | | | | | | | | | 2A Hernando\* | | | | | | | | | ~~2A Bacon\*~~ | | | | | | | | | | ~~3C Mendocino~~ | | | | | | | ~~5B Cheyenne~~ | | | | | ~~6B Saguache~~ | | | | | | | | | | | | | | | 2A Highlands\* | | | | | | | | | ~~2A Baker\*~~ | | | | | | | | | | ~~3B Merced~~ | | | | | | | ~~7 Clear Creek~~ | | | | | ~~7 San Juan~~ | | | | | | | | | | | | | | | 2A Hillsborough\* | | | | | | | | | ~~3A Baldwin~~ | | | | | | | | | | ~~5B Modoc~~ | | | | | | | ~~6B Conejos~~ | | | | | ~~6B San Miguel~~ | | | | | | | | | | | | | | | 2A Holmes\* | | | | | | | | | ~~4A Banks~~ | | | | | | | | | | ~~6B Mono~~ | | | | | | | ~~6B Costilla~~ | | | | | ~~5B Sedgwick~~ | | | | | | | | | | | | | | | 2A Indian River\* | | | | | | | | | ~~3A Barrow~~ | | | | | | | | | | ~~3C Monterey~~ | | | | | | | ~~5B Crowley~~ | | | | | ~~7 Summit~~ | | | | | | | | | | | | | | | 2A Jackson\* | | | | | | | | | ~~3A Bartow~~ | | | | | | | | | | ~~3C Napa~~ | | | | | | | ~~6B Custer~~ | | | | | ~~5B Teller~~ | | | | | | | | | | | | | | | 2A Jefferson\* | | | | | | | | | ~~3A Ben Hill\*~~ | | | | | | | | | | ~~5B Nevada~~ | | | | | | | ~~5B Delta~~ | | | | | ~~5B Washington~~ | | | | | | | | | | | | | | | 2A Lafayette\* | | | | | | | | | ~~2A Berrien\*~~ | | | | | | | | | | 3B Orange | | | | | | | 5B Denver | | | | | 5B Weld | | | | | | | | | | | | | | | 2A Lake\* | | | | | | | | | 3A Bibb | | | | | | | | | | 3B Placer | | | | | | | 6B Dolores | | | | | 5B Yuma | | | | | | | | | | | | | | | 1A Lee\* | | | | | | | | | 3A Bleckley\* | | | | | | | | | | 5B | | | | | | | 5B Douglas | | | | | **CONNECTICUT** | | | | | | | | | | | | | | | 2A Leon\* | | | | | | | | | 2A Brantley\* | | | | | | | | | | ~~3B Riverside~~ | | | | | | | ~~6B Eagle~~ | | | | | 2A Levy\* | | | | | | | | | ~~2A Brooks\*~~ | | | | | | | | | | ~~3B Sacramento~~ | | | | | | | ~~5B Elbert~~ | | | | | ~~5A (all)~~ | | | | | | | | | | | | | | | 2A Liberty\* | | | | | | | | | ~~2A Bryan\*~~ | | | | | | | | | | ~~3C San Benito~~ | | | | | | | ~~5B El Paso~~ | | | | | **~~DELAWARE~~** | | | | | | | | | | | | | | | 2A Madison\* | | | | | | | | | ~~3A~~ | | | | | | | | | | ~~3B San Bernardino~~ | | | | | | | ~~5B Fremont~~ | | | | | 2A Manatee\* | | | | | | | | | ~~3A Burke~~ | | | | | | | | | | ~~3B San Diego~~ | | | | | | | ~~5B Garfield~~ | | | | | ~~4A (all)~~ | | | | | | | | | | | | | | | 2A Marion\* | | | | | | | | | ~~3A Butts~~ | | | | | | | | | | ~~3C San Francisco~~ | | | | | | | ~~5B Gilpin~~ | | | | | **~~DISTRICT OF  COLUMBIA~~** | | | | | | | | | | | | | | | 2A Martin\* | | | | | | | | | ~~3A Calhoun\*~~ | | | | | | | | | | ~~3B San Joaquin~~ | | | | | | | ~~7~~ | | | | | 1A Miami-Dade\* | | | | | | | | | ~~2A Camden\*~~ | | | | | | | | | | ~~3C San Luis Obispo~~ | | | | | | | ~~7 Gunnison~~ | | | | | ~~4A (all)~~ | | | | | | | | | | | | | | | 1A Monroe\* | | | | | | | | | ~~3A Candler\*~~ | | | | | | | | | | ~~3C San Mateo~~ | | | | | | | ~~7 Hinsdale~~ | | | | | **FLORIDA** | | | | | | | | | | | | | | | 2A Nassau\* | | | | | | | | | ~~3A Carroll~~ | | | | | | | | | | ~~3C Santa Barbara~~ | | | | | | | ~~5B Huerfano~~ | | | | | 2A Okaloosa\* | | | | | | | | | ~~4A Catoosa~~ | | | | | | | | | | ~~3C Santa Clara~~ | | | | | | | ~~7 Jackson~~ | | | | | 2A Alachua\* | | | | | | | | | | | | | | | 2A Okeechobee\* | | | | | | | | | ~~2A Charlton\*~~ | | | | | | | | | | ~~3C Santa Cruz~~ | | | | | | | ~~5B Jefferson~~ | | | | | 2A Baker\* | | | | | | | | | | | | | | | 2A Orange\* | | | | | | | | | ~~2A Chatham\*~~ | | | | | | | | | | ~~3B Shasta~~ | | | | | | | ~~5B Kiowa~~ | | | | | 2A Bay\* | | | | | | | | | | | | | | | 2A Osceola\* | | | | | | | | | ~~3A Chattahoochee\*~~ | | | | | | | | | | ~~5B Sierra~~ | | | | | | | ~~5B~~ | | | | | 2A Bradford\* | | | | | | | | | | | | | | | 1A Palm Beach\* | | | | | | | | | ~~4A Chattooga~~ | | | | | | | | | | ~~5B Siskiyou~~ | | | | | | | ~~7 Lake~~ | | | | | 2A Brevard\* | | | | | | | | | | | | | | | 2A Pasco\* | | | | | | | | | ~~3A Cherokee~~ | | | | | | | | | | ~~3B Solano~~ | | | | | | | ~~5B La Plata~~ | | | | | 1A Broward\* | | | | | | | | | | | | | | | 2A Pinellas\* | | | | | | | | | ~~3A Clarke~~ | | | | | | | | | | ~~3C Sonoma~~ | | | | | | | ~~5B Larimer~~ | | | | | 2A Calhoun\* | | | | | | | | | | | | | | | 2A Polk\* | | | | | | | | | ~~3A Clay\*~~ | | | | | | | | | | ~~3B Stanislaus~~ | | | | | | | ~~4B Las Animas~~ | | | | | 2A Charlotte\* | | | | | | | | | | | | | | | 2A Putnam\* | | | | | | | | | ~~3A Clayton~~ | | | | | | | | | | ~~3B Sutter~~ | | | | | | | ~~5B Lincoln~~ | | | | | 2A Citrus\* | | | | | | | | | | | | | | | 2A Santa Rosa\* | | | | | | | | | ~~2A Clinch\*~~ | | | | | | | | | | ~~3B Tehama~~ | | | | | | | ~~5B Logan~~ | | | | | 2A Clay\* | | | | | | | | | | | | | | | 2A Sarasota\* | | | | | | | | | ~~3A Cobb~~ | | | | | | | | | | ~~4B Trinity~~ | | | | | | | ~~5B~~ | | | | | 1A Collier\* | | | | | | | | | | | | | | | 2A Seminole\* | | | | | | | | | ~~3A Coffee\*~~ | | | | | | | | | | ~~3B Tulare~~ | | | | | | | ~~7 Mineral~~ | | | | | 2A Columbia\* | | | | | | | | | | | | | | | 2A St. Johns\* | | | | | | | | | ~~2A Colquitt\*~~ | | | | | | | | | | ~~4B Tuolumne~~ | | | | | | | ~~6B Moffat~~ | | | | | 2A DeSoto\* | | | | | | | | | | | | | | | 2A St. Lucie\* | | | | | | | | | ~~3A Columbia~~ | | | | | | | | | | ~~3C Ventura~~ | | | | | | | ~~5B Montezuma~~ | | | | | 2A Dixie\* | | | | | | | | | | | | | | | 2A Sumter\* | | | | | | | | | ~~2A Cook\*~~ | | | | | | | | | | ~~3B Yolo~~ | | | | | | | ~~5B Montrose~~ | | | | | 2A Duval\* | | | | | | | | | | | | | | | 2A Suwannee\* | | | | | | | | | ~~3A Coweta~~ | | | | | | | | | | *(continued)* ~~3A Crawford~~ | | | | | ~~2A Lanier\*~~ | | | | | | | | | | ~~3A Taylor\*~~ | | | | | | | | | | | | | ~~5B Cassia~~ | | | | | | | | | | | ~~4A Crawford~~ | | | | | | | ~~3A Crisp\*~~ | | | | | ~~3A Laurens\*~~ | | | | | | | | | | ~~3A Telfair\*~~ | | | | | | | | | | | | | ~~6B Clark~~ | | | | | | | | | | | ~~5A Cumberland~~ | | | | | | | ~~4A Dade~~ | | | | | ~~3A Lee\*~~ | | | | | | | | | | ~~3A Terrell\*~~ | | | | | | | | | | | | | ~~5B Clearwater~~ | | | | | | | | | | | ~~5A DeKalb~~ | | | | | | | ~~4A Dawson~~ | | | | | ~~2A Liberty\*~~ | | | | | | | | | | ~~2A Thomas\*~~ | | | | | | | | | | | | | ~~6B Custer~~ | | | | | | | | | | | ~~5A De Witt~~ | | | | | | | ~~2A Decatur\*~~ | | | | | ~~3A Lincoln~~ | | | | | | | | | | ~~3A Tift\*~~ | | | | | | | | | | | | | ~~5B Elmore~~ | | | | | | | | | | | ~~5A Douglas~~ | | | | | | | ~~3A DeKalb~~ | | | | | ~~2A Long\*~~ | | | | | | | | | | ~~2A Toombs\*~~ | | | | | | | | | | | | | ~~6B Franklin~~ | | | | | | | | | | | ~~5A DuPage~~ | | | | | | | ~~3A Dodge\*~~ | | | | | ~~2A Lowndes\*~~ | | | | | | | | | | ~~4A~~ | | | | | | | | | | | | | ~~6B Fremont~~ | | | | | | | | | | | ~~5A Edgar~~ | | | | | | | ~~3A Dooly\*~~ | | | | | ~~4A Lumpkin~~ | | | | | | | | | | ~~3A Treutlen\*~~ | | | | | | | | | | | | | ~~5B Gem~~ | | | | | | | | | | | ~~4A Edwards~~ | | | | | | | ~~3A Dougherty\*~~ | | | | | ~~3A Macon\*~~ | | | | | | | | | | ~~3A Troup~~ | | | | | | | | | | | | | ~~5B Gooding~~ | | | | | | | | | | | ~~4A Effingham~~ | | | | | | | ~~3A Douglas~~ | | | | | ~~3A Madison~~ | | | | | | | | | | ~~3A Turner\*~~ | | | | | | | | | | | | | ~~5B Idaho~~ | | | | | | | | | | | ~~4A Fayette~~ | | | | | | | ~~3A~~ | | | | | ~~3A Marion\*~~ | | | | | | | | | | ~~3A Twiggs\*~~ | | | | | | | | | | | | | ~~6B Jefferson~~ | | | | | | | | | | | ~~5A Ford~~ | | | | | | | ~~2A Echols\*~~ | | | | | ~~3A McDuffie~~ | | | | | | | | | | ~~4A Union~~ | | | | | | | | | | | | | ~~5B Jerome~~ | | | | | | | | | | | ~~4A Franklin~~ | | | | | | | ~~2A Effingham\*~~ | | | | | ~~2A McIntosh\*~~ | | | | | | | | | | ~~3A Upson~~ | | | | | | | | | | | | | ~~5B Kootenai~~ | | | | | | | | | | | ~~5A Fulton~~ | | | | | | | ~~3A Elbert~~ | | | | | ~~3A Meriwether~~ | | | | | | | | | | ~~4A Walker~~ | | | | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~4A Gallatin~~ | | | | | | | ~~3A Emanuel\*~~ | | | | | ~~2A Miller\*~~ | | | | | | | | | | ~~3A Walton~~ | | | | | | | | | | | | | ~~6B Lemhi~~ | | | | | | | | | | | ~~5A Greene~~ | | | | | | | ~~2A Evans\*~~ | | | | | ~~2A Mitchell\*~~ | | | | | | | | | | ~~2A Ware\*~~ | | | | | | | | | | | | | ~~5B Lewis~~ | | | | | | | | | | | ~~5A Grundy~~ | | | | | | | ~~4A Fannin~~ | | | | | ~~3A Monroe~~ | | | | | | | | | | ~~3A Warren~~ | | | | | | | | | | | | | ~~5B Lincoln~~ | | | | | | | | | | | ~~4A Hamilton~~ | | | | | | | ~~3A Fayette~~ | | | | | ~~3A~~ | | | | | | | | | | ~~3A Washington~~ | | | | | | | | | | | | | ~~6B Madison~~ | | | | | | | | | | | ~~5A Hancock~~ | | | | | | | ~~4A Floyd~~ | | | | | ~~3A Morgan~~ | | | | | | | | | | ~~2A Wayne\*~~ | | | | | | | | | | | | | ~~5B Minidoka~~ | | | | | | | | | | | ~~4A Hardin~~ | | | | | | | ~~3A Forsyth~~ | | | | | ~~4A Murray~~ | | | | | | | | | | ~~3A Webster\*~~ | | | | | | | | | | | | | ~~5B Nez Perce~~ | | | | | | | | | | | ~~5A Henderson~~ | | | | | | | ~~4A Franklin~~ | | | | | ~~3A Muscogee~~ | | | | | | | | | | ~~3A Wheeler\*~~ | | | | | | | | | | | | | ~~6B Oneida~~ | | | | | | | | | | | ~~5A Henry~~ | | | | | | | ~~3A Fulton~~ | | | | | ~~3A Newton~~ | | | | | | | | | | ~~4A White~~ | | | | | | | | | | | | | ~~5B Owyhee~~ | | | | | | | | | | | ~~5A Iroquois~~ | | | | | | | ~~4A Gilmer~~ | | | | | ~~3A Oconee~~ | | | | | | | | | | ~~4A Whitfield~~ | | | | | | | | | | | | | ~~5B Payette~~ | | | | | | | | | | | ~~4A Jackson~~ | | | | | | | ~~3A Glascock~~ | | | | | ~~3A Oglethorpe~~ | | | | | | | | | | ~~3A Wilcox\*~~ | | | | | | | | | | | | | ~~5B Power~~ | | | | | | | | | | | ~~4A Jasper~~ | | | | | | | ~~2A Glynn\*~~ | | | | | ~~3A Paulding~~ | | | | | | | | | | ~~3A Wilkes~~ | | | | | | | | | | | | | ~~5B Shoshone~~ | | | | | | | | | | | ~~4A Jefferson~~ | | | | | | | ~~4A Gordon~~ | | | | | ~~3A Peach\*~~ | | | | | | | | | | ~~3A Wilkinson~~ | | | | | | | | | | | | | ~~6B Teton~~ | | | | | | | | | | | ~~5A Jersey~~ | | | | | | | ~~2A Grady\*~~ | | | | | ~~4A Pickens~~ | | | | | | | | | | ~~3A Worth\*~~ | | | | | | | | | | | | | ~~5B Twin Falls~~ | | | | | | | | | | | ~~5A Jo Daviess~~ | | | | | | | ~~3A Greene~~ | | | | | ~~2A Pierce\*~~ | | | | | | | | | | **~~HAWAII~~** | | | | | | | | | | | | | ~~6B Valley~~ | | | | | | | | | | | ~~4A Johnson~~ | | | | | | | ~~3A~~ | | | | | ~~3A Pike~~ | | | | | | | | | | ~~5B Washington~~ | | | | | | | | | | | ~~5A Kane~~ | | | | | | | ~~4A Habersham~~ | | | | | ~~3A Polk~~ | | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | | | | | | **~~ILLINOIS~~** | | | | | | | | | | | ~~5A Kankakee~~ | | | | | | | ~~4A Hall~~ | | | | | ~~3A Pulaski\*~~ | | | | | | | | | | **~~IDAHO~~** | | | | | | | | | | | | | ~~5A Kendall~~ | | | | | | | ~~3A Hancock~~ | | | | | ~~3A Putnam~~ | | | | | | | | | | ~~5A Adams~~ | | | | | | | | | | | ~~5A Knox~~ | | | | | | | ~~3A Haralson~~ | | | | | ~~3A Quitman\*~~ | | | | | | | | | | ~~5B~~ | | | | | | | | | | | | | ~~4A Alexander~~ | | | | | | | | | | | ~~5A Lake~~ | | | | | | | ~~3A Harris~~ | | | | | ~~4A Rabun~~ | | | | | | | | | | ~~6B Adams~~ | | | | | | | | | | | | | ~~4A Bond~~ | | | | | | | | | | | ~~5A La Salle~~ | | | | | | | ~~3A Hart~~ | | | | | ~~3A Randolph\*~~ | | | | | | | | | | ~~6B Bannock~~ | | | | | | | | | | | | | ~~5A Boone~~ | | | | | | | | | | | ~~4A Lawrence~~ | | | | | | | ~~3A Heard~~ | | | | | ~~3A Richmond~~ | | | | | | | | | | ~~6B Bear Lake~~ | | | | | | | | | | | | | ~~5A Brown~~ | | | | | | | | | | | ~~5A Lee~~ | | | | | | | ~~3A Henry~~ | | | | | ~~3A~~ | | | | | | | | | | ~~5B Benewah~~ | | | | | | | | | | | | | ~~5A Bureau~~ | | | | | | | | | | | ~~5A Livingston~~ | | | | | | | ~~3A Houston\*~~ | | | | | ~~3A Schley\*~~ | | | | | | | | | | ~~6B Bingham~~ | | | | | | | | | | | | | ~~5A Calhoun~~ | | | | | | | | | | | ~~5A Logan~~ | | | | | | | ~~3A Irwin\*~~ | | | | | ~~3A Screven\*~~ | | | | | | | | | | ~~6B Blaine~~ | | | | | | | | | | | | | ~~5A Carroll~~ | | | | | | | | | | | ~~5A Macon~~ | | | | | | | ~~3A Jackson~~ | | | | | ~~2A Seminole\*~~ | | | | | | | | | | ~~6B Boise~~ | | | | | | | | | | | | | ~~5A Cass~~ | | | | | | | | | | | ~~4A Macoupin~~ | | | | | | | ~~3A Jasper~~ | | | | | ~~3A Spalding~~ | | | | | | | | | | ~~6B Bonner~~ | | | | | | | | | | | | | ~~5A Champaign~~ | | | | | | | | | | | ~~4A Madison~~ | | | | | | | ~~2A Jeff Davis\*~~ | | | | | ~~4A Stephens~~ | | | | | | | | | | ~~6B Bonneville~~ | | | | | | | | | | | | | ~~4A Christian~~ | | | | | | | | | | | ~~4A Marion~~ | | | | | | | ~~3A Jefferson~~ | | | | | ~~3A Stewart\*~~ | | | | | | | | | | ~~6B Boundary~~ | | | | | | | | | | | | | ~~5A Clark~~ | | | | | | | | | | | ~~5A Marshall~~ | | | | | | | ~~3A Jenkins\*~~ | | | | | ~~3A~~ | | | | | | | | | | ~~6B Butte~~ | | | | | | | | | | | | | ~~4A Clay~~ | | | | | | | | | | | ~~5A Mason~~ | | | | | | | ~~3A Johnson\*~~ | | | | | ~~3A Talbot~~ | | | | | | | | | | ~~6B Camas~~ | | | | | | | | | | | | | ~~4A Clinton~~ | | | | | | | | | | | ~~4A Massac~~ | | | | | | | ~~3A Jones~~ | | | | | ~~3A Taliaferro~~ | | | | | | | | | | ~~5B Canyon~~ | | | | | | | | | | | | | ~~5A Coles~~ | | | | | | | | | | | ~~5A McDonough~~ | | | | | | | ~~3A Lamar~~ | | | | | ~~2A Tattnall\*~~ | | | | | | | | | | ~~6B Caribou~~ | | | | | | | | | | | | | ~~5A Cook~~ | | | | | | | | | | | ~~5A McHenry~~ | | | | | | | ~~A McLean~~ | | | | | | | | ~~5A Boone~~ | | | | | | | ~~5A Miami~~ | | | | | | | | | | | | | | ~~5A Appanoose~~ | | | | | | | | ~~5A Jasper~~ | | | | | | | | | ~~5A Menard~~ | | | | | | | | ~~4A Brown~~ | | | | | | | ~~4A Monroe~~ | | | | | | | | | | | | | | ~~5A Audubon~~ | | | | | | | | ~~5A Jefferson~~ | | | | | | | | | ~~5A Mercer~~ | | | | | | | | ~~5A Carroll~~ | | | | | | | ~~5A Montgomery~~ | | | | | | | | | | | | | | ~~5A Benton~~ | | | | | | | | ~~5A Johnson~~ | | | | | | | | | ~~4A Monroe~~ | | | | | | | | ~~5A Cass~~ | | | | | | | ~~5A Morgan~~ | | | | | | | | | | | | | | ~~6A Black Hawk~~ | | | | | | | | ~~5A Jones~~ | | | | | | | | | ~~4A Montgomery~~ | | | | | | | | ~~4A Clark~~ | | | | | | | ~~5A Newton~~ | | | | | | | | | | | | | | ~~5A Boone~~ | | | | | | | | ~~5A Keokuk~~ | | | | | | | | | ~~5A Morgan~~ | | | | | | | | ~~5A Clay~~ | | | | | | | ~~5A Noble~~ | | | | | | | | | | | | | | ~~6A Bremer~~ | | | | | | | | ~~6A Kossuth~~ | | | | | | | | | ~~5A Moultrie~~ | | | | | | | | ~~5A Clinton~~ | | | | | | | ~~4A Ohio~~ | | | | | | | | | | | | | | ~~6A Buchanan~~ | | | | | | | | ~~5A Lee~~ | | | | | | | | | ~~5A Ogle~~ | | | | | | | | ~~4A Crawford~~ | | | | | | | ~~4A Orange~~ | | | | | | | | | | | | | | ~~6A Buena Vista~~ | | | | | | | | ~~5A Linn~~ | | | | | | | | | ~~5A Peoria~~ | | | | | | | | ~~4A Daviess~~ | | | | | | | ~~5A Owen~~ | | | | | | | | | | | | | | ~~6A Butler~~ | | | | | | | | ~~5A~~ | | | | | | | | | ~~4A Perry~~ | | | | | | | | ~~4A Dearborn~~ | | | | | | | ~~5A Parke~~ | | | | | | | | | | | | | | ~~6A Calhoun~~ | | | | | | | | ~~5A Lucas~~ | | | | | | | | | ~~5A Piatt~~ | | | | | | | | ~~5A Decatur~~ | | | | | | | ~~4A Perry~~ | | | | | | | | | | | | | | ~~5A Carroll~~ | | | | | | | | ~~6A Lyon~~ | | | | | | | | | ~~5A Pike~~ | | | | | | | | ~~5A De Kalb~~ | | | | | | | ~~4A Pike~~ | | | | | | | | | | | | | | ~~5A Cass~~ | | | | | | | | ~~5A Madison~~ | | | | | | | | | ~~4A Pope~~ | | | | | | | | ~~5A Delaware~~ | | | | | | | ~~5A Porter~~ | | | | | | | | | | | | | | ~~5A Cedar~~ | | | | | | | | ~~5A Mahaska~~ | | | | | | | | | ~~4A Pulaski~~ | | | | | | | | ~~4A Dubois~~ | | | | | | | ~~4A Posey~~ | | | | | | | | | | | | | | ~~6A Cerro Gordo~~ | | | | | | | | ~~5A Marion~~ | | | | | | | | | ~~5A Putnam~~ | | | | | | | | ~~5A Elkhart~~ | | | | | | | ~~5A Pulaski~~ | | | | | | | | | | | | | | ~~6A Cherokee~~ | | | | | | | | ~~5A Marshall~~ | | | | | | | | | ~~4A Randolph~~ | | | | | | | | ~~5A Fayette~~ | | | | | | | ~~5A Putnam~~ | | | | | | | | | | | | | | ~~6A Chickasaw~~ | | | | | | | | ~~5A Mills~~ | | | | | | | | | ~~4A Richland~~ | | | | | | | | ~~4A Floyd~~ | | | | | | | ~~5A Randolph~~ | | | | | | | | | | | | | | ~~5A Clarke~~ | | | | | | | | ~~6A Mitchell~~ | | | | | | | | | ~~5A Rock Island~~ | | | | | | | | ~~5A Fountain~~ | | | | | | | ~~4A Ripley~~ | | | | | | | | | | | | | | ~~6A Clay~~ | | | | | | | | ~~5A Monona~~ | | | | | | | | | ~~4A Saline~~ | | | | | | | | ~~5A Franklin~~ | | | | | | | ~~5A Rush~~ | | | | | | | | | | | | | | ~~6A Clayton~~ | | | | | | | | ~~5A Monroe~~ | | | | | | | | | ~~5A Sangamon~~ | | | | | | | | ~~5A Fulton~~ | | | | | | | ~~4A Scott~~ | | | | | | | | | | | | | | ~~5A Clinton~~ | | | | | | | | ~~5A Montgomery~~ | | | | | | | | | ~~5A Schuyler~~ | | | | | | | | ~~4A Gibson~~ | | | | | | | ~~5A Shelby~~ | | | | | | | | | | | | | | ~~5A Crawford~~ | | | | | | | | ~~5A Muscatine~~ | | | | | | | | | ~~5A