The 2004 Arkansas
Energy Code for New Building Construction

Introduction

Residential

Commercial

Introduction

The Arkansas General Assembly authorized the Arkansas Energy Office to promulgate these regulations in Section 3(B)(2)(c) of Act 7 of 1981. These rules and regulations, in adherence with the Administrative Procedures Act, are effective October 1, 2004.

Arkansas adopts the *International Energy Conservation Code* (IECC), *2003 Edition*, published and copyrighted by the International Codes Council and the Southern Building Code Congress International, Inc. When the IECC 2003 Edition is used in conjunction with the *Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code*, this shall constitute the official *2004 Arkansas Energy Code for New Building Construction*.

To order copies of the *International Energy Conservation Code, 2003 Edition* with *Arkansas Supplements and Amendments* contact:

International Code Council
900 Montclair Road
Birmingham, Alabama 35213-1206
Phone: 1-800-786-4452, Fax: 205-591-0775
Telecommunications Device for the Deaf: 205-599-9742

For commercial structures, the *2003 International Energy Conservation Code* adopts by reference the *American Society of Heating, Refrigerating, and Air Conditioning Engineers* (ASHRAE) *ANSI / ASHRAE /IESNA Standard 90.1-2001—Energy Standard for Buildings Except Low-Rise Residential Buildings.*

The *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* is available for viewing only, without charge, on the ASHRAE website: http://www.ashrae.org/template/AssetDetail/assetid/16730.

To order copies of *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* contact:

American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, N.E.
Atlanta, GA 30329
Phone: 404-636-8400, Fax: 404-321-5478
Web: www.ashrae.org

Questions, inquiries or request for copies of the *2004 Arkansas Energy Code for New Building Construction*, which includes the *Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code*, may be addressed to:

Arkansas Energy Office
Attn: *2004 Arkansas Energy Code for New Building Construction*
One State Capitol Mall
Little Rock, AR 72201
Phone: 800-558-2633 or 501-682-6103
Fax: 501-682-2703
Email: energy@1-800-ARKANSAS.com
Download code information and compliance tools at www.1800arkansas.com/energy/energycode

2004 Arkansas Energy Code for New Building Construction

Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code

Arkansas Energy Office
Arkansas Department of Economic Development
One Capitol Mall
Little Rock, AR 72201
(501) 682-1370

http://www.1800arkansas.com/energy/energycode

Effective October 1, 2004

FORWARD

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OVERVIEW

This document supplements and amends the *International Energy Conservation Code (IECC), 2003 Edition*. In cases where there are differences between these "Supplements and Amendments" and the IECC 2003 Edition, or with *ANSI/ASHRAE/IESNA Standard 90.1-2001*, these "Supplements and Amendments" shall take precedence.

Each Chapter of this document associates directly with the corresponding chapters of the IECC 2003.

- **Chapter 1**: **Administration**. Deleted. Replaced with the *2004 Arkansas Energy Code for New Building Construction, Chapter 1—Administration and Enforcement*.

- **Chapter 2**: **Definitions**.

- **Chapter 3**: **Design Conditions**. Establishes the design criteria for the entire state of Arkansas and defines Arkansas' four climate zones. The climate zones establish the design conditions for use with chapters 4, 5, 6 and 8.
  This chapter has been modified to include a map of Arkansas with a list of counties and their associated climate zones, and a table identifying the Heating Degree Day (HDD) ranges associated with each zone.

- **Chapter 4**: Pertains to **residential building design by systems analysis**, as well as the use of renewable resources such as wind, solar, geothermal, etc.
  Section 402.2.3.1.3 has been deleted which required windows to have a 0.40 Solar Heat Gain Coefficient (SHGC) in homes located in areas experiencing less than 3,500 HDD.

- **Chapter 5**: **Residential compliance by designed component[1] performance**—this analyzes the total building for compliance one component at a time. Assuming each individual component of the building meets the thermal requirements of the code then the entire building is deemed to comply. This chapter offers the use of "trade-offs" to achieve compliance by allowing the builder to substitute or "trade-off" values between building components. A properly executed use of an Arkansas Energy Office approved compliance tool may be used to validate any trade-off.
  Section 502.1.5 has been deleted which required the 0.40 SHGC. The *R*-values in the Minimum Duct Insulation **Table 503.3.3.3** have been changed. Also **footnote "b"** under that same table has been deleted which stated that insulation on return ducts located in a basement is not required. All references to the *International Mechanical Code* have been changed to the *Arkansas Mechanical Code*.

- **Chapter 6**: Offers **residential prescriptive compliance** via the single step compliance method by selecting an option directly from the charts in the applicable climate zone. The values from the option show the minimum requirements for each component of a residential structure for the specific climate zone. An approved Arkansas Energy Office prescripive compliance tool may be used to validate code compliance.
  Section 602.2 has been deleted which required the 0.40 SHGC.

- **Chapter 7**: Pertains to **building design for commercial buildings**, except those that comply with Chapter 8. *ANSI/ASHRAE/IESNA Standard 90.1-2001* is adopted by reference. An approved Arkansas Energy Office compliance tool may be used to validate compliance.