Scott~~ | | | | | | | | ~~5A Grant~~ | | | | | | | ~~4A Spencer~~ | | | | | | | | | | | | | | ~~5A Dallas~~ | | | | | | | | ~~6A O’Brien~~ | | | | | | | | | ~~4A Shelby~~ | | | | | | | | ~~4A Greene~~ | | | | | | | ~~5A Starke~~ | | | | | | | | | | | | | | ~~5A Davis~~ | | | | | | | | ~~6A Osceola~~ | | | | | | | | | ~~5A Stark~~ | | | | | | | | ~~5A Hamilton~~ | | | | | | | ~~5A Steuben~~ | | | | | | | | | | | | | | ~~5A~~ | | | | | | | | ~~5A Page~~ | | | | | | | | | ~~4A St. Clair~~ | | | | | | | | ~~5A Hancock~~ | | | | | | | ~~5A St. Joseph~~ | | | | | | | | | | | | | | ~~6A Delaware~~ | | | | | | | | ~~6A Palo Alto~~ | | | | | | | | | ~~5A Stephenson~~ | | | | | | | | ~~4A Harrison~~ | | | | | | | ~~4A Sullivan~~ | | | | | | | | | | | | | | ~~5A Des Moines~~ | | | | | | | | ~~6A Plymouth~~ | | | | | | | | | ~~5A Tazewell~~ | | | | | | | | ~~5A Hendricks~~ | | | | | | | ~~4A Switzerland~~ | | | | | | | | | | | | | | ~~6A Dickinson~~ | | | | | | | | ~~6A~~ | | | | | | | | | ~~4A Union~~ | | | | | | | | ~~5A Henry~~ | | | | | | | ~~5A Tippecanoe~~ | | | | | | | | | | | | | | ~~5A Dubuque~~ | | | | | | | | ~~5A Polk~~ | | | | | | | | | ~~5A Vermilion~~ | | | | | | | | ~~5A Howard~~ | | | | | | | ~~5A Tipton~~ | | | | | | | | | | | | | | ~~6A Emmet~~ | | | | | | | | ~~5A Pottawattamie~~ | | | | | | | | | ~~4A Wabash~~ | | | | | | | | ~~5A Huntington~~ | | | | | | | ~~5A Union~~ | | | | | | | | | | | | | | ~~6A Fayette~~ | | | | | | | | ~~5A Poweshiek~~ | | | | | | | | | ~~5A Warren~~ | | | | | | | | ~~4A Jackson~~ | | | | | | | ~~4A Vanderburgh~~ | | | | | | | | | | | | | | ~~6A Floyd~~ | | | | | | | | ~~5A Ringgold~~ | | | | | | | | | ~~4A Washington~~ | | | | | | | | ~~5A Jasper~~ | | | | | | | ~~5A Vermillion~~ | | | | | | | | | | | | | | ~~6A Franklin~~ | | | | | | | | ~~6A Sac~~ | | | | | | | | | ~~4A Wayne~~ | | | | | | | | ~~5A Jay~~ | | | | | | | ~~5A Vigo~~ | | | | | | | | | | | | | | ~~5A Fremont~~ | | | | | | | | ~~5A Scott~~ | | | | | | | | | ~~4A White~~ | | | | | | | | ~~4A Jefferson~~ | | | | | | | ~~5A Wabash~~ | | | | | | | | | | | | | | ~~5A Greene~~ | | | | | | | | ~~5A Shelby~~ | | | | | | | | | ~~5A~~ | | | | | | | | ~~4A Jennings~~ | | | | | | | ~~5A Warren~~ | | | | | | | | | | | | | | ~~6A Grundy~~ | | | | | | | | ~~6A Sioux~~ | | | | | | | | | ~~5A Will~~ | | | | | | | | ~~5A Johnson~~ | | | | | | | ~~4A Warrick~~ | | | | | | | | | | | | | | ~~5A Guthrie~~ | | | | | | | | ~~5A Story~~ | | | | | | | | | ~~4A Williamson~~ | | | | | | | | ~~4A Knox~~ | | | | | | | ~~4A Washington~~ | | | | | | | | | | | | | | ~~6A Hamilton~~ | | | | | | | | ~~5A Tama~~ | | | | | | | | | ~~5A Winnebago~~ | | | | | | | | ~~5A Kosciusko~~ | | | | | | | ~~5A Wayne~~ | | | | | | | | | | | | | | ~~6A Hancock~~ | | | | | | | | ~~5A Taylor~~ | | | | | | | | | ~~5A Woodford~~ | | | | | | | | ~~5A Lagrange~~ | | | | | | | ~~5A Wells~~ | | | | | | | | | | | | | | ~~6A Hardin~~ | | | | | | | | ~~5A Union~~ | | | | | | | | | **~~INDIANA~~** | | | | | | | | ~~5A Lake~~ | | | | | | | ~~5A White~~ | | | | | | | | | | | | | | ~~5A Harrison~~ | | | | | | | | ~~5A Van Buren~~ | | | | | | | | | ~~5A La Porte~~ | | | | | | | ~~5A Whitley~~ | | | | | | | | | | | | | | ~~5A Henry~~ | | | | | | | | ~~5A Wapello~~ | | | | | | | | | ~~5A Adams~~ | | | | | | | | ~~4A Lawrence~~ | | | | | | | **~~IOWA~~** | | | | | | | | | | | | | | ~~6A Howard~~ | | | | | | | | ~~5A~~ | | | | | | | | | ~~5A Allen~~ | | | | | | | | ~~5A Madison~~ | | | | | | | ~~6A Humboldt~~ | | | | | | | | ~~5A Washington~~ | | | | | | | | | ~~5A Bartholomew~~ | | | | | | | | ~~5A Marion~~ | | | | | | | ~~5A Adair~~ | | | | | | | | | | | | | | ~~6A Ida~~ | | | | | | | | ~~5A Wayne~~ | | | | | | | | | ~~5A Benton~~ | | | | | | | | ~~5A Marshall~~ | | | | | | | ~~5A Adams~~ | | | | | | | | | | | | | | ~~5A Iowa~~ | | | | | | | | ~~6A Webster~~ | | | | | | | | | ~~5A Blackford~~ | | | | | | | | ~~4A Martin~~ | | | | | | | ~~6A Allamakee~~ | | | | | | | | | | | | | | ~~5A~~ | | | | | | | | ~~6A Winnebago~~ | | | | | | | | | ~~6A Winneshiek~~ | | | | | | | | | ~~4A Haskell~~ | | | | | | ~~4A Sedgwick~~ | | | | | | | | ~~2A~~ | | | | | | | | | | | ~~6A Cumberland~~ | | | | | | | | | | | | ~~5A Woodbury~~ | | | | | | | | | ~~4A Hodgeman~~ | | | | | | ~~4A Seward~~ | | | | | | | | ~~3A Jackson\*~~ | | | | | | | | | | | ~~6A Franklin~~ | | | | | | | | | | | | ~~6A Worth~~ | | | | | | | | | ~~4A Jackson~~ | | | | | | ~~4A Shawnee~~ | | | | | | | | ~~2A Jefferson\*~~ | | | | | | | | | | | ~~6A Hancock~~ | | | | | | | | | | | | ~~6A Wright~~ | | | | | | | | | ~~4A Jefferson~~ | | | | | | ~~5A Sheridan~~ | | | | | | | | ~~2A Jefferson Davis\*~~ | | | | | | | | | | | ~~6A Kennebec~~ | | | | | | | | | | | | **~~KANSAS~~** | | | | | | | | | ~~5A Jewell~~ | | | | | | ~~5A Sherman~~ | | | | | | | | ~~2A Lafayette\*~~ | | | | | | | | | | | ~~6A Knox~~ | | | | | | | | | | | | ~~4A Johnson~~ | | | | | | ~~5A Smith~~ | | | | | | | | ~~2A Lafourche\*~~ | | | | | | | | | | | ~~6A Lincoln~~ | | | | | | | | | | | | ~~4A Allen~~ | | | | | | | | | ~~4A Kearny~~ | | | | | | ~~4A Stafford~~ | | | | | | | | ~~3A La Salle\*~~ | | | | | | | | | | | ~~6A Oxford~~ | | | | | | | | | | | | ~~4A Anderson~~ | | | | | | | | | ~~4A Kingman~~ | | | | | | ~~4A Stanton~~ | | | | | | | | ~~3A Lincoln\*~~ | | | | | | | | | | | ~~6A Penobscot~~ | | | | | | | | | | | | ~~4A Atchison~~ | | | | | | | | | ~~4A Kiowa~~ | | | | | | ~~4A Stevens~~ | | | | | | | | ~~2A Livingston\*~~ | | | | | | | | | | | ~~6A Piscataquis~~ | | | | | | | | | | | | ~~4A Barber~~ | | | | | | | | | ~~4A Labette~~ | | | | | | ~~4A Sumner~~ | | | | | | | | ~~3A Madison\*~~ | | | | | | | | | | | ~~6A Sagadahoc~~ | | | | | | | | | | | | ~~4A Barton~~ | | | | | | | | | ~~5A Lane~~ | | | | | | ~~5A Thomas~~ | | | | | | | | ~~3A Morehouse~~ | | | | | | | | | | | ~~6A Somerset~~ | | | | | | | | | | | | ~~4A Bourbon~~ | | | | | | | | | ~~4A~~ | | | | | | ~~5A Trego~~ | | | | | | | | ~~3A Natchitoches\*~~ | | | | | | | | | | | ~~6A Waldo~~ | | | | | | | | | | | | ~~4A Brown~~ | | | | | | | | | ~~4A Lincoln~~ | | | | | | ~~4A Wabaunsee~~ | | | | | | | | ~~2A Orleans\*~~ | | | | | | | | | | | ~~6A Washington~~ | | | | | | | | | | | | ~~4A Butler~~ | | | | | | | | | ~~4A Linn~~ | | | | | | ~~5A Wallace~~ | | | | | | | | ~~3A Ouachita\*~~ | | | | | | | | | | | ~~6A York~~ | | | | | | | | | | | | ~~4A Chase~~ | | | | | | | | | ~~5A Logan~~ | | | | | | ~~4A Washington~~ | | | | | | | | ~~2A Plaquemines\*~~ | | | | | | | | | | | **~~MARYLAND~~** | | | | | | | | | | | | ~~4A Chautauqua~~ | | | | | | | | | ~~4A Lyon~~ | | | | | | ~~5A Wichita~~ | | | | | | | | ~~2A Pointe Coupee\*~~ | | | | | | | | | | | | ~~4A Cherokee~~ | | | | | | | | | ~~4A Marion~~ | | | | | | ~~4A Wilson~~ | | | | | | | | ~~2A Rapides\*~~ | | | | | | | | | | | ~~4A Allegany~~ | | | | | | | | | | | | ~~5A Cheyenne~~ | | | | | | | | | ~~4A Marshall~~ | | | | | | ~~4A Woodson~~ | | | | | | | | ~~3A Red River\*~~ | | | | | | | | | | | ~~4A Anne Arundel~~ | | | | | | | | | | | | ~~4A Clark~~ | | | | | | | | | ~~4A~~ | | | | | | ~~4A Wyandotte~~ | | | | | | | | ~~3A Richland\*~~ | | | | | | | | | | | ~~4A Baltimore~~ | | | | | | | | | | | | ~~4A Clay~~ | | | | | | | | | ~~4A Meade~~ | | | | | | **~~KENTUCKY~~** | | | | | | | | ~~3A Sabine\*~~ | | | | | | | | | | | ~~4A Baltimore (city)~~ | | | | | | | | | | | | ~~5A Cloud~~ | | | | | | | | | ~~4A Miami~~ | | | | | | ~~2A St. Bernard\*~~ | | | | | | | | | | | ~~4A Calvert~~ | | | | | | | | | | | | ~~4A Coffey~~ | | | | | | | | | ~~5A Mitchell~~ | | | | | | ~~4A (all)~~ | | | | | | | | ~~2A St. Charles\*~~ | | | | | | | | | | | ~~4A~~ | | | | | | | | | | | | ~~4A Comanche~~ | | | | | | | | | ~~4A Montgomery~~ | | | | | | **~~LOUISIANA~~** | | | | | | | | ~~2A St. Helena\*~~ | | | | | | | | | | | ~~4A Carroll~~ | | | | | | | | | | | | ~~4A Cowley~~ | | | | | | | | | ~~4A Morris~~ | | | | | | ~~2A St. James\*~~ | | | | | | | | | | | ~~4A Cecil~~ | | | | | | | | | | | | ~~4A Crawford~~ | | | | | | | | | ~~4A Morton~~ | | | | | | ~~2A Acadia\*~~ | | | | | | | | ~~2A St. John~~ | | | | | | | | | | | ~~4A Charles~~ | | | | | | | | | | | | ~~5A Decatur~~ | | | | | | | | | ~~4A Nemaha~~ | | | | | | ~~2A~~ | | | | | | | | ~~the Baptist\*~~ | | | | | | | | | | | ~~4A Dorchester~~ | | | | | | | | | | | | ~~4A Dickinson~~ | | | | | | | | | ~~4A Neosho~~ | | | | | | ~~2A Ascension\*~~ | | | | | | | | ~~2A St. Landry\*~~ | | | | | | | | | | | ~~4A Frederick~~ | | | | | | | | | | | | ~~4A Doniphan~~ | | | | | | | | | ~~5A Ness~~ | | | | | | ~~2A Assumption\*~~ | | | | | | | | ~~2A St. Martin\*~~ | | | | | | | | | | | ~~5A Garrett~~ | | | | | | | | | | | | ~~4A Douglas~~ | | | | | | | | | ~~5A Norton~~ | | | | | | ~~2A Avoyelles\*~~ | | | | | | | | ~~2A~~ | | | | | | | | | | | ~~4A Harford~~ | | | | | | | | | | | | ~~4A Edwards~~ | | | | | | | | | ~~4A Osage~~ | | | | | | ~~2A Beauregard\*~~ | | | | | | | | ~~2A St. Tammany\*~~ | | | | | | | | | | | ~~4A Howard~~ | | | | | | | | | | | | ~~4A Elk~~ | | | | | | | | | ~~5A Osborne~~ | | | | | | ~~3A Bienville\*~~ | | | | | | | | ~~2A Tangipahoa\*~~ | | | | | | | | | | | ~~4A Kent~~ | | | | | | | | | | | | ~~5A Ellis~~ | | | | | | | | | ~~4A Ottawa~~ | | | | | | ~~3A Bossier\*~~ | | | | | | | | ~~3A Tensas\*~~ | | | | | | | | | | | ~~4A Montgomery~~ | | | | | | | | | | | | ~~4A~~ | | | | | | | | | ~~4A Pawnee~~ | | | | | | ~~3A Caddo\*~~ | | | | | | | | ~~2A Terrebonne\*~~ | | | | | | | | | | | ~~4A Prince George’s~~ | | | | | | | | | | | | ~~4A Finney~~ | | | | | | | | | ~~5A Phillips~~ | | | | | | ~~2A Calcasieu\*~~ | | | | | | | | ~~3A Union\*~~ | | | | | | | | | | | ~~4A Queen Anne’s~~ | | | | | | | | | | | | ~~4A Ford~~ | | | | | | | | | ~~4A Pottawatomie~~ | | | | | | ~~3A Caldwell\*~~ | | | | | | | | ~~2A Vermilion\*~~ | | | | | | | | | | | ~~4A Somerset~~ | | | | | | | | | | | | ~~4A Franklin~~ | | | | | | | | | ~~4A~~ | | | | | | ~~2A Cameron\*~~ | | | | | | | | ~~3A Vernon\*~~ | | | | | | | | | | | ~~4A St. Mary’s~~ | | | | | | | | | | | | ~~4A Geary~~ | | | | | | | | | ~~5A Rawlins~~ | | | | | | ~~3A Catahoula\*~~ | | | | | | | | ~~2A Washington\*~~ | | | | | | | | | | | ~~4A Talbot~~ | | | | | | | | | | | | ~~5A Gove~~ | | | | | | | | | ~~4A Reno~~ | | | | | | ~~3A Claiborne\*~~ | | | | | | | | ~~3A Webster\*~~ | | | | | | | | | | | ~~4A Washington~~ | | | | | | | | | | | | ~~5A Graham~~ | | | | | | | | | ~~5A Republic~~ | | | | | | ~~3A Concordia\*~~ | | | | | | | | ~~2A~~ | | | | | | | | | | | ~~4A Wicomico~~ | | | | | | | | | | | | ~~4A Grant~~ | | | | | | | | | ~~4A Rice~~ | | | | | | ~~3A De Soto\*~~ | | | | | | | |  | | | | | | | | | | | ~~4A Worcester~~ | | | | | | | | | | | | ~~4A Gray~~ | | | | | | | | | ~~4A Riley~~ | | | | | | ~~2A East Baton Rouge\*~~ | | | | | | | | ~~3A West Carroll~~ | | | | | | | | | | | **~~MASSACHSETTS~~** | | | | | | | | | | | | ~~5A Greeley~~ | | | | | | | | | ~~5A Rooks~~ | | | | | | ~~3A East Carroll~~ | | | | | | | | ~~2A West Feliciana~~ | | | | | | | | | | | | ~~4A~~ | | | | | | | | | ~~4A Rush~~ | | | | | | ~~2A East Feliciana\*~~ | | | | | | | | ~~3A Winn\*~~ | | | | | | | | | | | ~~5A (all)~~ | | | | | | | | | | | | ~~5A Hamilton~~ | | | | | | | | | ~~4A Russell~~ | | | | | | ~~2A Evangeline~~ | | | | | | | | **~~MAINE~~** | | | | | | | | | | | **~~MICHIGAN~~** | | | | | | | | | | | | ~~4A Harper~~ | | | | | | | | | ~~4A Saline~~ | | | | | | ~~3A Franklin\*~~ | | | | | | | | | ~~4A Harvey~~ | | | | | | | | | ~~5A Scott~~ | | | | | | ~~3A Grant\*~~ | | | | | | | | ~~6A Androscoggin~~ | | | | | | | | | | | ~~6A Alcona~~ | | | | | | | | | | | | ~~2A~~ | | | | | | | | | ~~7 Aroostook~~ | | | | | | ~~6A Alger~~ | | | | | | | |  | | | | | | | | | | |  | | | | | | | | | | | | ~~5A Allegan~~ | ~~7 Mackinac~~ | | | | | | | | | | | | | | ~~6A Carver~~ | | | | | | | | | ~~7 Otter Tail~~ | | | | | | | | | | | | | | | | | | ~~3A Clarke~~ | | | | ~~6A Alpena~~ | ~~5A Macomb~~ | | | | | | | | | | | | | | ~~7 Cass~~ | | | | | | | | | ~~7 Pennington~~ | | | | | | | | | | | | | | | | | | ~~3A Clay~~ | | | | ~~6A Antrim~~ | ~~6A Manistee~~ | | | | | | | | | | | | | | ~~6A Chippewa~~ | | | | | | | | | ~~7 Pine~~ | | | | | | | | | | | | | | | | | | ~~3A Coahoma~~ | | | | ~~6A Arenac~~ | ~~6A Marquette~~ | | | | | | | | | | | | | | ~~6A Chisago~~ | | | | | | | | | ~~6A Pipestone~~ | | | | | | | | | | | | | | | | | | ~~3A Copiah\*~~ | | | | ~~7 Baraga~~ | ~~6A~~ | | | | | | | | | | | | | | ~~7 Clay~~ | | | | | | | | | ~~7 Polk~~ | | | | | | | | | | | | | | | | | | ~~3A Covington\*~~ | | | | ~~5A Barry~~ | ~~6A Mecosta~~ | | | | | | | | | | | | | | ~~7 Clearwater~~ | | | | | | | | | ~~6A Pope~~ | | | | | | | | | | | | | | | | | | ~~3A DeSoto~~ | | | | ~~5A Bay~~ | ~~6A Menominee~~ | | | | | | | | | | | | | | ~~7 Cook~~ | | | | | | | | | ~~6A Ramsey~~ | | | | | | | | | | | | | | | | | | ~~3A Forrest\*~~ | | | | ~~6A Benzie~~ | ~~5A Midland~~ | | | | | | | | | | | | | | ~~6A Cottonwood~~ | | | | | | | | | ~~7 Red Lake~~ | | | | | | | | | | | | | | | | | | ~~3A Franklin\*~~ | | | | ~~5A Berrien~~ | ~~6A Missaukee~~ | | | | | | | | | | | | | | ~~7 Crow Wing~~ | | | | | | | | | ~~6A Redwood~~ | | | | | | | | | | | | | | | | | | ~~3A George\*~~ | | | | ~~5A Branch~~ | ~~5A Monroe~~ | | | | | | | | | | | | | | ~~6A Dakota~~ | | | | | | | | | ~~6A Renville~~ | | | | | | | | | | | | | | | | | | ~~3A Greene\*~~ | | | | ~~5A Calhoun~~ | ~~5A Montcalm~~ | | | | | | | | | | | | | | ~~6A Dodge~~ | | | | | | | | | ~~6A Rice~~ | | | | | | | | | | | | | | | | | | ~~3A Grenada~~ | | | | ~~5A Cass~~ | ~~6A Montmorency~~ | | | | | | | | | | | | | | ~~6A Douglas~~ | | | | | | | | | ~~6A~~ | | | | | | | | | | | | | | | | | | ~~2A Hancock\*~~ | | | | ~~6A Charlevoix~~ | ~~5A Muskegon~~ | | | | | | | | | | | | | | ~~6A Faribault~~ | | | | | | | | | ~~7 Roseau~~ | | | | | | | | | | | | | | | | | | ~~2A Harrison\*~~ | | | | ~~6A Cheboygan~~ | ~~6A Newaygo~~ | | | | | | | | | | | | | | ~~6A Fillmore~~ | | | | | | | | | ~~6A Scott~~ | | | | | | | | | | | | | | | | | | ~~3A Hinds\*~~ | | | | ~~7 Chippewa~~ | ~~5A Oakland~~ | | | | | | | | | | | | | | ~~6A Freeborn~~ | | | | | | | | | ~~6A Sherburne~~ | | | | | | | | | | | | | | | | | | ~~3A Holmes~~ | | | | ~~6A Clare~~ | ~~6A Oceana~~ | | | | | | | | | | | | | | ~~6A Goodhue~~ | | | | | | | | | ~~6A Sibley~~ | | | | | | | | | | | | | | | | | | ~~3A Humphreys~~ | | | | ~~5A Clinton~~ | ~~6A Ogemaw~~ | | | | | | | | | | | | | | ~~7 Grant~~ | | | | | | | | | ~~6A Stearns~~ | | | | | | | | | | | | | | | | | | ~~3A Issaquena~~ | | | | ~~6A Crawford~~ | ~~7 Ontonagon~~ | | | | | | | | | | | | | | ~~6A Hennepin~~ | | | | | | | | | ~~6A Steele~~ | | | | | | | | | | | | | | | | | | ~~3A Itawamba~~ | | | | ~~6A Delta~~ | ~~6A Osceola~~ | | | | | | | | | | | | | | ~~6A Houston~~ | | | | | | | | | ~~6A Stevens~~ | | | | | | | | | | | | | | | | | | ~~2A~~ | | | | ~~6A Dickinson~~ | ~~6A Oscoda~~ | | | | | | | | | | | | | | ~~7 Hubbard~~ | | | | | | | | | ~~7St. Louis~~ | | | | | | | | | | | | | | | | | | ~~3A Jasper~~ | | | | ~~5A Eaton~~ | ~~6A Otsego~~ | | | | | | | | | | | | | | ~~6A Isanti~~ | | | | | | | | | ~~6A Swift~~ | | | | | | | | | | | | | | | | | | ~~3A Jefferson\*~~ | | | | ~~6A Emmet~~ | ~~5A Ottawa~~ | | | | | | | | | | | | | | ~~7 Itasca~~ | | | | | | | | | ~~6A Todd~~ | | | | | | | | | | | | | | | | | | ~~3A Jefferson Davis\*~~ | | | | ~~5A Genesee~~ | ~~6A Presque Isle~~ | | | | | | | | | | | | | | ~~6A Jackson~~ | | | | | | | | | ~~6A Traverse~~ | | | | | | | | | | | | | | | | | | ~~3A Jones\*~~ | | | | ~~6A Gladwin~~ | ~~6A Roscommon~~ | | | | | | | | | | | | | | ~~7 Kanabec~~ | | | | | | | | | ~~6A Wabasha~~ | | | | | | | | | | | | | | | | | | ~~3A Kemper~~ | | | | ~~7 Gogebic~~ | ~~5A Saginaw~~ | | | | | | | | | | | | | | ~~6A Kandiyohi~~ | | | | | | | | | ~~7 Wadena~~ | | | | | | | | | | | | | | | | | | ~~3A Lafayette~~ | | | | ~~6A Grand Traverse~~ | ~~6A Sanilac~~ | | | | | | | | | | | | | | ~~7 Kittson~~ | | | | | | | | | ~~6A Waseca~~ | | | | | | | | | | | | | | | | | | ~~3A~~ | | | | ~~5A Gratiot~~ | ~~7 Schoolcraft~~ | | | | | | | | | | | | | | ~~7 Koochiching~~ | | | | | | | | | ~~6A Washington~~ | | | | | | | | | | | | | | | | | | ~~3A Lauderdale~~ | | | | ~~5A Hillsdale~~ | ~~5A Shiawassee~~ | | | | | | | | | | | | | | ~~6A Lac qui Parle~~ | | | | | | | | | ~~6A Watonwan~~ | | | | | | | | | | | | | | | | | | ~~3A Lawrence\*~~ | | | | ~~7 Houghton~~ | ~~5A St. Clair~~ | | | | | | | | | | | | | | ~~7 Lake~~ | | | | | | | | | ~~7 Wilkin~~ | | | | | | | | | | | | | | | | | | ~~3A Leake~~ | | | | ~~6A Huron~~ | ~~5A St. Joseph~~ | | | | | | | | | | | | | | ~~7 Lake of the Woods~~ | | | | | | | | | ~~6A Winona~~ | | | | | | | | | | | | | | | | | | ~~3A Lee~~ | | | | ~~5A Ingham~~ | ~~5A Tuscola~~ | | | | | | | | | | | | | | ~~6A Le Sueur~~ | | | | | | | | | ~~6A Wright~~ | | | | | | | | | | | | | | | | | | ~~3A Leflore~~ | | | | ~~5A Ionia~~ | ~~5A Van Buren~~ | | | | | | | | | | | | | | ~~6A Lincoln~~ | | | | | | | | | ~~6A Yellow~~ | | | | | | | | | | | | | | | | | | ~~3A Lincoln\*~~ | | | | ~~6A Iosco~~ | ~~5A Washtenaw~~ | | | | | | | | | | | | | | ~~6A Lyon~~ | | | | | | | | | ~~Medicine~~ | | | | | | | | | | | | | | | | | | ~~3A Lowndes~~ | | | | ~~7 Iron~~ | ~~5A Wayne~~ | | | | | | | | | | | | | | ~~7 Mahnomen~~ | | | | | | | | | **~~MISSISSIPPI~~** | | | | | | | | | | | | | | | | | | ~~3A Madison~~ | | | | ~~6A Isabella~~ | ~~6A Wexford~~ | | | | | | | | | | | | | | ~~7 Marshall~~ | | | | | | | | | ~~3A Marion\*~~ | | | | ~~5A Jackson~~ | **~~MINNESOTA~~** | | | | | | | | | | | | | | ~~6A Martin~~ | | | | | | | | | ~~3A Adams\*~~ | | | | | | | | | | | | | | | | | | ~~3A Marshall~~ | | | | ~~5A Kalamazoo~~ | ~~6A McLeod~~ | | | | | | | | | ~~3A Alcorn~~ | | | | | | | | | | | | | | | | | | ~~3A~~ | | | | ~~6A Kalkaska~~ | ~~7 Aitkin~~ | | | | | | | | | | | | | | ~~6A Meeker~~ | | | | | | | | | ~~3A Amite\*~~ | | | | | | | | | | | | | | | | | | ~~3A Montgomery~~ | | | | ~~5A Kent~~ | ~~6A Anoka~~ | | | | | | | | | | | | | | ~~7 Mille Lacs~~ | | | | | | | | | ~~3A Attala~~ | | | | | | | | | | | | | | | | | | ~~3A Neshoba~~ | | | | ~~7 Keweenaw~~ | ~~7 Becker~~ | | | | | | | | | | | | | | ~~6A Morrison~~ | | | | | | | | | ~~3A Benton~~ | | | | | | | | | | | | | | | | | | ~~3A Newton~~ | | | | ~~6A Lake~~ | ~~7 Beltrami~~ | | | | | | | | | | | | | | ~~6A Mower~~ | | | | | | | | | ~~3A Bolivar~~ | | | | | | | | | | | | | | | | | | ~~3A Noxubee~~ | | | | ~~5A Lapeer~~ | ~~6A Benton~~ | | | | | | | | | | | | | | ~~6A Murray~~ | | | | | | | | | ~~3A Calhoun~~ | | | | | | | | | | | | | | | | | | ~~3A Oktibbeha~~ | | | | ~~6A Leelanau~~ | ~~6A Big Stone~~ | | | | | | | | | | | | | | ~~6A Nicollet~~ | | | | | | | | | ~~3A Carroll~~ | | | | | | | | | | | | | | | | | | ~~3A Panola~~ | | | | ~~5A Lenawee~~ | ~~6A Blue Earth~~ | | | | | | | | | | | | | | ~~6A Nobles~~ | | | | | | | | | ~~3A Chickasaw~~ | | | | | | | | | | | | | | | | | | ~~2A Pearl River\*~~ | | | | ~~5A Livingston~~ | ~~6A Brown~~ | | | | | | | | | | | | | | ~~7 Norman~~ | | | | | | | | | ~~3A Choctaw~~ | | | | | | | | | | | | | | | | | | ~~3A Perry\*~~ | | | | ~~7 Luce~~ | ~~7 Carlton~~ | | | | | | | | | | | | | | ~~6A Olmsted~~ | | | | | | | | | ~~3A Claiborne\*~~ | | | | | | | | | | | | | | | | | | ~~3A Pike\*~~ | | | | ~~3A Pontotoc~~ | | | | | ~~5A Chariton~~ | | | | | | | | | ~~4A Mississippi~~ | | | | | | | | | | | ~~4A Webster~~ | | | | | | | | | | | | | | | ~~4A Cumberland~~ | | | | | | ~~3A Prentiss~~ | | | | | ~~4A Christian~~ | | | | | | | | | ~~4A Moniteau~~ | | | | | | | | | | | ~~5A Worth~~ | | | | | | | | | | | | | | | ~~4A Essex~~ | | | | | | ~~3A Quitman~~ | | | | | ~~5A Clark~~ | | | | | | | | | ~~4A Monroe~~ | | | | | | | | | | | ~~4A Wright~~ | | | | | | | | | | | | | | | ~~4A Gloucester~~ | | | | | | ~~3A Rankin\*~~ | | | | | ~~4A Clay~~ | | | | | | | | | ~~4A Montgomery~~ | | | | | | | | | | | **~~MONTANA~~** | | | | | | | | | | | | | | | ~~4A Hudson~~ | | | | | | ~~3A Scott~~ | | | | | ~~5A Clinton~~ | | | | | | | | | ~~4A Morgan~~ | | | | | | | | | | | ~~5A Hunterdon~~ | | | | | | ~~3A Sharkey~~ | | | | | ~~4A Cole~~ | | | | | | | | | ~~4A New Madrid~~ | | | | | | | | | | | ~~6B (all)~~ | | | | | | | | | | | | | | | ~~5A Mercer~~ | | | | | | ~~3A Simpson\*~~ | | | | | ~~4A~~ | | | | | | | | | ~~4A Newton~~ | | | | | | | | | | | **~~NEBRASKA~~** | | | | | | | | | | | | | | | ~~4A Middlesex~~ | | | | | | ~~3A Smith\*~~ | | | | | ~~4A Crawford~~ | | | | | | | | | ~~5A Nodaway~~ | | | | | | | | | | | ~~4A Monmouth~~ | | | | | | ~~2A Stone\*~~ | | | | | ~~4A Dade~~ | | | | | | | | | ~~4A Oregon~~ | | | | | | | | | | | ~~5A (all)~~ | | | | | | | | | | | | | | | ~~5A Morris~~ | | | | | | ~~3A Sunflower~~ | | | | | ~~4A Dallas~~ | | | | | | | | | ~~4A Osage~~ | | | | | | | | | | | **~~NEVADA~~** | | | | | | | | | | | | | | | ~~4A Ocean~~ | | | | | | ~~3A Tallahatchie~~ | | | | | ~~5A Daviess~~ | | | | | | | | | ~~4A Ozark~~ | | | | | | | | | | | ~~5A Passaic~~ | | | | | | ~~3A Tate~~ | | | | | ~~5A DeKalb~~ | | | | | | | | | ~~4A Pemiscot~~ | | | | | | | | | | | ~~5B Carson City (city)~~ | | | | | | | | | | | | | | | ~~4A Salem~~ | | | | | | ~~3A Tippah~~ | | | | | ~~4A Dent~~ | | | | | | | | | ~~4A Perry~~ | | | | | | | | | | | ~~5B Churchill~~ | | | | | | | | | | | | | | | ~~5A Somerset~~ | | | | | | ~~3A Tishomingo~~ | | | | | ~~4A Douglas~~ | | | | | | | | | ~~4A Pettis~~ | | | | | | | | | | | ~~3B Clark~~ | | | | | | | | | | | | | | | ~~5A Sussex~~ | | | | | | ~~3A Tunica~~ | | | | | ~~4A Dunklin~~ | | | | | | | | | ~~4A Phelps~~ | | | | | | | | | | | ~~5B Douglas~~ | | | | | | | | | | | | | | | ~~4A Union~~ | | | | | | ~~3A Union~~ | | | | | ~~4A Franklin~~ | | | | | | | | | ~~5A Pike~~ | | | | | | | | | | | ~~5B Elko~~ | | | | | | | | | | | | | | | ~~5A Warren~~ | | | | | | ~~3A Walthall\*~~ | | | | | ~~4A Gasconade~~ | | | | | | | | | ~~4A Platte~~ | | | | | | | | | | | ~~5B Esmeralda~~ | | | | | | | | | | | | | | | **~~NEW MEXICO~~** | | | | | | ~~3A Warren\*~~ | | | | | ~~5A Gentry~~ | | | | | | | | | ~~4A Polk~~ | | | | | | | | | | | ~~5B Eureka~~ | | | | | | | | | | | | | | | | ~~3A Washington~~ | | | | | ~~4A Greene~~ | | | | | | | | | ~~4A Pulaski~~ | | | | | | | | | | | ~~5B Humboldt~~ | | | | | | | | | | | | | | | ~~4B Bernalillo~~ | | | | | | ~~3A Wayne\*~~ | | | | | ~~5A Grundy~~ | | | | | | | | | ~~5A Putnam~~ | | | | | | | | | | | ~~5B Lander~~ | | | | | | | | | | | | | | | ~~5B Catron~~ | | | | | | ~~3A Webster~~ | | | | | ~~5A Harrison~~ | | | | | | | | | ~~5A Ralls~~ | | | | | | | | | | | ~~5B Lincoln~~ | | | | | | | | | | | | | | | ~~3B Chaves~~ | | | | | | ~~3A Wilkinson\*~~ | | | | | ~~4A Henry~~ | | | | | | | | | ~~4A~~ | | | | | | | | | | | ~~5B Lyon~~ | | | | | | | | | | | | | | | ~~4B Cibola~~ | | | | | | ~~3A Winston~~ | | | | | ~~4A Hickory~~ | | | | | | | | | ~~4A Ray~~ | | | | | | | | | | | ~~5B Mineral~~ | | | | | | | | | | | | | | | ~~5B Colfax~~ | | | | | | ~~3A Yalobusha~~ | | | | | ~~5A Holt~~ | | | | | | | | | ~~4A Reynolds~~ | | | | | | | | | | | ~~5B Nye~~ | | | | | | | | | | | | | | | ~~4B Curry~~ | | | | | | ~~3A Yazoo~~ | | | | | ~~4A Howard~~ | | | | | | | | | ~~4A Ripley~~ | | | | | | | | | | | ~~5B Pershing~~ | | | | | | | | | | | | | | | ~~4B DeBaca~~ | | | | | | **~~MISSOURI~~** | | | | | ~~4A Howell~~ | | | | | | | | | ~~4A Saline~~ | | | | | | | | | | | ~~5B Storey~~ | | | | | | | | | | | | | | | ~~3B Dona Ana~~ | | | | | | ~~4A Iron~~ | | | | | | | | | ~~5A Schuyler~~ | | | | | | | | | | | ~~5B Washoe~~ | | | | | | | | | | | | | | | ~~3B Eddy~~ | | | | | | ~~5A Adair~~ | | | | | ~~4A Jackson~~ | | | | | | | | | ~~5A Scotland~~ | | | | | | | | | | | ~~5B White Pine~~ | | | | | | | | | | | | | | | ~~4B Grant~~ | | | | | | ~~5A Andrew~~ | | | | | ~~4A Jasper~~ | | | | | | | | | ~~4A Scott~~ | | | | | | | | | | | **~~NEW  HAMPSHIRE~~** | | | | | | | | | | | | | | | ~~4B Guadalupe~~ | | | | | | ~~5A Atchison~~ | | | | | ~~4A Jefferson~~ | | | | | | | | | ~~4A Shannon~~ | | | | | | | | | | | ~~5B Harding~~ | | | | | | ~~4A Audrain~~ | | | | | ~~4A Johnson~~ | | | | | | | | | ~~5A Shelby~~ | | | | | | | | | | | ~~6A Belknap~~ | | | | | | | | | | | | | | | ~~3B Hidalgo~~ | | | | | | ~~4A Barry~~ | | | | | ~~5A Knox~~ | | | | | | | | | ~~4A St. Charles~~ | | | | | | | | | | | ~~6A Carroll~~ | | | | | | | | | | | | | | | ~~3B Lea~~ | | | | | | ~~4A Barton~~ | | | | | ~~4A Laclede~~ | | | | | | | | | ~~4A St. Clair~~ | | | | | | | | | | | ~~5A Cheshire~~ | | | | | | | | | | | | | | | ~~4B Lincoln~~ | | | | | | ~~4A Bates~~ | | | | | ~~4A Lafayette~~ | | | | | | | | | ~~4A Ste. Genevieve~~ | | | | | | | | | | | ~~6A Coos~~ | | | | | | | | | | | | | | | ~~5B Los Alamos~~ | | | | | | ~~4A Benton~~ | | | | | ~~4A Lawrence~~ | | | | | | | | | ~~4A St. Francois~~ | | | | | | | | | | | ~~6A Grafton~~ | | | | | | | | | | | | | | | ~~3B Luna~~ | | | | | | ~~4A Bollinger~~ | | | | | ~~5A Lewis~~ | | | | | | | | | ~~4A St. Louis~~ | | | | | | | | | | | ~~5A Hillsborough~~ | | | | | | | | | | | | | | | ~~5B McKinley~~ | | | | | | ~~4A Boone~~ | | | | | ~~4A Lincoln~~ | | | | | | | | | ~~4A~~ | | | | | | | | | | | ~~6A Merrimack~~ | | | | | | | | | | | | | | | ~~5B Mora~~ | | | | | | ~~5A Buchanan~~ | | | | | ~~5A Linn~~ | | | | | | | | | ~~4A Stoddard~~ | | | | | | | | | | | ~~5A Rockingham~~ | | | | | | | | | | | | | | | ~~3B Otero~~ | | | | | | ~~4A Butler~~ | | | | | ~~5A Livingston~~ | | | | | | | | | ~~4A Stone~~ | | | | | | | | | | | ~~5A Strafford~~ | | | | | | | | | | | | | | | ~~4B Quay~~ | | | | | | ~~5A Caldwell~~ | | | | | ~~5A Macon~~ | | | | | | | | | ~~5A Sullivan~~ | | | | | | | | | | | ~~6A Sullivan~~ | | | | | | | | | | | | | | | ~~5B~~ | | | | | | ~~4A Callaway~~ | | | | | ~~4A Madison~~ | | | | | | | | | ~~4A Taney~~ | | | | | | | | | | | **~~NEW JERSEY~~** | | | | | | | | | | | | | | | ~~4B Roosevelt~~ | | | | | | ~~4A Camden~~ | | | | | ~~4A Maries~~ | | | | | | | | | ~~4A Texas~~ | | | | | | | | | | | ~~5B Sandoval~~ | | | | | | ~~4A Cape Girardeau~~ | | | | | ~~5A Marion~~ | | | | | | | | | ~~4A Vernon~~ | | | | | | | | | | | ~~4A Atlantic~~ | | | | | | | | | | | | | | | ~~5B San Juan~~ | | | | | | ~~4A Carroll~~ | | | | | ~~4A McDonald~~ | | | | | | | | | ~~4A~~ | | | | | | | | | | | ~~5A Bergen~~ | | | | | | | | | | | | | | | ~~5B San Miguel~~ | | | | | | ~~4A Carter~~ | | | | | ~~5A Mercer~~ | | | | | | | | | ~~4A Washington~~ | | | | | | | | | | | ~~4A Burlington~~ | | | | | | | | | | | | | | | ~~5B Santa Fe~~ | | | | | | ~~4A Cass~~ | | | | | ~~4A Miller~~ | | | | | | | | | ~~4A Wayne~~ | | | | | | | | | | | ~~4A Camden~~ | | | | | | | | | | | | | | | ~~4B Sierra~~ | | | | | | ~~4A Cedar~~ | | | | | ~~4A Cape May~~ | | | | | | | | | ~~4B Socorro~~ | | | | | | | | | | |  | | | | | | | | | | | | | | |  | | | | | | ~~5B Taos~~ | | | | | | | ~~4A Queens~~ | | | | | | | | | | | ~~4A Clay~~ | | | | | | | | | | | | ~~4A Orange~~ | | | | | | | | | | | | | | ~~7 Divide~~ | | ~~5B Torrance~~ | | | | | | | ~~5A Rensselaer~~ | | | | | | | | | | | ~~4A Cleveland~~ | | | | | | | | | | | | ~~3A~~ | | | | | | | | | | | | | | ~~6A Dunn~~ | | ~~4B Union~~ | | | | | | | ~~4A Richmond~~ | | | | | | | | | | | ~~3A Columbus\*~~ | | | | | | | | | | | | ~~3A Pasquotank~~ | | | | | | | | | | | | | | ~~7 Eddy~~ | | ~~4B Valencia~~ | | | | | | | ~~5A Rockland~~ | | | | | | | | | | | ~~3A Craven~~ | | | | | | | | | | | | ~~3A Pender\*~~ | | | | | | | | | | | | | | ~~6A Emmons~~ | | **~~NEW YORK~~** | | | | | | | ~~5A Saratoga~~ | | | | | | | | | | | ~~3A Cumberland~~ | | | | | | | | | | | | ~~3A Perquimans~~ | | | | | | | | | | | | | | ~~7 Foster~~ | | ~~5A Schenectady~~ | | | | | | | | | | | ~~3A Currituck~~ | | | | | | | | | | | | ~~4A Person~~ | | | | | | | | | | | | | | ~~6A Golden Valley~~ | | ~~5A Albany~~ | | | | | | | ~~6A Schoharie~~ | | | | | | | | | | | ~~3A Dare~~ | | | | | | | | | | | | ~~3A Pitt~~ | | | | | | | | | | | | | | ~~7 Grand Forks~~ | | ~~6A Allegany~~ | | | | | | | ~~6A Schuyler~~ | | | | | | | | | | | ~~3A Davidson~~ | | | | | | | | | | | | ~~4A Polk~~ | | | | | | | | | | | | | | ~~6A Grant~~ | | ~~4A Bronx~~ | | | | | | | ~~5A Seneca~~ | | | | | | | | | | | ~~4A Davie~~ | | | | | | | | | | | | ~~3A Randolph~~ | | | | | | | | | | | | | | ~~7 Griggs~~ | | ~~6A Broome~~ | | | | | | | ~~6A Steuben~~ | | | | | | | | | | | ~~3A Duplin~~ | | | | | | | | | | | | ~~3A Richmond~~ | | | | | | | | | | | | | | ~~6A Hettinger~~ | | ~~6A Cattaraugus~~ | | | | | | | ~~6A St. Lawrence~~ | | | | | | | | | | | ~~4A Durham~~ | | | | | | | | | | | | ~~3A Robeson~~ | | | | | | | | | | | | | | ~~7 Kidder~~ | | ~~5A Cayuga~~ | | | | | | | ~~4A Suffolk~~ | | | | | | | | | | | ~~3A Edgecombe~~ | | | | | | | | | | | | ~~4A Rockingham~~ | | | | | | | | | | | | | | ~~6A LaMoure~~ | | ~~5A Chautauqua~~ | | | | | | | ~~6A Sullivan~~ | | | | | | | | | | | ~~4A Forsyth~~ | | | | | | | | | | | | ~~3A Rowan~~ | | | | | | | | | | | | | | ~~6A Logan~~ | | ~~5A Chemung~~ | | | | | | | ~~5A Tioga~~ | | | | | | | | | | | ~~4A Franklin~~ | | | | | | | | | | | | ~~4A Rutherford~~ | | | | | | | | | | | | | | ~~7 McHenry~~ | | ~~6A Chenango~~ | | | | | | | ~~6A Tompkins~~ | | | | | | | | | | | ~~3A Gaston~~ | | | | | | | | | | | | ~~3A Sampson~~ | | | | | | | | | | | | | | ~~6A McIntosh~~ | | ~~6A Clinton~~ | | | | | | | ~~6A Ulster~~ | | | | | | | | | | | ~~4A Gates~~ | | | | | | | | | | | | ~~3A Scotland~~ | | | | | | | | | | | | | | ~~6A McKenzie~~ | | ~~5A Columbia~~ | | | | | | | ~~6A Warren~~ | | | | | | | | | | | ~~4A Graham~~ | | | | | | | | | | | | ~~3A Stanly~~ | | | | | | | | | | | | | | ~~7 McLean~~ | | ~~5A Cortland~~ | | | | | | | ~~5A Washington~~ | | | | | | | | | | | ~~4A Granville~~ | | | | | | | | | | | | ~~4A Stokes~~ | | | | | | | | | | | | | | ~~6A Mercer~~ | | ~~6A Delaware~~ | | | | | | | ~~5A Wayne~~ | | | | | | | | | | | ~~3A Greene~~ | | | | | | | | | | | | ~~4A Surry~~ | | | | | | | | | | | | | | ~~6A Morton~~ | | ~~5A Dutchess~~ | | | | | | | ~~4A Westchester~~ | | | | | | | | | | | ~~4A Guilford~~ | | | | | | | | | | | | ~~4A Swain~~ | | | | | | | | | | | | | | ~~7 Mountrail~~ | | ~~5A Erie~~ | | | | | | | ~~6A Wyoming~~ | | | | | | | | | | | ~~4A Halifax~~ | | | | | | | | | | | | ~~4A Transylvania~~ | | | | | | | | | | | | | | ~~7 Nelson~~ | | ~~6A Essex~~ | | | | | | | ~~5A Yates~~ | | | | | | | | | | | ~~4A Harnett~~ | | | | | | | | | | | | ~~3A Tyrrell~~ | | | | | | | | | | | | | | ~~6A Oliver~~ | | ~~6A Franklin~~ | | | | | | | **~~NORTH  CAROLINA~~** | | | | | | | | | | | ~~4A Haywood~~ | | | | | | | | | | | | ~~3A Union~~ | | | | | | | | | | | | | | ~~7 Pembina~~ | | ~~6A Fulton~~ | | | | | | | ~~4A Henderson~~ | | | | | | | | | | | | ~~4A Vance~~ | | | | | | | | | | | | | | ~~7 Pierce~~ | | ~~5A Genesee~~ | | | | | | | ~~4A Hertford~~ | | | | | | | | | | | | ~~4A Wake~~ | | | | | | | | | | | | | | ~~7 Ramsey~~ | | ~~5A Greene~~ | | | | | | | ~~4A Alamance~~ | | | | | | | | | | | ~~3A Hoke~~ | | | | | | | | | | | | ~~4A Warren~~ | | | | | | | | | | | | | | ~~6A Ransom~~ | | ~~6A Hamilton~~ | | | | | | | ~~4A Alexander~~ | | | | | | | | | | | ~~3A Hyde~~ | | | | | | | | | | | | ~~3A Washington~~ | | | | | | | | | | | | | | ~~7 Renville~~ | | ~~6A Herkimer~~ | | | | | | | ~~5A~~ | | | | | | | | | | | ~~4A Iredell~~ | | | | | | | | | | | | ~~5A Watauga~~ | | | | | | | | | | | | | | ~~6A Richland~~ | | ~~6A Jefferson~~ | | | | | | | ~~3A Anson~~ | | | | | | | | | | | ~~4A Jackson~~ | | | | | | | | | | | | ~~3A Wayne~~ | | | | | | | | | | | | | | ~~7 Rolette~~ | | ~~4A Kings~~ | | | | | | | ~~5A Ashe~~ | | | | | | | | | | | ~~3A Johnston~~ | | | | | | | | | | | | ~~4A Wilkes~~ | | | | | | | | | | | | | | ~~6A Sargent~~ | | ~~6A Lewis~~ | | | | | | | ~~5A Avery~~ | | | | | | | | | | | ~~3A Jones~~ | | | | | | | | | | | | ~~3A Wilson~~ | | | | | | | | | | | | | | ~~7 Sheridan~~ | | ~~5A Livingston~~ | | | | | | | ~~3A Beaufort~~ | | | | | | | | | | | ~~4A Lee~~ | | | | | | | | | | | | ~~4A Yadkin~~ | | | | | | | | | | | | | | ~~6A Sioux~~ | | ~~6A Madison~~ | | | | | | | ~~4A Bertie~~ | | | | | | | | | | | ~~3A Lenoir~~ | | | | | | | | | | | | ~~5A Yancey~~ | | | | | | | | | | | | | | ~~6A Slope~~ | | ~~5A Monroe~~ | | | | | | | ~~3A Bladen~~ | | | | | | | | | | | ~~4A Lincoln~~ | | | | | | | | | | | | **~~NORTH DAKOTA~~** | | | | | | | | | | | | | | ~~6A Stark~~ | | ~~6A Montgomery~~ | | | | | | | ~~3A Brunswick\*~~ | | | | | | | | | | | ~~4A Macon~~ | | | | | | | | | | | | ~~7 Steele~~ | | ~~4A Nassau~~ | | | | | | | ~~4A Buncombe~~ | | | | | | | | | | | ~~4A Madison~~ | | | | | | | | | | | | ~~6A Adams~~ | | | | | | | | | | | | | | ~~7 Stutsman~~ | | ~~4A New York~~ | | | | | | | ~~4A Burke~~ | | | | | | | | | | | ~~3A Martin~~ | | | | | | | | | | | | ~~7 Barnes~~ | | | | | | | | | | | | | | ~~7 Towner~~ | | ~~5A Niagara~~ | | | | | | | ~~3A Cabarrus~~ | | | | | | | | | | | ~~4A McDowell~~ | | | | | | | | | | | | ~~7 Benson~~ | | | | | | | | | | | | | | ~~7 Traill~~ | | ~~6A Oneida~~ | | | | | | | ~~4A Caldwell~~ | | | | | | | | | | | ~~3A Mecklenburg~~ | | | | | | | | | | | | ~~6A~~ | | | | | | | | | | | | | | ~~7 Walsh~~ | | ~~5A Onondaga~~ | | | | | | | ~~3A Camden~~ | | | | | | | | | | | ~~5A Mitchell~~ | | | | | | | | | | | | ~~7 Bottineau~~ | | | | | | | | | | | | | | ~~7 Ward~~ | | ~~5A Ontario~~ | | | | | | | ~~3A Carteret\*~~ | | | | | | | | | | | ~~3A Montgomery~~ | | | | | | | | | | | | ~~6A Bowman~~ | | | | | | | | | | | | | | ~~7 Wells~~ | | ~~5A Orange~~ | | | | | | | ~~4A Caswell~~ | | | | | | | | | | | ~~3A Moore~~ | | | | | | | | | | | | ~~7 Burke~~ | | | | | | | | | | | | | | ~~7 Williams~~ | | ~~5A Orleans~~ | | | | | | | ~~4A Catawba~~ | | | | | | | | | | | ~~4A Nash~~ | | | | | | | | | | | | ~~6A Burleigh~~ | | | | | | | | | | | | | | **~~OHIO~~** | | ~~5A Oswego~~ | | | | | | | ~~4A Chatham~~ | | | | | | | | | | | ~~3A New Hanover\*~~ | | | | | | | | | | | | ~~7 Cass~~ | | | | | | | | | | | | | | | ~~6A Otsego~~ | | | | | | | ~~4A Cherokee~~ | | | | | | | | | | | ~~4A Northampton~~ | | | | | | | | | | | | ~~7 Cavalier~~ | | | | | | | | | | | | | | ~~4A Adams~~ | | ~~5A Putnam~~ | | | | | | | ~~3A Chowan~~ | | | | | | | | | | | ~~3A Onslow\*~~ | | | | | | | | | | | | ~~6A Dickey~~ | | | | | | | | | | | | | | ~~5A Allen~~ | | ~~5A Ashland~~ | | ~~5A Mahoning~~ | | | | | | | | | | | ~~3A Bryan~~ | | | | | | | | | ~~3A Okfuskee~~ | | | | | | | | | | | ~~4C Linn~~ | | | | | | | | | | | | | ~~5A Ashtabula~~ | | ~~5A Marion~~ | | | | | | | | | | | ~~3A~~ | | | | | | | | | ~~3A Oklahoma~~ | | | | | | | | | | | ~~5B Malheur~~ | | | | | | | | | | | | | ~~5A Athens~~ | | ~~5A Medina~~ | | | | | | | | | | | ~~3A Canadian~~ | | | | | | | | | ~~3A Okmulgee~~ | | | | | | | | | | | ~~4C Marion~~ | | | | | | | | | | | | | ~~5A Auglaize~~ | | ~~5A Meigs~~ | | | | | | | | | | | ~~3A Carter~~ | | | | | | | | | ~~3A Osage~~ | | | | | | | | | | | ~~5B Morrow~~ | | | | | | | | | | | | | ~~5A Belmont~~ | | ~~5A Mercer~~ | | | | | | | | | | | ~~3A Cherokee~~ | | | | | | | | | ~~3A Ottawa~~ | | | | | | | | | | | ~~4C Multnomah~~ | | | | | | | | | | | | | ~~4A~~ | | ~~5A Miami~~ | | | | | | | | | | | ~~3A Choctaw~~ | | | | | | | | | ~~3A Pawnee~~ | | | | | | | | | | | ~~4C Polk~~ | | | | | | | | | | | | | ~~5A Butler~~ | | ~~5A Monroe~~ | | | | | | | | | | | ~~4B Cimarron~~ | | | | | | | | | ~~3A Payne~~ | | | | | | | | | | | ~~5B Sherman~~ | | | | | | | | | | | | | ~~5A Carroll~~ | | ~~5A Montgomery~~ | | | | | | | | | | | ~~3A Cleveland~~ | | | | | | | | | ~~3A Pittsburg~~ | | | | | | | | | | | ~~4C Tillamook~~ | | | | | | | | | | | | | ~~5A Champaign~~ | | ~~5A Morgan~~ | | | | | | | | | | | ~~3A Coal~~ | | | | | | | | | ~~3A Pontotoc~~ | | | | | | | | | | | ~~5B Umatilla~~ | | | | | | | | | | | | | ~~5A Clark~~ | | ~~5A Morrow~~ | | | | | | | | | | | ~~3A Comanche~~ | | | | | | | | | ~~3A Pottawatomie~~ | | | | | | | | | | | ~~5B Union~~ | | | | | | | | | | | | | ~~4A Clermont~~ | | ~~5A Muskingum~~ | | | | | | | | | | | ~~3A Cotton~~ | | | | | | | | | ~~3A Pushmataha~~ | | | | | | | | | | | ~~5B Wallowa~~ | | | | | | | | | | | | | ~~5A Clinton~~ | | ~~5A Noble~~ | | | | | | | | | | | ~~3A Craig~~ | | | | | | | | | ~~3A Roger Mills~~ | | | | | | | | | | | ~~5B Wasco~~ | | | | | | | | | | | | | ~~5A Columbiana~~ | | ~~5A Ottawa~~ | | | | | | | | | | | ~~3A Creek~~ | | | | | | | | | ~~3A Rogers~~ | | | | | | | | | | | ~~4C Washington~~ | | | | | | | | | | | | | ~~5A Coshocton~~ | | ~~5A Paulding~~ | | | | | | | | | | | ~~3A Custer~~ | | | | | | | | | ~~3A Seminole~~ | | | | | | | | | | | ~~5B Wheeler~~ | | | | | | | | | | | | | ~~5A Crawford~~ | | ~~5A Perry~~ | | | | | | | | | | | ~~3A Delaware~~ | | | | | | | | | ~~3A Sequoyah~~ | | | | | | | | | | | ~~4C Yamhill~~ | | | | | | | | | | | | | ~~5A Cuyahoga~~ | | ~~5A Pickaway~~ | | | | | | | | | | | ~~3A Dewey~~ | | | | | | | | | ~~3A Stephens~~ | | | | | | | | | | | **~~PENNSYLVANIA~~** | | | | | | | | | | | | | ~~5A Darke~~ | | ~~4A Pike~~ | | | | | | | | | | | ~~3A Ellis~~ | | | | | | | | | ~~4B Texas~~ | | | | | | | | | | | | ~~5A Defiance~~ | | ~~5A Portage~~ | | | | | | | | | | | ~~3A Garfield~~ | | | | | | | | | ~~3A Tillman~~ | | | | | | | | | | | ~~5A Adams~~ | | | | | | | | | | | | | ~~5A Delaware~~ | | ~~5A Preble~~ | | | | | | | | | | | ~~3A Garvin~~ | | | | | | | | | ~~3A Tulsa~~ | | | | | | | | | | | ~~5A Allegheny~~ | | | | | | | | | | | | | ~~5A Erie~~ | | ~~5A Putnam~~ | | | | | | | | | | | ~~3A Grady~~ | | | | | | | | | ~~3A Wagoner~~ | | | | | | | | | | | ~~5A Armstrong~~ | | | | | | | | | | | | | ~~5A Fairfield~~ | | ~~5A Richland~~ | | | | | | | | | | | ~~3A Grant~~ | | | | | | | | | ~~3A Washington~~ | | | | | | | | | | | ~~5A Beaver~~ | | | | | | | | | | | | | ~~5A Fayette~~ | | ~~5A Ross~~ | | | | | | | | | | | ~~3A Greer~~ | | | | | | | | | ~~3A Washita~~ | | | | | | | | | | | ~~5A Bedford~~ | | | | | | | | | | | | | ~~5A Franklin~~ | | ~~5A Sandusky~~ | | | | | | | | | | | ~~3A Harmon~~ | | | | | | | | | ~~3A Woods~~ | | | | | | | | | | | ~~5A Berks~~ | | | | | | | | | | | | | ~~5A Fulton~~ | | ~~4A Scioto~~ | | | | | | | | | | | ~~3A~~ | | | | | | | | | ~~3A Woodward~~ | | | | | | | | | | | ~~5A Blair~~ | | | | | | | | | | | | | ~~4A Gallia~~ | | ~~5A Seneca~~ | | | | | | | | | | | ~~3A Haskell~~ | | | | | | | | | **~~OREGON~~** | | | | | | | | | | | ~~5A Bradford~~ | | | | | | | | | | | | | ~~5A Geauga~~ | | ~~5A Shelby~~ | | | | | | | | | | | ~~3A Hughes~~ | | | | | | | | | ~~4A Bucks~~ | | | | | | | | | | | | | ~~5A Greene~~ | | ~~5A Stark~~ | | | | | | | | | | | ~~3A Jackson~~ | | | | | | | | | ~~5B Baker~~ | | | | | | | | | | | ~~5A Butler~~ | | | | | | | | | | | | | ~~5A Guernsey~~ | | ~~5A Summit~~ | | | | | | | | | | | ~~3A~~ | | | | | | | | | ~~4C Benton~~ | | | | | | | | | | | ~~5A Cambria~~ | | | | | | | | | | | | | ~~4A Hamilton~~ | | ~~5A Trumbull~~ | | | | | | | | | | | ~~3A Johnston~~ | | | | | | | | | ~~4C Clackamas~~ | | | | | | | | | | | ~~6A Cameron~~ | | | | | | | | | | | | | ~~5A Hancock~~ | | ~~5A Tuscarawas~~ | | | | | | | | | | | ~~3A Kay~~ | | | | | | | | | ~~4C Clatsop~~ | | | | | | | | | | | ~~5A Carbon~~ | | | | | | | | | | | | | ~~5A Hardin~~ | | ~~5A Union~~ | | | | | | | | | | | ~~3A Kingfisher~~ | | | | | | | | | ~~4C Columbia~~ | | | | | | | | | | | ~~5A Centre~~ | | | | | | | | | | | | | ~~5A Harrison~~ | | ~~5A Van Wert~~ | | | | | | | | | | | ~~3A Kiowa~~ | | | | | | | | | ~~4C Coos~~ | | | | | | | | | | | ~~4A Chester~~ | | | | | | | | | | | | | ~~5A Henry~~ | | ~~5A Vinton~~ | | | | | | | | | | | ~~3A Latimer~~ | | | | | | | | | ~~5B Crook~~ | | | | | | | | | | | ~~5A Clarion~~ | | | | | | | | | | | | | ~~5A Highland~~ | | ~~5A Warren~~ | | | | | | | | | | | ~~3A Le Flore~~ | | | | | | | | | ~~4C Curry~~ | | | | | | | | | | | ~~6A Clearfield~~ | | | | | | | | | | | | | ~~5A Hocking~~ | | ~~4A Washington~~ | | | | | | | | | | | ~~3A Lincoln~~ | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~5A Clinton~~ | | | | | | | | | | | | | ~~5A Holmes~~ | | ~~5A Wayne~~ | | | | | | | | | | | ~~3A Logan~~ | | | | | | | | | ~~4C Douglas~~ | | | | | | | | | | | ~~5A Columbia~~ | | | | | | | | | | | | | ~~5A Huron~~ | | ~~5A Williams~~ | | | | | | | | | | | ~~3A Love~~ | | | | | | | | | ~~5B Gilliam~~ | | | | | | | | | | | ~~5A Crawford~~ | | | | | | | | | | | | | ~~5A Jackson~~ | | ~~5A Wood~~ | | | | | | | | | | | ~~3A Major~~ | | | | | | | | | ~~5B Grant~~ | | | | | | | | | | | ~~5A Cumberland~~ | | | | | | | | | | | | | ~~5A Jefferson~~ | | ~~5A~~ | | | | | | | | | | | ~~3A Marshall~~ | | | | | | | | | ~~5B Harney~~ | | | | | | | | | | | ~~5A Dauphin~~ | | | | | | | | | | | | | ~~5A Knox~~ | | **~~OKLAHOMA~~** | | | | | | | | | | | ~~3A Mayes~~ | | | | | | | | | ~~5B Hood River~~ | | | | | | | | | | | ~~4A Delaware~~ | | | | | | | | | | | | | ~~5A Lake~~ | | ~~3A McClain~~ | | | | | | | | | ~~4C Jackson~~ | | | | | | | | | | | ~~6A Elk~~ | | | | | | | | | | | | | ~~4A Lawrence~~ | | ~~3A Adair~~ | | | | | | | | | | | ~~3A McCurtain~~ | | | | | | | | | ~~5B Jefferson~~ | | | | | | | | | | | ~~5A Erie~~ | | | | | | | | | | | | | ~~5A Licking~~ | | ~~3A Alfalfa~~ | | | | | | | | | | | ~~3A McIntosh~~ | | | | | | | | | ~~4C Josephine~~ | | | | | | | | | | | ~~5A Fayette~~ | | | | | | | | | | | | | ~~5A Logan~~ | | ~~3A Atoka~~ | | | | | | | | | | | ~~3A Murray~~ | | | | | | | | | ~~5B Klamath~~ | | | | | | | | | | | ~~5A Forest~~ | | | | | | | | | | | | | ~~5A Lorain~~ | | ~~4B Beaver~~ | | | | | | | | | | | ~~3A Muskogee~~ | | | | | | | | | ~~5B Lake~~ | | | | | | | | | | | ~~5A Franklin~~ | | | | | | | | | | | | | ~~5A Lucas~~ | | ~~3A Beckham~~ | | | | | | | | | | | ~~3A Noble~~ | | | | | | | | | ~~4C Lane~~ | | | | | | | | | | | ~~5A Fulton~~ | | | | | | | | | | | | | ~~5A Madison~~ | | ~~3A Blaine~~ | | | | | | | | | | | ~~3A Nowata~~ | | | | | | | | | ~~4C Lincoln~~ | | | | | | | | | | | ~~5A Greene~~ | | | | | | | | | | | | | ~~5A~~ | | | | | | | | | | | ~~3A Bamberg\*~~ | | | | | | | | | ~~5A Bennett~~ | | | | | | | | | | | ~~6A Minnehaha~~ | | | | | | | | | | | | ~~4A Gibson~~ | | | ~~5A Indiana~~ | | | | | | | | | | | ~~3A Barnwell\*~~ | | | | | | | | | ~~5A Bon Homme~~ | | | | | | | | | | | ~~6A Moody~~ | | | | | | | | | | | | ~~4A Giles~~ | | | ~~5A Jefferson~~ | | | | | | | | | | | ~~3A Beaufort\*~~ | | | | | | | | | ~~6A Brookings~~ | | | | | | | | | | | ~~6A Pennington~~ | | | | | | | | | | | | ~~4A Grainger~~ | | | ~~5A Juniata~~ | | | | | | | | | | | ~~3A Berkeley\*~~ | | | | | | | | | ~~6A Brown~~ | | | | | | | | | | | ~~6A Perkins~~ | | | | | | | | | | | | ~~4A Greene~~ | | | ~~5A Lackawanna~~ | | | | | | | | | | | ~~3A Calhoun~~ | | | | | | | | | ~~6A Brule~~ | | | | | | | | | | | ~~6A Potter~~ | | | | | | | | | | | | ~~4A Grundy~~ | | | ~~5A Lancaster~~ | | | | | | | | | | | ~~3A Charleston\*~~ | | | | | | | | | ~~6A Buffalo~~ | | | | | | | | | | | ~~6A Roberts~~ | | | | | | | | | | | | ~~4A Hamblen~~ | | | ~~5A Lawrence~~ | | | | | | | | | | | ~~3A Cherokee~~ | | | | | | | | | ~~6A Butte~~ | | | | | | | | | | | ~~6A Sanborn~~ | | | | | | | | | | | | ~~4A Hamilton~~ | | | ~~5A Lebanon~~ | | | | | | | | | | | ~~3A Chester~~ | | | | | | | | | ~~6A Campbell~~ | | | | | | | | | | | ~~6A Shannon~~ | | | | | | | | | | | | ~~4A Hancock~~ | | | ~~5A Lehigh~~ | | | | | | | | | | | ~~3A Chesterfield~~ | | | | | | | | | ~~5A Charles Mix~~ | | | | | | | | | | | ~~6A Spink~~ | | | | | | | | | | | | ~~3A Hardeman~~ | | | ~~5A Luzerne~~ | | | | | | | | | | | ~~3A Clarendon~~ | | | | | | | | | ~~6A Clark~~ | | | | | | | | | | | ~~6A Stanley~~ | | | | | | | | | | | | ~~3A Hardin~~ | | | ~~5A Lycoming~~ | | | | | | | | | | | ~~3A Colleton\*~~ | | | | | | | | | ~~5A Clay~~ | | | | | | | | | | | ~~6A Sully~~ | | | | | | | | | | | | ~~4A Hawkins~~ | | | ~~6A McKean~~ | | | | | | | | | | | ~~3A Darlington~~ | | | | | | | | | ~~6A Codington~~ | | | | | | | | | | | ~~5A Todd~~ | | | | | | | | | | | | ~~3A Haywood~~ | | | ~~5A Mercer~~ | | | | | | | | | | | ~~3A Dillon~~ | | | | | | | | | ~~6A Corson~~ | | | | | | | | | | | ~~5A Tripp~~ | | | | | | | | | | | | ~~3A Henderson~~ | | | ~~5A Mifflin~~ | | | | | | | | | | | ~~3A Dorchester\*~~ | | | | | | | | | ~~6A Custer~~ | | | | | | | | | | | ~~6A Turner~~ | | | | | | | | | | | | ~~4A Henry~~ | | | ~~5A~~ | | | | | | | | | | | ~~3A Edgefield~~ | | | | | | | | | ~~6A Davison~~ | | | | | | | | | | | ~~5A Union~~ | | | | | | | | | | | | ~~4A Hickman~~ | | | ~~4A Montgomery~~ | | | | | | | | | | | ~~3A Fairfield~~ | | | | | | | | | ~~6A Day~~ | | | | | | | | | | | ~~6A Walworth~~ | | | | | | | | | | | | ~~4A Houston~~ | | | ~~5A Montour~~ | | | | | | | | | | | ~~3A Florence~~ | | | | | | | | | ~~6A Deuel~~ | | | | | | | | | | | ~~5A Yankton~~ | | | | | | | | | | | | ~~4A Humphreys~~ | | | ~~5A Northampton~~ | | | | | | | | | | | ~~3A Georgetown\*~~ | | | | | | | | | ~~6A Dewey~~ | | | | | | | | | | | ~~6A Ziebach~~ | | | | | | | | | | | | ~~4A Jackson~~ | | | ~~5A Northumberland~~ | | | | | | | | | | | ~~3A Greenville~~ | | | | | | | | | ~~5A Douglas~~ | | | | | | | | | | | **~~TENNESSEE~~** | | | | | | | | | | | | ~~4A Jefferson~~ | | | ~~5A Perry~~ | | | | | | | | | | | ~~3A Greenwood~~ | | | | | | | | | ~~6A Edmunds~~ | | | | | | | | | | | ~~4A Johnson~~ | | | ~~4A Philadelphia~~ | | | | | | | | | | | ~~3A Hampton\*~~ | | | | | | | | | ~~6A Fall River~~ | | | | | | | | | | | ~~4A Anderson~~ | | | | | | | | | | | | ~~4A Knox~~ | | | ~~5A~~ | | | | | | | | | | | ~~3A Horry\*~~ | | | | | | | | | ~~6A Faulk~~ | | | | | | | | | | | ~~4A Bedford~~ | | | | | | | | | | | | ~~3A Lake~~ | | | ~~6A Potter~~ | | | | | | | | | | | ~~3A Jasper\*~~ | | | | | | | | | ~~6A Grant~~ | | | | | | | | | | | ~~4A Benton~~ | | | | | | | | | | | | ~~3A Lauderdale~~ | | | ~~5A Schuylkill~~ | | | | | | | | | | | ~~3A Kershaw~~ | | | | | | | | | ~~5A Gregory~~ | | | | | | | | | | | ~~4A Bledsoe~~ | | | | | | | | | | | | ~~4A Lawrence~~ | | | ~~5A Snyder~~ | | | | | | | | | | | ~~3A Lancaster~~ | | | | | | | | | ~~6A Haakon~~ | | | | | | | | | | | ~~4A Blount~~ | | | | | | | | | | | | ~~4A Lewis~~ | | | ~~5A Somerset~~ | | | | | | | | | | | ~~3A Laurens~~ | | | | | | | | | ~~6A Hamlin~~ | | | | | | | | | | | ~~4A Bradley~~ | | | | | | | | | | | | ~~4A Lincoln~~ | | | ~~5A Sullivan~~ | | | | | | | | | | | ~~3A Lee~~ | | | | | | | | | ~~6A Hand~~ | | | | | | | | | | | ~~4A Campbell~~ | | | | | | | | | | | | ~~4A Loudon~~ | | | ~~6A Susquehanna~~ | | | | | | | | | | | ~~3A Lexington~~ | | | | | | | | | ~~6A Hanson~~ | | | | | | | | | | | ~~4A Cannon~~ | | | | | | | | | | | | ~~4A Macon~~ | | | ~~6A Tioga~~ | | | | | | | | | | | ~~3A Marion~~ | | | | | | | | | ~~6A~~ | | | | | | | | | | | ~~4A Carroll~~ | | | | | | | | | | | | ~~3A Madison~~ | | | ~~5A Union~~ | | | | | | | | | | | ~~3A Marlboro~~ | | | | | | | | | ~~6A Hughes~~ | | | | | | | | | | | ~~4A Carter~~ | | | | | | | | | | | | ~~4A Marion~~ | | | ~~5A Venango~~ | | | | | | | | | | | ~~3A McCormick~~ | | | | | | | | | ~~5A Hutchinson~~ | | | | | | | | | | | ~~4A Cheatham~~ | | | | | | | | | | | | ~~4A Marshall~~ | | | ~~5A Warren~~ | | | | | | | | | | | ~~3A Newberry~~ | | | | | | | | | ~~6A Hyde~~ | | | | | | | | | | | ~~3A Chester~~ | | | | | | | | | | | | ~~4A Maury~~ | | | ~~5A~~ | | | | | | | | | | | ~~3A Oconee~~ | | | | | | | | | ~~5A Jackson~~ | | | | | | | | | | | ~~4A Claiborne~~ | | | | | | | | | | | | ~~4A McMinn~~ | | | ~~6A Wayne~~ | | | | | | | | | | | ~~3A Orangeburg~~ | | | | | | | | | ~~6A Jerauld~~ | | | | | | | | | | | ~~4A Clay~~ | | | | | | | | | | | | ~~3A McNairy~~ | | | ~~5A Westmoreland~~ | | | | | | | | | | | ~~3A Pickens~~ | | | | | | | | | ~~6A Jones~~ | | | | | | | | | | | ~~4A Cocke~~ | | | | | | | | | | | | ~~4A Meigs~~ | | | ~~5A Wyoming~~ | | | | | | | | | | | ~~3A Richland~~ | | | | | | | | | ~~6A Kingsbury~~ | | | | | | | | | | | ~~4A~~ | | | | | | | | | | | | ~~4A Monroe~~ | | | ~~4A York~~ | | | | | | | | | | | ~~3A Saluda~~ | | | | | | | | | ~~6A Lake~~ | | | | | | | | | | | ~~3A Crockett~~ | | | | | | | | | | | | ~~4A Montgomery~~ | | | **~~RHODE ISLAND~~** | | | | | | | | | | | ~~3A Spartanburg~~ | | | | | | | | | ~~6A Lawrence~~ | | | | | | | | | | | ~~4A Cumberland~~ | | | | | | | | | | | | ~~4A Moore~~ | | | ~~3A Sumter~~ | | | | | | | | | ~~6A Lincoln~~ | | | | | | | | | | | ~~4A Davidson~~ | | | | | | | | | | | | ~~4A Morgan~~ | | | ~~5A (all)~~ | | | | | | | | | | | ~~3A Union~~ | | | | | | | | | ~~6A~~ | | | | | | | | | | | ~~4A Decatur~~ | | | | | | | | | | | | ~~4A Obion~~ | | | **~~SOUTH  CAROLINA~~** | | | | | | | | | | | ~~3A Williamsburg~~ | | | | | | | | | ~~6A Marshall~~ | | | | | | | | | | | ~~4A DeKalb~~ | | | | | | | | | | | | ~~4A Overton~~ | | | ~~3A York~~ | | | | | | | | | ~~6A McCook~~ | | | | | | | | | | | ~~4A Dickson~~ | | | | | | | | | | | | ~~4A Perry~~ | | | ~~3A Abbeville~~ | | | | | | | | | | | **~~SOUTH DAKOTA~~** | | | | | | | | | ~~6A McPherson~~ | | | | | | | | | | | ~~3A Dyer~~ | | | | | | | | | | | | ~~4A Pickett~~ | | | ~~3A Aiken~~ | | | | | | | | | | | ~~6A~~ | | | | | | | | | | | ~~3A Fayette~~ | | | | | | | | | | | | ~~4A Polk~~ | | | ~~3A Allendale\*~~ | | | | | | | | | | | ~~6A Aurora~~ | | | | | | | | | ~~5A Mellette~~ | | | | | | | | | | | ~~4A Fentress~~ | | | | | | | | | | | | ~~4A Putnam~~ | | | ~~3A Anderson~~ | | | | | | | | | | | ~~6A Beadle~~ | | | | | | | | | ~~6A Miner~~ | | | | | | | | | | | ~~4A Franklin~~ | | | | | | | | | | | | ~~4A Rhea~~ | | | ~~4A Roane~~ | | | ~~3B Brewster~~ | | | | | | | | | | | | | ~~3B Ector~~ | | | | | | | | | | | ~~3B Howard~~ | | | | | | | | | | ~~3B McCulloch~~ | | | | | | | | | ~~4A Robertson~~ | | | ~~4B Briscoe~~ | | | | | | | | | | | | | ~~2B Edwards\*~~ | | | | | | | | | | | ~~3B Hudspeth~~ | | | | | | | | | | ~~2A McLennan\*~~ | | | | | | | | | ~~4A Rutherford~~ | | | ~~2A Brooks\*~~ | | | | | | | | | | | | | ~~3A Ellis\*~~ | | | | | | | | | | | ~~3A Hunt\*~~ | | | | | | | | | | ~~2A McMullen\*~~ | | | | | | | | | ~~4A Scott~~ | | | ~~3A Brown\*~~ | | | | | | | | | | | | | ~~3B El Paso~~ | | | | | | | | | | | ~~4B Hutchinson~~ | | | | | | | | | | ~~2B Medina\*~~ | | | | | | | | | ~~4A Sequatchie~~ | | | ~~2A Burleson\*~~ | | | | | | | | | | | | | ~~3A Erath\*~~ | | | | | | | | | | | ~~3B Irion~~ | | | | | | | | | | ~~3B Menard~~ | | | | | | | | | ~~4A Sevier~~ | | | ~~3A Burnet\*~~ | | | | | | | | | | | | | ~~2A Falls\*~~ | | | | | | | | | | | ~~3A Jack~~ | | | | | | | | | | ~~3B Midland~~ | | | | | | | | | ~~3A Shelby~~ | | | ~~2A Caldwell\*~~ | | | | | | | | | | | | | ~~3A Fannin~~ | | | | | | | | | | | ~~2A Jackson\*~~ | | | | | | | | | | ~~2A Milam\*~~ | | | | | | | | | ~~4A Smith~~ | | | ~~2A Calhoun\*~~ | | | | | | | | | | | | | ~~2A Fayette\*~~ | | | | | | | | | | | ~~2A Jasper\*~~ | | | | | | | | | | ~~3A Mills\*~~ | | | | | | | | | ~~4A Stewart~~ | | | ~~3B Callahan~~ | | | | | | | | | | | | | ~~3B Fisher~~ | | | | | | | | | | | ~~3B Jeff Davis~~ | | | | | | | | | | ~~3B Mitchell~~ | | | | | | | | | ~~4A~~ | | | ~~2A Cameron\*~~ | | | | | | | | | | | | | ~~4B Floyd~~ | | | | | | | | | | | ~~2A Jefferson\*~~ | | | | | | | | | | ~~3A Montague~~ | | | | | | | | | ~~4A Sumner~~ | | | ~~3A Camp\*~~ | | | | | | | | | | | | | ~~3B Foard~~ | | | | | | | | | | | ~~2A Jim Hogg\*~~ | | | | | | | | | | ~~2A Montgomery\*~~ | | | | | | | | | ~~3A Tipton~~ | | | ~~4B Carson~~ | | | | | | | | | | | | | ~~2A Fort Bend\*~~ | | | | | | | | | | | ~~2A Jim Wells\*~~ | | | | | | | | | | ~~4B Moore~~ | | | | | | | | | ~~4A Trousdale~~ | | | ~~3A Cass\*~~ | | | | | | | | | | | | | ~~3A Franklin\*~~ | | | | | | | | | | | ~~3A Johnson\*~~ | | | | | | | | | | ~~3A Morris\*~~ | | | | | | | | | ~~4A Unicoi~~ | | | ~~4B Castro~~ | | | | | | | | | | | | | ~~2A Freestone\*~~ | | | | | | | | | | | ~~3B Jones~~ | | | | | | | | | | ~~3B Motley~~ | | | | | | | | | ~~4A Union~~ | | | ~~2A Chambers\*~~ | | | | | | | | | | | | | ~~2B Frio\*~~ | | | | | | | | | | | ~~2A Karnes\*~~ | | | | | | | | | | ~~3A Nacogdoches\*~~ | | | | | | | | | ~~4A Van Buren~~ | | | ~~2A Cherokee\*~~ | | | | | | | | | | | | | ~~3B Gaines~~ | | | | | | | | | | | ~~3A Kaufman\*~~ | | | | | | | | | | ~~3A Navarro\*~~ | | | | | | | | | ~~4A~~ | | | ~~3B Childress~~ | | | | | | | | | | | | | ~~2A Galveston\*~~ | | | | | | | | | | | ~~3A Kendall\*~~ | | | | | | | | | | ~~2A Newton\*~~ | | | | | | | | | ~~4A Washington~~ | | | ~~3A Clay~~ | | | | | | | | | | | | | ~~3B Garza~~ | | | | | | | | | | | ~~2A Kenedy\*~~ | | | | | | | | | | ~~3B Nolan~~ | | | | | | | | | ~~4A Wayne~~ | | | ~~4B Cochran~~ | | | | | | | | | | | | | ~~3A Gillespie\*~~ | | | | | | | | | | | ~~3B Kent~~ | | | | | | | | | | ~~2A Nueces\*~~ | | | | | | | | | ~~4A Weakley~~ | | | ~~3B Coke~~ | | | | | | | | | | | | | ~~3B Glasscock~~ | | | | | | | | | | | ~~3B Kerr~~ | | | | | | | | | | ~~4B Ochiltree~~ | | | | | | | | | ~~4A White~~ | | | ~~3B Coleman~~ | | | | | | | | | | | | | ~~2A Goliad\*~~ | | | | | | | | | | | ~~3B Kimble~~ | | | | | | | | | | ~~4B Oldham~~ | | | | | | | | | ~~4A Williamson~~ | | | ~~3A Collin\*~~ | | | | | | | | | | | | | ~~2A Gonzales\*~~ | | | | | | | | | | | ~~3B King~~ | | | | | | | | | | ~~2A Orange\*~~ | | | | | | | | | ~~4A Wilson~~ | | | ~~3B Collingsworth~~ | | | | | | | | | | | | | ~~4B Gray~~ | | | | | | | | | | | ~~2B Kinney\*~~ | | | | | | | | | | ~~3A Palo Pinto\*~~ | | | | | | | | | **~~TEXAS~~** | | | ~~2A~~ | | | | | | | | | | | | | ~~3A Grayson~~ | | | | | | | | | | | ~~2A Kleberg\*~~ | | | | | | | | | | ~~3A Panola\*~~ | | | | | | | | | ~~2A Comal\*~~ | | | | | | | | | | | | | ~~3A Gregg\*~~ | | | | | | | | | | | ~~3B Knox~~ | | | | | | | | | | ~~3A Parker\*~~ | | | | | | | | | ~~2A Anderson\*~~ | | | ~~3A Comanche\*~~ | | | | | | | | | | | | | ~~2A Grimes\*~~ | | | | | | | | | | | ~~3A Lamar\*~~ | | | | | | | | | | ~~4B Parmer~~ | | | | | | | | | ~~3B Andrews~~ | | | ~~3B Concho~~ | | | | | | | | | | | | | ~~2A Guadalupe\*~~ | | | | | | | | | | | ~~4B Lamb~~ | | | | | | | | | | ~~3B Pecos~~ | | | | | | | | | ~~2A~~ | | | ~~3A Cooke~~ | | | | | | | | | | | | | ~~4B Hale~~ | | | | | | | | | | | ~~3A Lampasas\*~~ | | | | | | | | | | ~~2A Polk\*~~ | | | | | | | | | ~~2A Aransas\*~~ | | | ~~2A Coryell\*~~ | | | | | | | | | | | | | ~~3B Hall~~ | | | | | | | | | | | ~~2B La Salle\*~~ | | | | | | | | | | ~~4B Potter~~ | | | | | | | | | ~~3A Archer~~ | | | ~~3B Cottle~~ | | | | | | | | | | | | | ~~3A Hamilton\*~~ | | | | | | | | | | | ~~2A Lavaca\*~~ | | | | | | | | | | ~~3B Presidio~~ | | | | | | | | | ~~4B Armstrong~~ | | | ~~3B Crane~~ | | | | | | | | | | | | | ~~4B Hansford~~ | | | | | | | | | | | ~~2A Lee\*~~ | | | | | | | | | | ~~3A Rains\*~~ | | | | | | | | | ~~2A Atascosa\*~~ | | | ~~3B Crockett~~ | | | | | | | | | | | | | ~~3B Hardeman~~ | | | | | | | | | | | ~~2A Leon\*~~ | | | | | | | | | | ~~4B Randall~~ | | | | | | | | | ~~2A Austin\*~~ | | | ~~3B Crosby~~ | | | | | | | | | | | | | ~~2A Hardin\*~~ | | | | | | | | | | | ~~2A Liberty\*~~ | | | | | | | | | | ~~3B Reagan~~ | | | | | | | | | ~~4B Bailey~~ | | | ~~3B Culberson~~ | | | | | | | | | | | | | ~~2A Harris\*~~ | | | | | | | | | | | ~~2A Limestone\*~~ | | | | | | | | | | ~~2B Real\*~~ | | | | | | | | | ~~2B Bandera\*~~ | | | ~~4B~~ | | | | | | | | | | | | | ~~3A Harrison\*~~ | | | | | | | | | | | ~~4B Lipscomb~~ | | | | | | | | | | ~~3A Red River\*~~ | | | | | | | | | ~~2A Bastrop\*~~ | | | ~~3A Dallas\*~~ | | | | | | | | | | | | | ~~4B Hartley~~ | | | | | | | | | | | ~~2A Live Oak\*~~ | | | | | | | | | | ~~3B Reeves~~ | | | | | | | | | ~~3B Baylor~~ | | | ~~3B Dawson~~ | | | | | | | | | | | | | ~~3B Haskell~~ | | | | | | | | | | | ~~3A Llano\*~~ | | | | | | | | | | ~~2A Refugio\*~~ | | | | | | | | | ~~2A Bee\*~~ | | | ~~4B Deaf Smith~~ | | | | | | | | | | | | | ~~2A Hays\*~~ | | | | | | | | | | | ~~3B Loving~~ | | | | | | | | | | ~~4B~~ | | | | | | | | | ~~2A Bell\*~~ | | | ~~3A Delta~~ | | | | | | | | | | | | | ~~3B Hemphill~~ | | | | | | | | | | | ~~3B Lubbock~~ | | | | | | | | | | ~~2A Robertson\*~~ | | | | | | | | | ~~2A Bexar\*~~ | | | ~~3A Denton\*~~ | | | | | | | | | | | | | ~~3A Henderson\*~~ | | | | | | | | | | | ~~3B Lynn~~ | | | | | | | | | | ~~3A Rockwall\*~~ | | | | | | | | | ~~3A Blanco\*~~ | | | ~~2A DeWitt\*~~ | | | | | | | | | | | | | ~~2A Hidalgo\*~~ | | | | | | | | | | | ~~2A Madison\*~~ | | | | | | | | | | ~~3B Runnels~~ | | | | | | | | | ~~3B Borden~~ | | | ~~3B Dickens~~ | | | | | | | | | | | | | ~~2A Hill\*~~ | | | | | | | | | | | ~~3A Marion\*~~ | | | | | | | | | | ~~3A Rusk\*~~ | | | | | | | | | ~~2A Bosque\*~~ | | | ~~2B Dimmit\*~~ | | | | | | | | | | | | | ~~4B Hockley~~ | | | | | | | | | | | ~~3B Martin~~ | | | | | | | | | | ~~3A Sabine\*~~ | | | | | | | | | ~~3A Bowie\*~~ | | | ~~4B Donley~~ | | | | | | | | | | | | | ~~3A Hood\*~~ | | | | | | | | | | | ~~3B Mason~~ | | | | | | | | | | ~~3A San Augustine\*~~ | | | | | | | | | ~~2A Brazoria\*~~ | | | ~~2A Duval\*~~ | | | | | | | | | | | | | ~~3A Hopkins\*~~ | | | | | | | | | | | ~~2A Matagorda\*~~ | | | | | | | | | | ~~2A San Jacinto\*~~ | | | | | | | | | ~~2A Brazos\*~~ | | | ~~3A Eastland~~ | | | | | | | | | | | | | ~~2A Houston\*~~ | | | | | | | | | | | ~~2B Maverick\*~~ | | | | | | | | | | ~~2A San Patricio\*~~ | | | | | | | | | ~~3A San Saba\*~~ | | | | | | | | | | ~~3A Young~~ | | | | | | | | | | | ~~4C Clark~~ | | | | | | | | | | | ~~4A Gilmer~~ | | | | | | | | | **~~WISCONSIN~~** | | | | | ~~3B Schleicher~~ | | | | | | | | | | ~~2B Zapata\*~~ | | | | | | | | | | | ~~5B Columbia~~ | | | | | | | | | | | ~~5A Grant~~ | | | | | | | | | ~~6A Adams~~ | | | | | ~~3B Scurry~~ | | | | | | | | | | ~~2B Zavala\*~~ | | | | | | | | | | | ~~4C Cowlitz~~ | | | | | | | | | | | ~~5A Greenbrier~~ | | | | | | | | | ~~7 Ashland~~ | | | | | ~~3B Shackelford~~ | | | | | | | | | | **~~UTAH~~** | | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~5A Hampshire~~ | | | | | | | | | ~~6A Barron~~ | | | | | ~~3A Shelby\*~~ | | | | | | | | | | ~~6B Ferry~~ | | | | | | | | | | | ~~5A Hancock~~ | | | | | | | | | ~~7 Bayfield~~ | | | | | ~~4B Sherman~~ | | | | | | | | | | ~~5B Beaver~~ | | | | | | | | | | | ~~5B Franklin~~ | | | | | | | | | | | ~~5A Hardy~~ | | | | | | | | | ~~6A Brown~~ | | | | | ~~3A Smith\*~~ | | | | | | | | | | ~~6B Box Elder~~ | | | | | | | | | | | ~~5B Garfield~~ | | | | | | | | | | | ~~5A Harrison~~ | | | | | | | | | ~~6A Buffalo~~ | | | | | ~~3A Somervell\*~~ | | | | | | | | | | ~~6B Cache~~ | | | | | | | | | | | ~~5B Grant~~ | | | | | | | | | | | ~~4A Jackson~~ | | | | | | | | | ~~7 Burnett~~ | | | | | ~~2A Starr\*~~ | | | | | | | | | | ~~6B Carbon~~ | | | | | | | | | | | ~~4C Grays Harbor~~ | | | | | | | | | | | ~~4A Jefferson~~ | | | | | | | | | ~~6A Calumet~~ | | | | | ~~3A Stephens~~ | | | | | | | | | | ~~6B Daggett~~ | | | | | | | | | | | ~~4C Island~~ | | | | | | | | | | | ~~4A Kanawha~~ | | | | | | | | | ~~6A Chippewa~~ | | | | | ~~3B Sterling~~ | | | | | | | | | | ~~5B Davis~~ | | | | | | | | | | | ~~4C Jefferson~~ | | | | | | | | | | | ~~5A Lewis~~ | | | | | | | | | ~~6A~~ | | | | | ~~3B Stonewall~~ | | | | | | | | | | ~~6B Duchesne~~ | | | | | | | | | | | ~~4C King~~ | | | | | | | | | | | ~~4A Lincoln~~ | | | | | | | | | ~~6A Columbia~~ | | | | | ~~3B Sutton~~ | | | | | | | | | | ~~5B Emery~~ | | | | | | | | | | | ~~4C Kitsap~~ | | | | | | | | | | | ~~4A Logan~~ | | | | | | | | | ~~6A Crawford~~ | | | | | ~~4B Swisher~~ | | | | | | | | | | ~~5B Garfield~~ | | | | | | | | | | | ~~5B Kittitas~~ | | | | | | | | | | | ~~5A Marion~~ | | | | | | | | | ~~6A Dane~~ | | | | | ~~3A Tarrant\*~~ | | | | | | | | | | ~~5B Grand~~ | | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~5A Marshall~~ | | | | | | | | | ~~6A Dodge~~ | | | | | ~~3B Taylor~~ | | | | | | | | | | ~~5B Iron~~ | | | | | | | | | | | ~~4C Lewis~~ | | | | | | | | | | | ~~4A Mason~~ | | | | | | | | | ~~6A Door~~ | | | | | ~~3B Terrell~~ | | | | | | | | | | ~~5B Juab~~ | | | | | | | | | | | ~~5B Lincoln~~ | | | | | | | | | | | ~~4A McDowell~~ | | | | | | | | | ~~7 Douglas~~ | | | | | ~~3B Terry~~ | | | | | | | | | | ~~5B Kane~~ | | | | | | | | | | | ~~4C Mason~~ | | | | | | | | | | | ~~4A Mercer~~ | | | | | | | | | ~~6A Dunn~~ | | | | | ~~3B Throckmorton~~ | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~6B Okanogan~~ | | | | | | | | | | | ~~5A Mineral~~ | | | | | | | | | ~~6A Eau Claire~~ | | | | | ~~3A Titus\*~~ | | | | | | | | | | ~~6B Morgan~~ | | | | | | | | | | | ~~4C Pacific~~ | | | | | | | | | | | ~~4A Mingo~~ | | | | | | | | | ~~7 Florence~~ | | | | | ~~3B Tom Green~~ | | | | | | | | | | ~~5B Piute~~ | | | | | | | | | | | ~~6B Pend Oreille~~ | | | | | | | | | | | ~~5A Monongalia~~ | | | | | | | | | ~~6A Fond du Lac~~ | | | | | ~~2A Travis\*~~ | | | | | | | | | | ~~6B Rich~~ | | | | | | | | | | | ~~4C Pierce~~ | | | | | | | | | | | ~~4A Monroe~~ | | | | | | | | | ~~7Forest~~ | | | | | ~~2A Trinity\*~~ | | | | | | | | | | ~~5B Salt Lake~~ | | | | | | | | | | | ~~4C San Juan~~ | | | | | | | | | | | ~~4A Morgan~~ | | | | | | | | | ~~6A Grant~~ | | | | | ~~2A Tyler\*~~ | | | | | | | | | | ~~5B San Juan~~ | | | | | | | | | | | ~~4C Skagit~~ | | | | | | | | | | | ~~5A Nicholas~~ | | | | | | | | | ~~6A Green~~ | | | | | ~~3A Upshur\*~~ | | | | | | | | | | ~~5B Sanpete~~ | | | | | | | | | | | ~~5B Skamania~~ | | | | | | | | | | | ~~5A Ohio~~ | | | | | | | | | ~~6A Green Lake~~ | | | | | ~~3B Upton~~ | | | | | | | | | | ~~5B Sevier~~ | | | | | | | | | | | ~~4C~~ | | | | | | | | | | | ~~5A Pendleton~~ | | | | | | | | | ~~6A Iowa~~ | | | | | ~~2B Uvalde\*~~ | | | | | | | | | | ~~6B Summit~~ | | | | | | | | | | | ~~5B Spokane~~ | | | | | | | | | | | ~~4A Pleasants~~ | | | | | | | | | ~~7 Iron~~ | | | | | ~~2B Val Verde\*~~ | | | | | | | | | | ~~5B Tooele~~ | | | | | | | | | | | ~~6B Stevens~~ | | | | | | | | | | | ~~5A Pocahontas~~ | | | | | | | | | ~~6A Jackson~~ | | | | | ~~3A Van Zandt\*~~ | | | | | | | | | | ~~6B Uintah~~ | | | | | | | | | | | ~~4C Thurston~~ | | | | | | | | | | | ~~5A Preston~~ | | | | | | | | | ~~6A Jefferson~~ | | | | | ~~2A Victoria\*~~ | | | | | | | | | | ~~5B Utah~~ | | | | | | | | | | | ~~4C Wahkiakum~~ | | | | | | | | | | | ~~4A Putnam~~ | | | | | | | | | ~~6A Juneau~~ | | | | | ~~2A Walker\*~~ | | | | | | | | | | ~~6B Wasatch~~ | | | | | | | | | | | ~~5B Walla Walla~~ | | | | | | | | | | | ~~5A Raleigh~~ | | | | | | | | | ~~6A Kenosha~~ | | | | | ~~2A Waller\*~~ | | | | | | | | | | ~~3B Washington~~ | | | | | | | | | | | ~~4C Whatcom~~ | | | | | | | | | | | ~~5A Randolph~~ | | | | | | | | | ~~6A Kewaunee~~ | | | | | ~~3B Ward~~ | | | | | | | | | | ~~5B Wayne~~ | | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~4A Ritchie~~ | | | | | | | | | ~~6A La Crosse~~ | | | | | ~~2A Washington\*~~ | | | | | | | | | | ~~5B Weber~~ | | | | | | | | | | | ~~5B Yakima~~ | | | | | | | | | | | ~~4A Roane~~ | | | | | | | | | ~~6A Lafayette~~ | | | | | ~~2B Webb\*~~ | | | | | | | | | | **~~VERMONT~~** | | | | | | | | | | | **~~WEST VIRGINIA~~** | | | | | | | | | | | ~~5A Summers~~ | | | | | | | | | ~~7 Langlade~~ | | | | | ~~2A Wharton\*~~ | | | | | | | | | | ~~5A Taylor~~ | | | | | | | | | ~~7 Lincoln~~ | | | | | ~~3B Wheeler~~ | | | | | | | | | | ~~6A (all)~~ | | | | | | | | | | | ~~5A~~ | | | | | | | | | | | ~~5A Tucker~~ | | | | | | | | | ~~6A Manitowoc~~ | | | | | ~~3A Wichita~~ | | | | | | | | | | **~~VIRGINIA~~** | | | | | | | | | | | ~~4A Berkeley~~ | | | | | | | | | | | ~~4A Tyler~~ | | | | | | | | | ~~6A Marathon~~ | | | | | ~~3B Wilbarger~~ | | | | | | | | | | ~~4A Boone~~ | | | | | | | | | | | ~~5A Upshur~~ | | | | | | | | | ~~6A Marinette~~ | | | | | ~~2A Willacy\*~~ | | | | | | | | | | ~~4A (all)~~ | | | | | | | | | | | ~~4A Braxton~~ | | | | | | | | | | | ~~4A Wayne~~ | | | | | | | | | ~~6A Marquette~~ | | | | | ~~2A Williamson\*~~ | | | | | | | | | | **~~WASHINGTON~~** | | | | | | | | | | | ~~5A Brooke~~ | | | | | | | | | | | ~~5A Webster~~ | | | | | | | | | ~~6A Menominee~~ | | | | | ~~2A Wilson\*~~ | | | | | | | | | | ~~4A Cabell~~ | | | | | | | | | | | ~~5A Wetzel~~ | | | | | | | | | ~~6A Milwaukee~~ | | | | | ~~3B Winkler~~ | | | | | | | | | | ~~5B Adams~~ | | | | | | | | | | | ~~4A Calhoun~~ | | | | | | | | | | | ~~4A Wirt~~ | | | | | | | | | ~~6A Monroe~~ | | | | | ~~3A Wise~~ | | | | | | | | | | ~~5B Asotin~~ | | | | | | | | | | | ~~4A Clay~~ | | | | | | | | | | | ~~4A Wood~~ | | | | | | | | | ~~6A Oconto~~ | | | | | ~~3A Wood\*~~ | | | | | | | | | | ~~5B~~ | | | | | | | | | | | ~~5A Doddridge~~ | | | | | | | | | | | ~~4A Wyoming~~ | | | | | | | | | ~~7 Oneida~~ | | | | | ~~4B Yoakum~~ | | | | | | | | | | ~~5B Chelan~~ | | | | | | | | | | | ~~5A Fayette~~ | | | | | | | | | | | ~~6A Outagamie~~ | | | | | | | | |  | | | | | ~~4C Clallam~~ | | | | | | | | | |  | | | | | | | | | | |  | | | | | | | | | | |  | | | | | | | | |  | | | | | ~~6A Ozaukee~~ | | | | ~~7 Taylor~~ | | | | | | | | | | | | | | | ~~6B Big Horn~~ | | | | | | | | | ~~6B Sheridan~~ | | | | | | | | | | **~~NORTHERN  MARIANA  ISLANDS~~** | | | | | | | | ~~6A Pepin~~ | | | | ~~6A Trempealeau~~ | | | | | | | | | | | | | | | ~~6B Campbell~~ | | | | | | | | | ~~7 Sublette~~ | | | | | | | | | | | ~~6A Pierce~~ | | | | ~~6A Vernon~~ | | | | | | | | | | | | | | | ~~6B Carbon~~ | | | | | | | | | ~~6B Sweetwater~~ | | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | ~~6A Polk~~ | | | | ~~7 Vilas~~ | | | | | | | | | | | | | | | ~~6B Converse~~ | | | | | | | | | ~~7 Teton~~ | | | | | | | | | | **~~PUERTO RICO~~** | | | | | | | | ~~6A Portage~~ | | | | ~~6A Walworth~~ | | | | | | | | | | | | | | | ~~6B Crook~~ | | | | | | | | | ~~6B Uinta~~ | | | | | | | | | | | ~~7 Price~~ | | | | ~~7 Washburn~~ | | | | | | | | | | | | | | | ~~6B Fremont~~ | | | | | | | | | ~~6B Washakie~~ | | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | ~~6A Racine~~ | | | | ~~6A~~ | | | | | | | | | | | | | | | ~~5B Goshen~~ | | | | | | | | | ~~6B Weston~~ | | | | | | | | | | **~~VIRGIN ISLANDS~~** | | | | | | | | ~~6A Richland~~ | | | | ~~6A Waukesha~~ | | | | | | | | | | | | | | | ~~6B Hot Springs~~ | | | | | | | | | **~~US TERRITORIES~~** | | | | | | | | | | | ~~6A Rock~~ | | | | ~~6A Waupaca~~ | | | | | | | | | | | | | | | ~~6B Johnson~~ | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | ~~6A Rusk~~ | | | | ~~6A Waushara~~ | | | | | | | | | | | | | | | ~~6B Laramie~~ | | | | | | | | | **~~AMERICAN  SAMOA~~** | | | | | | | | | |  | | | | | | | | ~~6A Sauk~~ | | | | ~~6A~~ | | | | | | | | | | | | | | | ~~7 Lincoln~~ | | | | | | | | |  | | | | | | | | ~~7 Sawyer~~ | | | | ~~6A Wood~~ | | | | | | | | | | | | | | | ~~6B Natrona~~ | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | | |  | | | | | | | | ~~6A Shawano~~ | | | | **~~WYOMING~~** | | | | | | | | | | | | | | | ~~6B Niobrara~~ | | | | | | | | | **~~GUAM~~** | | | | | | | | | |  | | | | | | | | ~~6A Sheboygan~~ | | | | ~~6B Park~~ | | | | | | | | |  | | | | | | | | ~~6A St. Croix~~ | | | | ~~6B Albany~~ | | | | | | | | | | | | | | | ~~5B Platte~~ | | | | | | | | | ~~1A (all)\*~~ | | | | | | | | | |  | | | | | | | |
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|  |

***Section R303.1 Identification. Change to read as shown:***

**R303.1 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.

**R303.1.1 Building thermal envelope insulation.**[move text to R303.1.1.2]

**R303.1.1.1~~4~~ Insulation product rating.** The thermal resistance (R-value) of insulation shall be determined in accordance with the U.S. Federal Trade Commission R-value rule (CFR Title 16, Part 460) in units of h x ft2 x oF/Btu at a mean temperature of 75oF (24oC).

**R303.1.1.1.1** R-values referenced in Chapter 4 of this code refer to the R-values of the added insulation only. The R-values of structural building materials such as framing members, concrete blocks or gypsum board shall not be included.

**Exception:**R402.1.4 Total UA Alternative.

|  |
| --- |
| **R303.1.1.1.2** When installing two layers of bulk or board insulation, the R-values of each material may be added together for a total R-value. When installing two separate reflective insulation products in layers, the total R-value of the system shall have been achieved by testing under FTC regulations, 16 CFR Part 460. |

**R303.1.1.2 Building thermal envelope insulation markers.**

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 (fiberglass and cellulose), the initial

installed thickness, settled thickness, settled *R*-value, installed density, coverage area and number of bags installed shall be *listed* on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and *R*-value of installed thickness shall be *listed* on the certification. For insulated siding, the *R*-value shall be labeled on the product’s package and shall be *listed* on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

**R303.1.1.2.1 Blown or sprayed roof/ceiling insulation.** The thickness of blown-in or sprayed roof/ceiling insulation (fiberglass or cellulose) shall be written in inches (mm) on markers that are installed at least one for every 300 square feet (28 m2) 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. Spray polyurethane foam thickness and installed *R-*value shall be *listed* on certification provided by the insulation installer

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

**R303.1.2 Equipment efficiency ratings.**Minimum equipment efficiency rating identification for heating, cooling, hot water, swimming pool heating and filtration, and lighting shall be in accordance with industry standards and as described in Chapter 4 of the Commercial Provisions of this code, as applicable, for such equipment.

**R303.1.3 Fenestration product rating.** U-factors…..[No change to R303.1.3 or tables]

**~~R303.1.4 Insulation product rating.~~**[move to Section R303.1.1.1]

***Section R303.2 Installation. Change to read as shown:***

**R303.2 Installation.**  All materials, systems and equipment shall be installed in accordance with the manufacturer’s installation instructions and the *Florida Building Code, Residential,* or *Florida Building Code, Building*, as applicable.

**~~R 303.2.1~~** ~~Protection of exposed foundation insulation~~. [Delete in its entirety]

**R303.2.1 Insulation installation.**Insulation materials shall comply with the requirements of their respective ASTM standard specification and shall be installed in accordance with their respective ASTM installation practice in Table R303.2.1 in such a manner as to achieve *rated R-value of insulation*. Open-blown or poured loose-fill insulation shall not be used in *attic roof* spaces when the slope of the ceiling is more than three in twelve. When eave vents are installed, baffling of the vent openings shall be provided to deflect the incoming air above the surface of the insulation.

**Exception**: Where *metal building roof* and *metal building wall* insulation is compressed between the *roof* or *wall* skin and the structure.

**R303.2.1.1** **Compressed insulation**. Insulation that has been compressed to 85-percent or less of the manufacturer’s rated thickness for the product shall use the R-values given in Table 303.2.1.1. These values are to be used except where data developed by an independent testing laboratory is provided.

**R303.2.1.2  Substantial Contact.** Insulation shall be installed in a permanent manner in *substantial contact* with the inside surface in accordance with manufacturer’s recommendations for the framing system used. Flexible batt insulation installed in floor cavities shall be supported in a permanent manner by supports no greater than 24 inches (610 mm) on center (o.c.).

**Exception:** Insulation materials that rely on airspaces adjacent to reflective surfaces for their rated performance.

**R303.2.1.3 Insulation protection.**Exterior insulation shall be covered with a protective material to prevent damage from sunlight, moisture, landscaping operations, equipment maintenance, and wind. In *attics* and mechanical rooms, a way to access equipment that prevents damaging or compressing the insulation shall be provided. Foundation vents shall not interfere with the insulation. Insulation materials in ground contact shall have a water absorption rate no greater than .3 percent when tested in accordance with ASTM C272, shall cover the exposed exterior insulation and shall extend a minimum of 6 inches (153 mm) below grade.

**TABLE R303.2.1**

**INSULATION INSTALLATION STANDARDS**

|  |  |  |
| --- | --- | --- |
| **Insulation Material** | **Standard Specification** | **Installation Practice** |
| Mineral Fiber Batt/Blanket | ASTM C 665 | ASTM C 1320 |
| Mineral Fiber Loose Fill | ASTM C 764 | ASTM C 1015 |
| Cellulose Loose Fill | ASTM C 739 | ASTM C 1015 |
| Polystyrene Foam | ASTM C 578 |  |
| Polyisocyanurate Foam | ASTM C 1289 |  |
| Reflective | ASTM C 1224 | ASTM C 727 |
| Radiant Barrier | ASTM C 1313 | ASTM C 1158 |
| Vermiculite | ASTM C 516 |  |
| Perlite | ASTM C 549 |  |
| Spray-Applied Rigid Cellular Polyurethane Foam | ASTM C 1029 |  |
| Interior Radiation Control Coating Systems |  | ASTM C 1321 |

**TABLE R303.2.1.1**

**R-VALUES OF COMPRESSED INSULATION**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **% of Original Thickness** | **R-5** | **R-7** | **R-11** | **R-14** | **R-19** | **R-30** | **R-38** |
| 90 | 5 | 6 | 10 | 13 | 18 | 28 | 36 |
| 80 | 4 | 6 | 10 | 12 | 17 | 26 | 33 |
| 70 | 4 | 5 | 9 | 11 | 15 | 24 | 30 |
| 60 | 3 | 5 | 8 | 10 | 14 | 22 | 27 |
| 50 | 3 | 4 | 7 | 9 | 12 | 18 | 24 |
| 40 | 2 | 4 | 6 | 8 | 10 | 15 | 20 |
| 30 | 2 | 3 | 4 | 6 | 8 | 12 | 16 |
| 20 | 2 | 2 | 2 | 3 | 4 | 10 | 10 |

**Chapter 4 [RE]**

**Residential Energy Efficiency**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | |  | | | | ***Section R401.3 Certificate. Replace to read as shown:***  **R401.3 Energy performance level (EPL) display card (Mandatory).** The building official shall require that an energy performance level (EPL) display card be completed and certified by the builder to be accurate and correct before final approval of the building for occupancy. Florida law (Section 553.9085, *Florida Statutes*) requires the EPL display card to be included as an addendum to each sales contract for both presold and nonpresold residential buildings. The EPL display card contains information indicating the energy performance level and efficiencies of components installed in a dwelling unit. The building official shall verify that the EPL display card completed and signed by the builder accurately reflects the plans and specifications submitted to demonstrate code compliance for the building. A copy of the EPL Display Card can be found in Appendix C.  **~~R401.3 Certificate (Mandatory).~~** ~~A permanent certificate shall be completed by the builder or registered design professional and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate~~  ~~shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall list the predominant~~ *~~R~~*~~-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and floor) and ducts outside~~  ~~conditioned spaces;~~ *~~U~~*~~-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. 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 types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall list “gas-fired~~  ~~unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be~~ *~~listed~~* ~~for gas-fired unvented room heaters, electric furnaces or electric~~  ~~baseboard heaters.~~  ***Table R402.1.1. Insulation and Fenestration Requirements by Component. Change to read as shown:***  **TABLE R402.1.1**  **INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENTa**   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **CLIMATE ZONE** | **FENESTRATION *U-*FACTORbj** | **SKYLIGHTb *U-*FACTOR** | **GLAZED FENESTRATION SHGCb, e** | **CEILING *R-*VALUE** | **WOOD FRAME WALL *R-*VALUE** | **MASS WALL *R-*VALUEi** | **FLOOR *R-*VALUE** | **BASEMENTc WALL *R-*VALUE** | **SLABd *R-*VALUE & DEPTH** | **CRAWL SPACEc WALL *R-*VALUE** | | 1 | ~~NR~~ .65 | 0.75 | 0.25 | 30 | 13 | 3/4 | 13 | 0 | 0 | 0 | | 2 | 0.40 | 0.65 | 0.25 | 38 | 13 | 4/6 | 13 | 0 | 0 | 0 | | 3 | 0.35 | 0.55 | 0.25 | 38 | 20 or 13+5h | 8/13 | 19 | 5/13f | 0 | 5/13 | | 4 except Marine | 0.35 | 0.55 | 0.40 | 49 | 20 or 13+5h | 8/13 | 19 | 10 /13 | 10, 2 ft | 10/13 | | 5 and Marine 4 | 0.32 | 0.55 | NR | 49 | 20 or 13+5h | 13/17 | 30g | 15/19 | 10, 2 ft | 15/19 | | 6 | 0.32 | 0.55 | NR | 49 | 20+5 or 13+10h | 15/20 | 30g | 15/19 | 10, 4 ft | 15/19 | | 7 and 8 | 0.32 | 0.55 | NR | 49 | 20+5 or 13+10h | 19/21 | 38g | 15/19 | 10, 4 ft | 15/19 |   [No change to footnotes a – i]  j. For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code*, *Building* the maximum *U*-factor shall be 0.75 in Climate Zone 1 and 0.65 in Climate Zone 2. | |  | | ***Section R402.2.14. Add a section to read as shown:***  **R402.2.14 Common walls/ceilings/floors.** Walls, ceilings or floors common to separate conditioned tenancies shall be insulated to a minimum R-11, space permitting.  **Exception:**  Mass common walls shall be insulated to a minimum of R-6.  ***Section R402.5 Maximum U-factor and SHGC. Delete section as shown and move to R405.5.3.4.***  **~~R402.5 Maximum fenestration~~ *~~U-~~*~~factor and SHGC (Mandatory).~~** ~~The area-weighted average maximum fenestration~~ *~~U-~~*~~factor permitted using tradeoffs from Section R402.1.4 or R405 shall be 0.48 in Climate Zones 4 and 5 and 0.40 in Climate Zones 6 through 8 for vertical fenestration, and 0.75 in Climate Zones 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section R405 in Climate Zones 1 through 3 shall be 0.50.~~ | | | ***Section R403.1 Controls. Change to read as shown:*** | |   **R403.1 Controls ~~(Mandatory).~~** ~~At least one thermostat shall be provided for each separate heating and cooling system.~~  **R403.1.1 Thermostat provision (Mandatory).**At least one thermostat shall be provided for each separate heating and cooling system.  **R403.1.~~1~~2 Programmable thermostat (Prescriptive).** The thermostat controlling the primary heating or cooling system of the dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain *zone* temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed by the manufacturer with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).  **R403.1.~~2~~3 Heat pump supplementary heat (Mandatory).** Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.  ***Section R403.2.2 Sealing. Change to read as shown:***  **R403.2.2 Sealing (Mandatory).** All d~~D~~ucts, air handlers, and filter boxes and building cavities that form the primary air containment passageways for air distribution systems shall be considered ducts or plenum chambers, shall be constructed and sealed in accordance with Section C403.2.7.2 of the Commercial Provisions of this code and shall be shown to meet duct tightness criteria below. ~~Joints and seams shall comply with either the~~ *~~International Mechanical Code~~* ~~or~~ *~~International Residential Code,~~* ~~as applicable.~~  **~~Exceptions:~~**  ~~1. Air-impermeable spray foam products shall be permitted to be applied without additional joint~~  ~~seals.~~  ~~2 For ducts having a static pressure classification of less than 2 inches of water column (500 Pa),~~  ~~additional closure systems shall not be required for continuously welded joints and seams, and~~  ~~locking-type joints and seams of other than the snap-lock and button-lock types.~~  Duct tightness shall be verified by testing to Section 803 of the RESNET Standards by either an energy rater certified in accordance with Section 553.99, *Florida Statutes*, or as authorized by *Florida Statutes,* to be “substantially leak free” in accordance with Section R403.3.3.:  **Section R403.3.3 Duct testing (Mandatory). [No change to text]**  **Exceptions**:  1. A duct air leakage test shall not be required where the ducts and air handlers are  located entirely within the building thermal envelope.  2. Duct testing is not mandatory for buildings complying by Section 405 of this code.   |  | | --- | |  | | ***Section R403.3.6. Add a new section to read as shown:*** |   **R403.3.6 Air-handling units.**Air handling units shall not be installed in the attic when a home is brought into code compliance by Section R402. Air-handling units shall be allowed in attics for compliance by Section R405 only if the following conditions are met:  1. The service panel of the equipment is located within 6 feet (1829 mm) of an attic access.  2. A device is installed to alert the owner or shut the unit down when the condensation drain is not working properly.  3. The attic access opening is of sufficient size to replace the air handler.  4. A notice is posted on the electric service panel indicating to the homeowner that the air handler is located in the attic. Said notice shall be in all capitals, in 16 point type, with the title and first paragraph in bold:  **NOTICE TO HOMEOWNER**  **A PART OF YOUR AIR-CONDITIONING SYSTEM, THE AIR HANDLER, IS LOCATED IN THE ATTIC. FOR PROPER, EFFICIENT, AND ECONOMIC OPERATION OF THE AIR-CONDITIONING SYSTEM, YOU MUST ENSURE THAT REGULAR MAINTENANCE IS PERFORMED. YOUR AIR-CONDITIONING SYSTEM IS EQUIPPED WITH ONE OR BOTH OF THE FOLLOWING: (1) A DEVICE THAT WILL ALERT YOU WHEN THE CONDENSATION DRAIN IS NOT WORKING PROPERLY OR (2) A DEVICE THAT WILL SHUT THE SYSTEM DOWN WHEN THE CONDENSATION DRAIN IS NOT WORKING. TO LIMIT POTENTIAL DAMAGE TO YOUR HOME, AND TO AVOID DISRUPTION OF SERVICE, IT IS RECOMMENDED THAT YOU ENSURE PROPER WORKING ORDER OF THESE DEVICES BEFORE EACH SEASON OF PEAK OPERATION.**  ***Section R403.5 Service hot water systems. Change to read as shown:***  **R403.5 Service hot water systems.** Energy conservation measures for service hot water systems shall be in accordance with SectionsR403.4.1 through R403.4.4 ~~and R403.4.2~~.  **R403.5.1 Heated water circulation and temperature maintenance systems.  (Mandatory).**  [No change to IECC text]  **R403.5.2 Demand recirculation systems.** [No change to IECC text]  **R403.5.3 Hot water pipe insulation (Prescriptive).**  [No change to IECC text]  **R403.5.4 Drain water heat recovery units.** [No change to IECC text]  **R403.5.5 Heat traps (Mandatory).** Storage water heaters not equipped with integral heat traps and having vertical pipe risers shall have heat traps installed on both the inlets and outlets. External heat traps shall consist of either a commercially available heat trap or a downward and upward bend of at least 3½ inches (89 mm) in the hot water distribution line and cold water line located as close as possible to the storage tank.  **R403.5.6 Water heater efficiencies (Mandatory).**  **R403.5.6.1 Storage water heater temperature controls.**  **403.5.6.1.1 Automatic controls.** Service water heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest acceptable temperature settings for the intended use. The minimum temperature setting range shall be from 100°F to 140°F (38°C to 60°C).  **R403.5.6.1.2 Shut down.** A separate switch or a clearly marked circuit breaker shall be provided to permit the power supplied to electric service systems to be turned off. A separate valve shall be provided to permit the energy supplied to the main burner(s) of combustion types of service water heating systems to be turned off.  **R403.5.6.2 Water heating equipment.**Water heating equipment installed in residential units shall meet the minimum efficiencies of Table C404.2 in Chapter 4 of the *Florida Building Code, Energy Conservation,* Commercial Provisions, for the type of equipment installed. Equipment used to provide heating functions as part of a combination system shall satisfy all stated requirements for the appropriate water heating category. Solar water heaters shall meet the criteria of Section R403.5.6.2.1.  **R403.5.6.2.1 Solar water heating systems.** Solar systems for domestic hot water production are rated by the annual solar energy factor of the system. The solar energy factor of a system shall be determined from the Florida Solar Energy Center Directory of Certified Solar Systems. Solar collectors shall be tested in accordance with ISO Standard 9806, *Test Methods for Solar Collectors*, and SRCC Standard TM-1, *Solar Domestic Hot Water System and Component Test Protocol*. Collectors in installed solar water heating systems should meet the following criteria:  1.  Be installed with a tilt angle between 10 degrees and 40 degrees of the horizontal; and  2.  Be installed at an orientation within 45 degrees of true south.  ***Section R403.6 Mechanical ventilation. Change to read as shown:***  **R403.6 Mechanical ventilation (Mandatory).**The building shall be provided with ventilation that meets the requirements of the *Florida Building Code, ~~International~~ Residential ,~~Code~~* or *Florida Building Code, ~~International~~ Mechanical ~~Code~~*, as applicable, or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.  **R403.6.1 Whole-house mechanical ventilation system fan efficacy.**Mechanical ventilation system fans shall meet the efficacy requirements of Table R403.6.1. [No change to table]  **R403.6.2 Ventilation air.**Residential buildings designed to be operated at a positive indoor pressure or for mechanical ventilation shall meet the following criteria:  1.The design air change per hour minimums for residential buildings in ASHRAE 62, *Ventilation for Acceptable Indoor Air Quality*, shall be the maximum rates allowed for residential applications.  2.  No ventilation or air-conditioning system make-up air shall be provided to conditioned space from attics, crawlspaces, attached enclosed garages or outdoor spaces adjacent to swimming pools or spas.  3. If ventilation air is drawn from enclosed space(s), then the walls of the space(s) from which air is drawn shall be insulated to a minimum of R-11 and the ceiling shall be insulated to a minimum of R-19, space permitting, or R-10 otherwise.   |  | | --- | | ***Section R403.7 Equipment sizing. Change to read as shown:***  **R403.7 Heating and Cooling Equipment (Mandatory).**  **R403.7.1 Equipment sizing ~~(Mandatory)~~.** Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on the equipment ~~building~~ loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies, based on building loads for the directional orientation of the building. The manufacturer and model number of the outdoor and indoor units (if split system) shall be submitted along with the sensible and total cooling capacities at the design conditions described in Section R302.1. This Code does not allow designer safety factors, provisions for future expansion or other factors which affect equipment sizing.  System sizing calculations shall not include loads created by local intermittent mechanical ventilation such as standard kitchen and bathroom exhaust systems.  **R403.7.1.1 Cooling equipment capacity.** Cooling only equipment shall be selected so that its total capacity is not less than the calculated total load but not more than 1.15 times greater than the total load calculated according to the procedure selected in Section 403.7, or the closest available size provided by the manufacturer's product lines. The corresponding latent capacity of the equipment shall not be less than the calculated latent load.  The published value for AHRI total capacity is a nominal, rating-test value and shall not be used for equipment sizing. Manufacturer’s expanded performance data shall be used to select cooling-only equipment. This selection shall be based on the outdoor design dry bulb temperature for the load calculation (or entering water temperature for water-source equipment), the blower CFM provided by the expanded performance data, the design value for entering wet bulb temperature and the design value for entering dry bulb temperature.  Design values for entering wet bulb and dry bulb temperature shall be for the indoor dry bulb and relative humidity used for the load calculation and shall be adjusted for return side gains if the return duct(s) is installed in an unconditioned space.  **Exceptions:**  1. Attached single- and multiple-family residential equipment sizing may be selected so that its cooling capacity is less than the calculated total sensible load but not less than 80 percent of that load.  2. When signed and sealed by a Florida-registered engineer, in attached single- and multiple-family units, the capacity of equipment may be sized in accordance with good design practice.  **R403.7.1.2 Heating equipment capacity.**  **R403.7.1.2.1**  **Heat Pumps.**  Heat pump sizing shall be based on the cooling requirements as calculated according to Section R403.7.1.1 and the heat pump total cooling capacity shall not be more than 1.15 times greater than the design cooling load even if the design heating load is 1.15 times greater than the design cooling load.  **R403.7.1.2.2**  **Electric resistance furnaces.**Electric resistance furnaces shall be sized within 4 kW of the design requirements calculated according to the procedure selected in Section R403.7.1.  **R403.7.1.2.3 Fossil fuel heating equipment.**The capacity of fossil fuel heating equipment with natural draft atmospheric burners shall not be less than the design load calculated in accordance with Section R403.7.1.  **R403.7.1.3 Extra capacity required for special occasions.** Residences requiring excess cooling or heating equipment capacity on an intermittent basis, such as anticipated additional loads caused by major entertainment events, shall have equipment sized or controlled to prevent continuous space cooling or heating within that space by one or more of the following options:  1. A separate cooling or heating system is utilized to provide cooling or heating to the major entertainment areas.  2. A variable capacity system sized for optimum performance during base load periods is utilized.  **R403.10.2.1 Gas and oil-fired pool and spa heaters**. All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 82 percent for heaters manufactured on or after April 16, 2013 when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural or LP gas shall not have continuously burning pilot lights.  **R403.10.2.2 Heat pump pool heaters.**  Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with ARI 1160, Table 2, Standard Rating Conditions-Low Air Temperature. A test report from an independent laboratory is required to verify procedure compliance. Geothermal swimming pool heat pumps are not required to meet this standard.  **R403.9.2 Time switches.** Time switches or other control methods that can automatically turn off and on according to a preset schedule shall be installed for heaters and pump motors. Heaters and pump motors that have built-in time switches shall be in compliance with this section.  **Exceptions:**  1. Where public health standards require 24-hour pump operation.  2. Pumps that operate solar- and waste-heat-recovery pool heating systems.  3. Where pumps are powered exclusively from on-site renewable generation.  **R403.9.3 Covers.** Outdoor heated swimming pools and outdoor permanent spas shall be equipped ~~provided~~ with a vapor-retardant cover on or at the water surface or a liquid cover or other means proven to reduce heat loss ~~or other approved vapor-retardant means~~.  **Exception:** [No change to text]  ***Section R405.2.1 Add a new section to read as shown:***  **R405.2.1 Ceiling insulation.** Ceilings shall have an insulation level of at least R-19, space permitting. For the purposes of this code, types of ceiling construction that are considered to have inadequate space to install R-19 include single assembly ceilings of the exposed deck and beam type and concrete deck roofs. Such ceiling assemblies shall be insulated to at least a level of R-10.  ***Section R405.3 Performance-based compliance. Change to read as shown:***  **R405.3 Performance-based compliance.** Compliance based on simulated energy performance requires that a proposed residence (*proposed design)* be shown to have ~~an~~ annual ~~energy cost~~ total normalized Modified Loads that ~~is~~ are less than or equal to the annual ~~energy cost~~ total loads of the *standard reference design* as calculated in accordance with Appendix B of this standard*.* ~~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:~~** ~~The energy use based on source energy expressed in Btu or Btu per square foot of~~ *~~conditioned floor area~~* ~~shall be permitted to be substituted for the energy cost. The source energy multiplier for electricity shall be 3.16. The source energy multiplier for fuels other than electricity shall be 1.1.~~  ***Replace IECC provisions for code compliance documentation for Residential applications of the Energy Conservation code with Florida-specific provisions as shown below:***  **R405.4 Documentation.** Documentation of the software used for the performance design and the parameters for the building shall be in accordance with Sections R405.4.1 through R405.4.3.  **R405.4.1 Compliance software tools.** Computer software utilized for demonstration of code compliance shall have been approved by the Florida Building Commission in accordance with requirements of this code. ~~Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the code official~~.  **Section R405.4.2.1. Compliance report for permit application. Change to read as follows:**  **R405.4.2.1 Compliance report for permit application.** A compliance report submitted with the application for building permit shall include the following:  1. Building street address, or other building site identification.  2. A statement indicating that the *proposed design* complies with Section R405.3.  3. An inspection checklist documenting the building component characteristics of the *proposed design*  as indicated in Table R405.5.2(1). The inspection checklist shall show results for ~~both the~~ *~~standard~~*  *~~reference design~~* ~~and~~ the *proposed design* with user inputs to the compliance software to generate  the results.  4. A site-specific energy analysis report that is in compliance with Section R405.3.  5. The name of the individual performing the analysis and generating the report.  6. The name and version of the compliance software tool. | |  | |
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| **R405.4.3 Additional documentation.** The *code official* shall be permitted to require the following documents:  ~~1. Documentation of the building component characteristics of the standard reference design.~~  1.~~2~~ Verification that an EPL Display Card signed by the builder providing the building component characteristics of the *proposed design* will be provided to the purchaser of the home at time of title transfer. ~~A certification signed by the builder providing the building component characteristics of the proposed design as given in Table R405.5.2(1).~~  2. Documentation of the component efficiencies ~~actual values~~ used in the software calculations for the *proposed design.*   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | ***Section R405.5 Calculation procedure. Change as shown:*** | |  |   **R405.5 Calculation procedure.** Calculations of the performance design shall be in accordance with Sections R405.5.1 through ~~and~~ R405.5.3~~2~~.  ***TABLE R405.5.2(1)— SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS. Modify as follows:***  **TABLE R405.5.2(1)**  **SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**   |  |  |  | | --- | --- | --- | | **BUILDING COMPONENT** | **STANDARD REFERENCE DESIGN** | **PROPOSED DESIGN** | | Heating systemsd, e | Efficiency: In accordance with prevailing Federal minimum standards  ~~As proposed for other than electric heating without a heat pump. Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC—Commercial Provisions.~~ Capacity: sized in accordance with Section R403.7   Fuel type: same as proposed | As proposed        As proposed  As proposed | | Cooling systemsd, f | ~~As proposed~~  Fuel Type: Electric  Capacity: sized in accordance with Section R403.7.  Efficiency: In accordance with prevailing Federal minimum standards | As proposed  As proposed  As proposed | | Service water Heatingd, e, f, g | ~~As proposed~~ Fuel Type: As proposed Use: same as proposed design  Efficiency: In accordance with prevailing Federal minimum standards | As proposed  Gal/day = 30 + (10 ×*Nbr)*   As proposed |    [All other parts of the table to remain unchanged.]   |  | | --- | |  | | ***TABLE R405.5.2(1)— SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS. Modify as follows:***  **TABLE R405.5.2(1)**  **SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**   |  |  |  | | --- | --- | --- | | **BUILDING COMPONENT** | **STANDARD REFERENCE DESIGN** | **PROPOSED DESIGN** | | Thermal distribution systems | Replace as follows:  Distribution System Efficiency: 0.88      Duct location: entirely within the building thermal envelope  Air Handler location: entirely within the building thermal envelope  Duct insulation: R-6 | Revise as follows:  Thermal distribution system efficiency shall be as tested in accordance with Section 803 of RESNET Standards or as specified in Table R405.5.2(2) if not tested.  As proposed …….  As proposed… …...  As proposed~~Duct insulation shall be as proposed.~~ |    [No other changes to table.] | |  |   ***Section R405.5.3. Add a new section to read as shown:***  **R405.5.3 Calculation requirements for glazing.**  **R405.5.3.1 Glass areas.** All glazing areas of a residence, including windows, sliding glass doors, glass in doors, skylights, etc. shall include the manufacturer’s frame area in the total window area. Window measurements shall be as specified on the plans and specifications for the residence.  **Exception:** When a window in existing exterior walls is enclosed by an addition, an amount equal to the area of this window may be subtracted from the glazing area for the addition for that overhang and orientation.  **R405.5.3.2 Overhangs.** Overhang effect is measured by Overhang Separation, which is the vertical measure of the distance from the top of a window to the bottom of the overhang. The overhang for adjustable exterior shading devices shall be determined at its most extended position. Nonpermanent shading devices such as canvas awnings shall not be considered overhangs. Permanently attached wood and metal awnings may be considered overhangs.  **R405.5.3.3 Doors with glazing.** For doors that are opaque or where the glass is less than one-third of the area of the door, the total door area shall be included in the door calculation. For unlabeled sliding glass doors or when glass areas in doors is greater than or equal to one-third of the area of the door, the glazing portion shall be included in the glazing calculation and the opaque portion of the door shall be included in the door calculation. When glass area in doors is greater than or equal to one-third of the area of the door, the door shall be included in the glazing calculation as a total fenestration using the tested U-factor and solar heat gain coefficient.  **R405.5.3.4 Maximum fenestration SHGC.** The Proposed Design must have either an area-weighted average maximum fenestration SHGC of 0.50 or a window area-weighted average overhang depth of 4.0 feet or greater (all conditioned space windows must be included in the calculation). The area-weighted average maximum fenestration *U-*factor permitted using tradeoffs from Section R402.1.4 or R405 shall be 0.48 in Climate Zones 4 and 5 and 0.40 in Climate Zones 6 through 8 for vertical fenestration, and 0.75 in Climate Zones 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section R405 in Climate Zones 1 through 3 shall be 0.50.  ***Section R405.6.3 Input values. Add new section to read as shown:***   |  | | --- | | **R405.6.3 Input values.** When calculations require input values not specified by Sections R402, R403, R404 and R405, those input values shall be taken from an *approved* source.  **R405.6.3.1 Water Heating EF adjustment factors.** The Energy Factor (EF) of an instantaneous water heater (those with capacity of two gallons or less) in the Proposed home shall be reduced to 92% of the value in the manufacturer’s documentation or AHRI Directory of Certified Product Performance. | |  | | |  | |  | | | | ***Section R405.7. Add a new section to read as follow:*** | | |   **R405.7 Requirements specific to credit options.**Credit may be claimed in the software compliance calculation for technologies that meet prescriptive criteria specified below for various options.  **R405.7.1 Installation criteria for homes claiming the radiant barrier option.** The sheet radiant barrier or IRCC options may be claimed where the radiant barrier system is to be installed in one of the configurations depicted in Figure R405.7.1 and the following conditions are met:  1. It shall be fabricated over a ceiling insulated to a minimum of R-19 with conventional insulation and shall not be used as a means to achieve partial or whole compliance with a minimum attic insulation level of R-19. Either a sheet type or spray applied interior radiation control coating (IRCC) may be used.  2. If the radiant barrier material has only one surface with high reflectivity or low emissivity it shall be facing downward toward the ceiling insulation.  3. The attic airspace shall be vented in accordance with Section R806 of the *Florida Building Code, Residential*.  4. The radiant barrier system shall conform to ASTM C 1313, Standard Specification for Sheet Radiant Barriers for Building Construction Applications, or ASTM C 1321, Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCCS) in Building Construction as appropriate for the type of radiant barrier to be installed. The operative surface shall have an emissivity not greater than 0.06 for sheet radiant barriers or 0.25 for interior radiation control coatings as demonstrated by independent laboratory testing according to ASTM C 1371.  5. The radiant barrier system (RBS) shall conform with ASTM C 1158, Use and Installation of Radiant Barrier Systems (RBS) in Building Constructions for Sheet Radiant Barriers, or ASTM C 1321, Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCCS) in Building Construction for IRCC systems.  6. The radiant barrier shall be installed so as to cover gable ends without closing off any soffit, gable or roof ventilation.  **R405.7.2** **Installation criteria for homes claiming the cool roof option.** The cool roof option may be claimed where the roof to be installed has a tested solar reflectance of greater than 4 percent when evaluated in accordance with ASTM methods E-903, C-1549, E-1918 or CRRC Method #1. Emittance values provided by the roofing manufacturer in accordance with ASTM C 1371 shall be used when available. In cases where the appropriate data are not known, emittance shall be the same as the Standard Reference Design. Testing of a qualifying sample of the roofing material shall be performed by an approved independent laboratory with these results provided by the manufacturer.  **R405.7.3 Installation criteria for homes using the unvented attic assembly option.** The unvented attic assembly option may be used if the criteria in Section R806.5 of the *Florida Building Code, Residential,* have been met.  **R405.7.4 Installation criteria for homes using the cross ventilation option.**The cross ventilation option may be used if the following criteria have been met.  1. Operable aperture areas totaling a minimum of 12 percent of the floor area of the room shall be provided for all primary living areas and main bedrooms.  2. Insect screens shall be provided for all windows and doors to be considered operable aperture area. All screened entry doors and interior doors in the ventilated areas shall be provided with either (1) mechanically attached door stops (or similar devices) to hold the door in an open position or (2) operable louvers.  3. The total aperture area shall be provided by a minimum of two distinct windows. Each window shall provide not more than 70 percent of the total aperture area. The windows (or sliding glass doors) shall be placed in adjacent or opposite walls. The windows may be placed on a single outside wall if wing walls are used.  4. Where wing walls are included in the building design for ventilation purposes, they shall be placed between windows to create a high-pressure and a low-pressure zone on each window. Wing walls shall extend from the ground to eve height, be located on the windward side of the building, and extend outward from the building a distance at least equal to one-half the width of the window. NOTE: This technique is effective only for areas which experience significant and continuous winds during the cooling months.  **FIGURE R405.7.1 ACCEPTABLE ATTIC RADIANT BARRIER CONFIGURATIONS**   |  | | --- | |  |   **R405.7.5 Installation criteria for homes using the whole house fan option.**The whole house fan option may be used if the following criteria have been met.  1. The whole house fan has been sized to provide a minimum of 20 air changes per hour for the entire house.  2. The fan installed shall have a free air cfm rating of at least three times the square footage of the conditioned area of the house.  3. To ensure adequate air exhaust, the house attic shall have gable, ridge or wind turbine vents whose total opening area is equal to four times the ceiling cutout area for the whole house fan. Soffit vents shall not be included in the exhaust vent area.  **R405.7.6 Installation criteria for homes using the ceiling fan option.** The ceiling fan option shall apply a 2% reduction in cooling energy use for the proposed design if one or more ceiling fans are installed in each of the bedrooms and a minimum of one ceiling fan is installed in all primary living areas (living rooms, family rooms, or great rooms). This shall not include spaces designed to be dining rooms or dining areas. Areas separated by permanently fixed archways, walls, or dividers shall be considered separate rooms. The following criteria shall be met:  1. Ceiling fans shall be installed with minimum fan blade diameters of no less than those listed in Table R405.7.5 for the size and shape of the room.  2. Where a primary living area is an “L-shaped” room and the smaller portion of this area is 8 feet by 10 feet (2438 mm by 3048 mm) or larger, a fan shall be installed in both the larger and smaller portions of the primary living area.  **Exception:** Credit shall not be taken for both ceiling fans and cross ventilation.  **TABLE R405.7.6**  **FAN SIZING TABLE**   |  |  | | --- | --- | | **LONGEST WALL LENGTH (feet)** | **MINIMUM FAN SIZE (inches)** | | = 12 | 36 | | > 12 – 16 | 48 | | > 16 – 17.5 | 52 | | > 17.5 – 25 | 56 | | > 25 | 2 fans (minimum of 48 inches each) |                              For SI: 1 inch = 25.4mm, 1 foot = 304.8 mm.  **R405.7.7 Installation criteria for homes claiming the heat recovery unit (HRU) option.**The heat recovery unit option may be used for installation of a waste heat recovery unit (HRU) on either an air conditioner or a heat pump where the heat recovery unit has a minimum net useful heat exchange effect of 50 percent and meets the following criteria:  1. The net useful heat exchange effect shall be demonstrated by either a Form 400D-2013 prominently displayed on the unit with test results clearly visible for inspection or by an ARDM certified refrigerant desuperheater seal affixed to the unit.  2. The net useful heat exchange effect shall have been determined by an independent laboratory testing to AHRI Standard 470.  3. If more than one air conditioning system is installed in a residence and only one HRU is installed, energy load shall be based on the gallon capacity of the water heater to which it is coupled and the total capacity of the water heaters in the residence. In such case, the HRU shall be attached to the system serving the daytime primary living areas (family room, living room, kitchen, dining room and adjacent bedrooms and bathrooms).  **R405.7.8 Installation criteria for homes claiming the dedicated heat pump option.**The dedicated heat pump option may be used for a dedicated heat pump (also known as a heat pump water heater) installed either with a tank (an integral unit) or without tank (add on to another water heater) based on the COP or energy factor (EF) of the system on which it is installed. No minimum rating is required for this equipment.  **CHAPTER 5 [RE]**  **Existing Buildings**  ***Section R501.7 Building systems and components. Add section to read as shown:***  **R501.7 Building systems and components.** Thermal efficiency standards are set for the following building systems and components where new products are installed or replaced in existing buildings, and for which a permit must be obtained. New products shall meet the minimum efficiencies allowed by this code for the following systems and components:            Heating, ventilating or air conditioning systems;            Service water or pool heating systems;            Lighting systems.  Replacement Fenestration.  **Exceptions:**  1. Where part of a functional unit is repaired or replaced. For example, replacement of an entire HVAC system is not required because a new compressor or other part does not meet code when installed with an older system.  2.   If the unit being replaced is itself a functional unit, such as a condenser, it does not constitute a repair. Outdoor and indoor units that are not designed to be operated together must meet the U.S. Department of Energy certification requirements contained in Section R303.1.2. Matched systems are required; this match may be verified by any one of the following means:  a. AHRI data  b. Accredited laboratory  c. Manufacturer’s letter  d. Letter from registered P.E. State of Florida  3. Where existing components are utilized with a replacement system, such as air distribution system ducts or electrical wiring for lights, such components or controls need not meet code if meeting code would require that component’s replacement.  4. Replacement equipment that would require extensive revisions to other systems, equipment or elements of a building where such replacement is a like-for-like replacement, such as through-the-wall condensing units and PTACs, chillers, and cooling towers in confined spaces.  **R501.7.1 Existing equipment efficiencies.** Existing cooling and heating equipment in residential applications need not meet the minimum equipment efficiencies, including system sizing and duct sealing.  ***Section R503.1.1 Building envelope. Change to read as shown:***  **R503.1.1 Building envelope.** [No change]  **Exception:** The following need not comply provided the energy use of the building is not increased:  [1 – 6 No change]  7. Swimming pool filtration pumps and motors. |

**CHAPTER 6 [RE]**

**REFERENCED STANDARDS**

***Add or revise the following referenced standards as shown:***

**ACCA**

Air Conditioning Contractors of America

2800 Shirlington Road, Suite 300

Arlington, VA 22206

Standard referenced number Title Reference in code section number

ACCA Manual D-09 Residential Duct Systems R403.7

**AHRI**

Air Conditioning, Heating, and Refrigeration Institute

4100 North Fairfax Drive

Suite 200

Arlington, VA 22203

Standard referenced number Title Reference in code section number

470-06              Performance Rating of Desuperheater/Water Heaters                       . . . . . . . . . . . .R405.7.7, Appendix C Form 400D

1160—08 Performance Rating of Heat Pump Pool Heaters . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .R403.9.1.2

Directory of Certified Product Performance R405.6.3.1

**ANSI**

American National Standards Institute

25 West 43rd Street

Fourth Floor

New York, NY 10036

Standard referenced number Title Reference in code section number

Z21.56-2006 Gas-Fired Pool Heaters R403.9.1.1

**ARDM**

Association of Refrigerant Desuperheater Manufacturers, Inc,

c/o Doucette Industries

4151 112 Terrace N

Clearwater, FL 33762

Standard referenced number Title Reference in code section number

ARDM-88 Residential Heat Recovery Installation Guide, First Edition R405.7.7

**ASHRAE**

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

Standard referenced number Title Reference in code section number

ANSI/ASHRAE Std. 62.2-10 Ventilation for Acceptable Indoor Air Quality R403.5.2, Table R405.5.2(1)

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**ASTM**

ASTM International

100 Barr Harbor Drive

West Conshohocken, PA 19428-2959

Standard referenced number Title Reference in code section number

C36/C36M-03 Standard Specification for Gypsum Wallboard R202

C272-01 Test Method for Water Absorption of Core Materials for Structural Sandwich Construction R303.2.1.3

C 516-08~~02~~    Vermiculite Loose Fill Thermal Insulation                                              Table R303.2.1

C 549-06     Perlite Loose Fill Insulation                                                Table R303.2.1

C 578-08b~~06~~    Rigid, Cellular Polystyrene Thermal Insulation                 Table R303.2.1

C 665-06     Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and

Manufactured Housing                  Table R303.2.1

C 727-01     Standard Practice for Installation and Use of Reflective Insulation in Building

Constructions.                Table R303.2.1

C 739-08~~05b~~  Cellulosic Fiber Loose-Fill Thermal Insulation                                       Table R303.2.1

C 764-07~~06a~~ Mineral Fiber Loose-Fill Thermal Insulation                                                   Table R303.2.1

C 1015-06  Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill

Thermal Insulation                        Table R303.2.1

C 1029-08~~05a~~  Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation   Table R303.2.1

C 1158-05 Standard Practice for Use and Installation of Radiant Barrier Systems (RBS) in Building

Construction Table R303.2.1, R405.7.1

C 1224-03 Reflective Insulation for Building Applications                                          Table R303.2

C 1289-08~~06~~ Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board               Table 303.2

C 1313-05 Sheet Radiant Barriers for Building Construction Applications Table R303.2.1, R405.7.1

C 1320-05  Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light-Frame

Construction                                                         Table R303.2.1

C 1321-04 Standard Practice for Installation and Use of Interior Radiation Control Coating Systems (IRCC)

in Building Construction Table R303.2.1,Table R303.2, R405.7.1

C 1371-04a Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable

Emissometers. R405.7.1, R405.7.2

C 1549-04 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature

Using a Portable Solar Reflector R405.7.2

E 903-96 Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials

Using Integrating Spheres R405.7.2

E 1918-06 Standard Test Method for Measuring Solar Reflectance of Horizontal and

Low-Sloped Surfaces in the Field R405.7.2

**CRRC**

**Cool Roof Rating Council\**

**1738 Excelsior Avenue**

**Oakland, CA 94602**

Standard referenced number Title Reference in code section number

CRRC-1-2006 CRRC-1 Product Rating Program R405.7.2

***Change to replace the ICC codes with Florida codes and add the following Florida references to the list:***

**Florida Codes**

Building Codes and Standards Office

Florida Department of Business and Professional Regulation

1940 N. Monroe Street, Suite 90A

Tallahassee, FL 32399-0772

Standard referenced number Title Reference in code section number

FBC-B - 6th Edition (2017) Florida Building Code, Building R201.3, R303.2, Table R402.1.1

FBC-M – 6th Edition (2017) Florida Building Code, Mechanical R403.5

FBC-R-6th Edition (2017) Florida Building Code, Residential R202, R303.2, R402.1.1, R403.5, R405.7.1, R405.7.3

FS 2013 Florida Statutes R103.1.1.2, R401.3, R103.1.1.1.2

**FSEC**

**Florida Solar Energy Center**

**1679 Clearlake Road**

**Cocoa, FL 32922-5703**

Standard referenced number Title Reference in code section number

FSEC-RR-54-00 "The HERS Rating Method and the Derivation of the Normalized Modified

Loads Method", October 11, 2000, Fairey, P., J. Tait, D. Goldstein, D. Tracey,

M. Holtz, and R. Judkoff . Appendix B, B-1

Available online at: <http://www2.fsec.ucf.edu/en/publications/html/FSEC-RR-54-00/index.htm>

**ISO**

International Standards Organization

1, rue de Varembe, Case postale 56,

CH-1211 Geneve 20, Switzerland

Standard referenced number Title Reference in code section number

9806 (1994, 1995) TEST Methods for Solar Collectors

Part 1: Thermal Performance of glazed liquid heating collectors including pressure drop,

December 1, 1994

Part 2: Qualification test procedures", August 15, 1995.

Part 3: Thermal performance of unglazed liquid heating collectors (sensible heat transfer only)

including pressure drop", December 15, 1995. R403.4.4.2.1

**RESNET**

Residential Energy Services Network, Inc.

2170 E. El Camino Real

Oceanside, CA 92054

Standard referenced number Title Reference in code section number

2006 Mortgage Industry National Home Energy Rating ,

Systems Standards (March 2, 2012 edition). R403.2.2, Table R405.5.2(1)

**SRCC**

Solar Rating and Certification Corporation

c/o Florida Solar Energy Center

1679 Clearlake Road

Cocoa, FL 32922-5703

Standard referenced number Title Reference in code section number

FSEC Directory of Certified Solar Systems R403.4.4.2.1

SRCC TM-1 Solar Domestic Hot Water System and Component Test Protocol,

December 6, 2002 R403.4.4.2.1

**US—FTC**

United States - Federal Trade Commission

600 Pennsylvania Avenue NW

Washington, DC 20580

Standard referenced number Title Reference in code section number

CFR Title 16, Part 460 R-value Rule. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .. . . . . . . . . . . . . . . . . . . . . . R303.1.1.1, R303.1.1.1.2 ~~R303.1.4~~

***Add Appendix RC to read as follows:***

**APPENDIX RC**

**CALCULATION OF END USE ENERGY LOADS**

**C-1 Calculation of end use energy loads for code compliance determination.**   
The energy loads for heating, cooling and hot water in the *Proposed Design* home shall be normalized to account for the differences in improvement potential that exist across equipment types using the following formula in accordance with the paper "The HERS Rating Method and the Derivation of the Normalized Modified Loads Method,” Research Report No. FSEC-RR-54-00, Florida Solar Energy Center.   
  
nMEUL = REUL \* (nEC × /EC r)   
  
where:

|  |  |  |
| --- | --- | --- |
| nMEUL | = | normalized Modified End Use Loads (for heating, cooling or hot water) as computed using Commission approved compliance software. |
| REUL | = | *Standard Reference Design* Home End Use Loads (for heating, cooling or hot water) as computed using Commission approved compliance software. |
| EC\_r | = | estimated Energy Consumption for the *Standard Reference Design* Home’s end uses (for heating, including auxiliary electric consumption, cooling or hot water) as computed using Commission approved compliance software. |

and where: nEC\_x = (a\* EEC\_x – b)\*(EC\_x \* EC\_r \* DSE\_r) / (EEC\_x \* REUL)   
  
where:

|  |  |  |
| --- | --- | --- |
| nEC\_x | = | normalized Energy Consumption for *Proposed Design’s* end uses (for heating, including auxiliary electric consumption, cooling or hot water) as computed using Commission approved compliance software. |
| EC\_r | = | estimated Energy Consumption for *Standard Reference Design* home’s end uses (for heating, including auxiliary electric consumption, cooling or hot water) as computed using Commission approved compliance software. |
| EC\_x | = | estimated Energy Consumption for the *Proposed Design* home’s end uses (for heating, including auxiliary electric consumption, cooling or hot water) as computed using Commission approved compliance software. |
| EEC\_x | = | Equipment Efficiency Coefficient for the *Standard Reference Design* home’s equipment, such that EEC\_x = the energy consumption per unit load in like units as the load, and as derived from the Manufacturer’s Equipment Performance Rating (MEPR) such that EEC\_x = 1.0 / MEPR for AFUE, COP or EF ratings, or such that EEC\_x equals 3.413 / MEPR for HSPF, EER or SEER ratings. |

DSE\_r = REUL/EC\_r \* EEC\_r   
  
For simplified system performance methods, DSE\_r equals 0.80 for heating and cooling systems. However, for detailed modeling of heating and cooling systems, DSE\_r may be less than 0.80 as a result of part load performance degradation, coil air flow degradation, improper system charge and auxiliary resistance heating for heat pumps. Except as otherwise provided by these Standards, where detailed systems modeling is employed, it must be applied equally to both the *Standard Reference Design* and the *Proposed Design* homes.

|  |  |  |
| --- | --- | --- |
| EEC\_r | = | Equipment Efficiency Coefficient for the *Standard Reference Design* home’s equipment, such that EEC\_r equals the energy consumption per unit load in like units as the load, and as derived from the Manufacturer’s Equipment Performance Rating (MEPR) such that EEC\_r equals 1.0 / MEPR for AFUE, COP or EF ratings, or such that EEC\_r equals 3.413 / MEPR for HSPF, EER or SEER ratings. |
| REUL | = | *Standard Reference Design* home End Use Loads (for heating or cooling) as computed using Commission approved compliance software. |

and where the coefficients ‘a’ and ‘b’ are as defined by Table B-1(1).

**TABLE B-1(1) COEFFICIENTS ‘a’ AND ‘b’**

|  |  |  |
| --- | --- | --- |
| **Fuel type and End Use** | **a** | **b** |
| Electric space heating | 2.2561 | 0 |
| Fossil fuel\* space heating | 1.0943 | 0.4043 |
| Biomass space heating | 0.8850 | 0.4047 |
| Electric air conditioning | 3.8090 | 0 |
| Electric water heating | 0.9200 | 0 |
| Fossil fuel\* water heating | 1.1877 | 1.0130 |
| \* Such as natural gas, LP, fuel oil | | |

**C-2**

Following normalization of the heating, cooling and hot water energy consumptions for the *Proposed Design* as specified in Section B-1 above, the *Standard Reference Design* home’s total reference end use loads for heating, cooling and hot water (REULtot) shall be compared with the *Proposed Design* home’s total normalized modified end use loads for heating, cooling and hot water (nMEULtot). If the total normalized modified loads of the *Proposed Design* home (nMEULtot) are equal to or less than the total reference loads of the *Standard Reference Design* home (REULtot), the *Proposed Design* complies with this code.

***Add Appendix D to read as follows:***

**APPENDIX D**

***EPL Display Card. Add to read as shown.***

**ENERGY PERFORMANCE LEVEL (EPL) DISPLAY CARD**

ESTIMATED ENERGY PERFORMANCE INDEX\* = \_\_\_\_  
The lower the Energy Performance Index, the more efficient the home.

|  |  |  |
| --- | --- | --- |
| |  |  | | --- | --- | | 1.  New home or, addition                   1. \_\_\_\_\_\_\_\_\_\_\_  2.  Single-family or multiple-family     2. \_\_\_\_\_\_\_\_\_\_  3.  No. of units (if multiple-family)      3.\_\_\_\_\_\_\_\_\_\_\_  4.  Number of bedrooms                       4.\_\_\_\_\_\_\_\_ \_\_\_  5. Is this a worst case? (yes/no)          5.\_\_\_\_\_\_\_ \_\_\_  6. Conditioned floor area (sq. ft.)         6. \_\_\_\_\_\_ \_\_\_\_  7.  Windows, type and area      a)    U-factor:                                        7a.\_\_\_\_\_\_\_\_      b)   Solar Heat Gain Coefficient (SHGC)7b.\_\_\_\_ \_      c)    Area                                             7c.\_\_\_\_\_\_ \_\_  8. Skylights      a)    U-factor:        8a. \_ \_\_      b)  Solar Heat Gain Coefficient (SHGC) b.\_\_\_\_\_\_\_\_  9  Floor type, insulation level:      a)    Slab-on-grade (R-value)                  8a. \_\_\_\_\_\_\_\_\_      b)    Wood, raised (R-value)                   8b. \_\_\_\_\_\_\_\_\_      c)    Concrete, raised (R-value)              8c. \_\_\_\_\_\_\_\_\_  9.  Wall type and insulation:  A. Exterior:      1. Wood frame (Insulation R-value)        9A1.\_\_\_\_\_\_\_\_      2. Masonry (Insulation R-value)            9A2.\_\_\_\_\_\_\_\_  B Adjacent:      1. Wood frame (Insulation R-value)       9B1.\_\_\_\_\_\_\_       2. Masonry (Insulation R-value)            9B2.\_\_\_\_\_\_\_  10. Ceiling type and insulation level      a)  Under attic                                            10a.\_\_\_\_\_\_\_      b)  Single assembly                                   10b.\_\_\_\_\_\_\_      c) Knee walls/skylight walls                       10c.\_\_\_\_\_\_\_      d) Radiant barrier installed\_\_\_\_\_\_\_\_\_\_\_\_\_10d.\_\_\_\_\_\_ | 11. Ducts, Location & Insulation Level       a)   Supply ducts                   R=       b)\_\_Return ducts                   R= \_\_\_\_  c)    AHU location  12. Cooling system:                    Capacity:\_\_\_\_\_\_\_       a) Split system                        SEER \_\_\_\_\_\_\_\_\_       b) Single package                   SEER\_\_\_\_\_\_\_\_\_       c) Ground/water source          COP\_\_\_\_\_\_\_\_\_\_        d) Room unit/PTAC                 EER\_\_\_\_\_\_\_\_\_\_        e) Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  13. Heating system:       a) Split system heat pump        HSPF\_\_\_\_\_\_\_\_\_       b) Single package heat pump   HSPF\_\_\_\_\_\_\_\_\_       c) Electric resistance                 COP\_\_\_\_\_\_\_\_\_       d) Gas furnace, natural gas        AFUE\_\_\_\_\_\_\_\_        e)Gas furnace, LPG                 AFUE\_\_\_\_\_\_\_\_\_        f) Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  14. Water heating system         a) Electric resistance                 EF\_\_\_\_\_\_\_\_\_\_         b) Gas fired, natural gas             EF\_\_\_\_\_\_\_\_\_         c) Gas fired, LPG                       EF\_\_\_\_\_\_\_\_\_\_         d) Solar system with tank            EF\_\_\_\_\_\_\_\_\_         e) Dedicated heat pump with tank EF\_\_\_\_\_\_\_\_         f) Heat recovery unit             HeatRec%\_\_         g) Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  15. HVAC credits claimed (Performance Method)        a) Ceiling fans        b) Cross ventilation        c) Whole house fan        d) Multizone cooling credit        e) Multizone heating credit        f) Programmable thermostat | |
| *\*\**Label required by Section 303.1.3 of the *Florida Building Code, Energy Conservation,* if not DEFAULT. |

I certify that this home has complied with the *Florida Building Code, Energy Conservation*, through the above energy saving features which will be installed (or exceeded) in this home before final inspection. Otherwise, a new EPL Display Card will be completed based on installed Code compliant features.

|  |  |  |  |
| --- | --- | --- | --- |
| **Builder Signature::** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Date:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Address of New Home:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **City/FLZip:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**FORM  R400D-2017**

**DESUPERHEATER, HEAT RECOVERY UNIT (HRU) WATER HEATER**

**EFFICIENCY CERTIFICATION**

**TESTS CONDUCTED IN ACCORDANCE WITH**

**AHRI STANDARD 470**

Laboratory:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Test: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Report Approved By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Report No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Manufacturer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Model No:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Construction Type: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Recommended for use with refrigeration system capacities of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tons.

Design Pressure:                                     Water side \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ psig

Refrigerant side \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ psig

Test results at Standard Conditions:

Test refrigerant designation: \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tested at system capacity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Tons

Total system hot gas superheat: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Btu/h

Total useful heat exchange effect: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Btu/h

Water pump input: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Watts

**NET SUPERHEAT RECOVERY: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ %**

***Form R402. Add a form R402 to read as shown:***

***FLORIDA BUILDING CODE, ENERGY CONSERVATION***

**Residential Building Thermal Envelope Approach**

**FORM R402-2017                                                                                 Climate Zone □**

**Scope:** Compliance with Section R402.1.1 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations, and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all of the energy efficiency requirements on Table R402A and all applicable mandatory requirements summarized in Table R402B of this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 of the *Florida Building Code, Energy Conservation*.

|  |  |  |
| --- | --- | --- |
| **PROJECT NAME:**  **AND ADDRESS:** |  | **BUILDER:** |
|  |
|  | **PERMITTING OFFICE:** |
| **OWNER:** |  | **PERMIT NUMBER:** |

General Instructions:

1. Fill in all the applicable spaces of the “To Be Installed” column on Table R402A with the information requested. All “To Be Installed” values must be equal to or more efficient than the required levels.

2. Complete page 1 based on the “To Be Installed” column information.

3. Read the requirements of Table R402B and check each box to indicate your intent to comply with all applicable items.

4. Read, sign and date the “Prepared By” certification statement at the bottom of page 1. The owner or owner’s agent must also sign and date the form.

                                                                                                                                                            Check\_\_\_\_\_

1.     New construction, addition, or existing building                          1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    \_\_\_\_\_\_

2.     Single-family detached or multiple-family attached                     2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     \_\_\_\_\_\_

3.     If multiple-family, number of units covered by this submission   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    \_\_\_\_\_\_

4.     Is this a worst case? (yes/no)                                                     4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

5. Conditioned floor area (sq. ft.)                                                     5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    \_\_\_\_\_\_

6.     Windows, type and area

a)    U-factor:                                                                           6a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_

b) Solar Heat Gain Coefficient (SHGC) 6b.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

c) Area 6c.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

7. Skylights

a)    U-factor:                                                                           7a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_

b) Solar Heat Gain Coefficient (SHGC) 7b.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

8.     Floor type, area or perimeter, and insulation:

a)    Slab-on-grade (R-value)                                                      8a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_\_

b)    Wood, raised (R-value)                                                    8b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_\_

c)    Wood, common (R-value)                                                     8c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_\_

d)    Concrete, raised (R-value)                                                    8d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_\_

e)    Concrete, common (R-value)                                               8e. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_\_

9.     Wall type and insulation:

a)     Exterior:   1. Wood frame (Insulation R-value)                9a1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_\_

2. Masonry (Insulation R-value)                         9a2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     \_\_\_\_\_

b)    Adjacent:   1. Wood frame (Insulation R-value)                 9b1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_

2. Masonry (Insulation R-value)                      9b2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_     \_\_\_\_\_

10. Ceiling type and insulation

a)     Attic (Insulation R-value)                                                 10a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_

b)    Single assembly (Insulation R-value)                         10b.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_

11. Air distribution system:

a)     Duct location, insulation                                       11a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_

b)    AHU location                                                                       11b.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_       \_\_\_\_

c)    Total duct leakage. Test report attached.                     11c.\_\_\_\_\_\_\_cfm/100 s.f. Yes □ No □

12. Cooling system: a) type b) efficiency    12a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_

12b.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_

13. Heating system: a) type b) efficiency:                                   13a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_       \_\_\_\_

13b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_

14. HVAC sizing calculation: attached                                        14. Yes □ No □

15. Water heating system: a) type b) efficiency                                15a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_                                                                                                  15b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \_\_\_\_

|  |  |
| --- | --- |
| I hereby certify that the plans and specifications covered by this form are in compliance with the *Florida Building Code, Energy Conservation.*  PREPARED BY:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_  I hereby certify that this building is in compliance with the *Florida Building Code, Energy Conservation*.  OWNER/AGENT:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_ | Review of plans and specifications covered by this form indicate compliance with the *Florida Building Code, Energy Conservation*. Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, *F.S.*  CODE OFFICIAL:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Date:\_\_\_­­\_\_\_\_\_\_ |

|  |  |  |  |
| --- | --- | --- | --- |
| **TABLE R402A                                                                                                         CLIMATE ZONES 1 and 2** | | | |
| **BUILDING COMPONENT** | **PRESCRIPTIVE REQUIREMENTS1** | | **INSTALLED VALUES** |
| **Climate Zone 1** | **Climate Zone 2** |
| Windows:  Skylights | U-Factor = 0.652  SHGC =     0.25  U-factor = 0.75  SHGC =     0.30 | U-Factor = 0.402  SHGC =     0.25  U-factor = 0.65  SHGC =     0.30 | U-Factor =  SHGC =  U-factor =  SHGC = |
| Doors: Exterior door | U-factor = 0.653 | U-factor = 0.403 | U-factor= |
| Floors:  Slab-on-Grade  Over unconditioned spaces4 | NR  R-13 | NR  R-13 | R-Value = |
| Walls4 – Ext. and Adj.      Frame      Mass  Insulation on wall interior:  Insulation on wall exterior | R-13  R-4  R-3 | R-13  R-6  R-4 | R-Value =    R-Value =  R-Value = |
| Ceilings5 | R=30 | R=38 | R-Value = |
| Air infiltration | Blower door test is required on the building envelope to verify leakage ≤5 ACH; test report provided to code official. | | Total leakage= ACH ­­­­­­  Test report Attached?  Yes □ No □ |
| Air distribution system5  Air handling unit  Duct R-value  Air leakage5:  Duct test    Ducts in conditioned space | Not allowed in attic  R-value ≥ R-8 (supply in attics) or ≥ R-6 (all other duct locations)  Postconstruction test: Total leakage ≤ 4 cfm/100 s.f.  Rough-in test Total leakage ≤ 3 cfm/100 s.f.  Test not required if all ducts and ahu are in conditioned space | | Location:  R-Value =  Total leakage= cfm/100s.f. ­­­­­­  Test report Attached?  Yes □ No □  Location: |
| Air conditioning systems  Central system ≤ 65,000 Btu/h  Room unit or PTAC  Other: | Minimum federal standard required by NAECA6.  SEER 13.0  EER (from Table C403.2.3(3))  See Tables C403.2.3(1)-(11) | | SEER=  EER = |
| Heating system  Heat pump ≤ 65,000 Btu/h  Gas furnace, non-weatherized  Oil furnace, non-weatherized  Other: | Minimum federal standard required by NAECA6  HSPF 7.7 (before 1/1/15); HSPF 8.2 (as of 1/1/15)  AFUE 80%  AFUE 83% | | HSPF =  AFUE =  AFUE = |
| Water heating system (storage type):  Electric7  Gas fired8  Other (describe): | Minimum federal standard required by NAECA6  40 gal: EF = 0.92  50 gal: EF = 0.90  40 gal: EF = 0.59  50 gal: EF = 0.58 | | Gallons =  EF =  Gallons =  EF = |

NR = No requirement.

(1) Each component present in the As Proposed home must meet or exceed each of the applicable performance criteria in order to comply with this code using this method.

(2) For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code*, *Building* the maximum *U*-factor shall be 0.75 in Climate Zone 1 and 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, or up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Sections R402.3.1, R402.3.2 and R402.3.3.

(3) One side-hinged opaque door assembly up to 24 s.f. is exempted from this U-factor requirement.

(4) R-values are for insulation material only as applied in accordance with manufacturers’ installation instructions. For mass walls, the “interior of wall” requirement must be met except if at least 50% of the insulation required for the “exterior of wall” is installed exterior of, or integral to, the wall.

(5) Ducts & AHU installed “substantially leak free” per Section R403.2.2. Test required by an energy rater certified in accordance with Section 553.99, *Florida Statutes*, or as authorized by *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

(6) Minimum efficiencies are those set by the National Appliance Energy Conservation Act of 1987 for typical residential equipment and are subject to NAECA rules and regulations.. For other types of equipment, see Tables C403.2.3(1-11) of the Commercial Provisions of the *Florida Building Code, Energy Conservation*.

(7) For other electric storage volumes, minimum EF = 0.97 - (0.00132 \* volume) ;

(8) For other natural gas storage volumes, minimum EF = 0.67 - (0.0019 \* volume)

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| TABLE R402B    MANDATORY REQUIREMENTS | | | |
| **Component** | **Section** | **Summary of Requirement(s)** | **Check** |
| Air leakage | R402.4 | To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting: IC-rated as having ≤2.0 cfm tested to ASTM E 283.  Windows and doors: 0.3 cfm/sq.ft (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440.  Fireplaces: Tight-fitting flue dampers & outdoor combustion air. |  |
| Programmable thermostat | R403.1.2 | Where forced-air furnace is primary system, a programmable thermostat is required. |  |
| Air distribution system | R403.2.2  R403.2.4 | Ducts shall be tested to Section 803 of the RESNET standards by an energy rater certified in accordance with Section 553.99, *Florida Statutes*, or as authorized by *Florida Statutes.* Air handling units are not allowed in attics. |  |
| Water heaters | R403.4 | Comply with efficiencies in Table C404.2. Hot water pipes insulated to ≥ R-3 to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers. |  |
| Swimming pools & spas | R403.9 | Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0. |  |
| Cooling/heating equipment | R403.6 | Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system. |  |
| Lighting equipment | R404.1 | At least 75% of permanently installed lighting fixtures shall be high-efficacy lamps. |  |