- **Chapter 8**: Pertains to design by **acceptable practice for commercial buildings**. All references to the *International Mechanical Code* have been changed to the *Arkansas Mechanical Code*. An approved Arkansas Energy Office compliance tool may be used to validate compliance.

[1] The word "component" for the purposes of this code is defined as being a particular segment of a building such as a wall, ceiling, or floor. Hence, the terms *wall component* or *ceiling component*.

SUMMARY

Chapters 4, 5 and 6 offer different methods to achieve code compliance for low-rise residential construction, and Chapters 7 and 8 offer different methods to achieve code compliance for commercial and high-rise residential construction.

These amendments have four significant changes:

1) **Chapter 1 - Administration, of the IECC 2003 was deleted and replaced with the *2004 Arkansas Energy Code for New Building Construction, Chapter 1, Administration and Enforcement.***
2) **The requirement of a 0.4 Solar Heat Gain Coefficient in Chapters 4, 5 and 6 was deleted.**
3) **The residential duct insulation requirement was changed.**
4) ***ANSI/ASHRAE/IESNA 90.1-2001* is referenced for commercial buildings and high-rise residential buildings in Chapters 7 and 8.**

ARKANSAS AMENDMENTS

**** Revise the 2004 Arkansas Energy Code for New Building Construction (the 2003 Edition of the International Energy Conservation Code), as follows:***

CHAPTER 1
ADMINISTRATION

Delete entire CHAPTER 1 ADMINISTRATION. Replace with the *2004 Arkansas Energy Code for New Building Construction, CHAPTER 1, ADMINISTRATION AND ENFORCEMENT* as follows.

CHAPTER 1
ADMINISTRATION AND ENFORCEMENT

SECTION 101
GENERAL

101.1 Title. These regulations shall be known as the *2004 Arkansas Energy Code for New Building Construction,* and shall be cited as such. It is referred to herein as "this code."

101.2 Scope. This code establishes minimum prescriptive and performance-related regulations for the design of energy-efficient buildings and structures or portions thereof that provide facilities or shelter for public assembly, educational, business, mercantile, institutional, storage and residential occupancies, as well as those portions of factory and industrial occupancies designed primarily for human occupancy. This code thereby addresses the design of energy-efficient building envelopes and the selection and installation of energy-efficient mechanical, service water-heating, electrical distribution and illumination systems and equipment for the effective use of energy in these buildings and structures. NOTE: All referenced Chapters, Sections and Tables in this Chapter correspond directly to the *International Energy Conservation Code, 2003 Edition.*

101.2.1 Exempt buildings. Buildings and structures indicated in Sections 101.2.1.1 through 101.2.1.5 shall be exempt from the building envelope provisions of this code, but shall comply with the provisions for building, mechanical, service water heating and lighting systems.

101.2.1.1 Separated buildings. Buildings and structures, or portions thereof separated by building envelope assemblies from the remainder of the building, that have a peak design rate of energy usage less than 3.4 Btu/h per square foot (10.7 W/m^2) or 1.0 watt per square foot (10.7 W/m^2) of floor area for space conditioning purposes.

101.2.1.2 Unconditioned buildings. Buildings and structures or portions thereof, which are neither heated nor cooled.

101.2.1.3: Buildings and structures or portions thereof that are exclusively heated or cooled by renewable fuels.

101.2.1.4: Mobile homes

101.2.1.5: Temporary use structures such as hunting and fishing camps, boat houses, remote cabins, etc. that do not meet the definition of "dwelling units" in Section 202; General Definitions.

101.2.2 Applicability. The provisions of this code shall apply to all matters affecting or relating to structures and premises, as set forth in Section 101. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

101.2.2.1 Existing installations. Except as otherwise provided for in this chapter, a provision in this code shall not require the removal, alteration or abandonment of, nor prevent the continued utilization and maintenance of, an existing building envelope, mechanical, service water-heating, electrical distribution or illumination system lawfully in existence at the time of the adoption of this code.

101.2.2.2 Additions to Existing Buildings: Additions to existing buildings or structures may be made to such buildings or structures without making the entire building or structure comply. The new addition shall conform to the provisions of this Code as they relate to new construction only.

101.2.2.3 Renovations: Any rehabilitation of an existing building that requires more than 25 percent of the gross floor area or volume of the entire building to be rebuilt shall comply with this Code. Cosmetic work such as painting, wall covering, wall paneling, and floor covering shall not be included.

101.2.2.4 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or movement of buildings or structures shall not be mandatory for existing buildings or structures specifically identified and classified as historically significant by the state or local jurisdiction, listed in *The National Register of Historic Places* or which have been determined to be eligible for such listing.

101.2.3 Mixed occupancy. When a building houses more than one occupancy, each portion of the building shall conform to the requirements for the occupancy housed therein. Where minor accessory uses do not occupy more than 10 percent of the area of any floor of a building, the major use shall be considered the building occupancy. Buildings, other than detached one- and two-family dwellings and townhouses, with a height of four or more stories above grade shall be considered commercial buildings for purposes of this code, regardless of the number of floors that are classified as residential occupancy.

101.3 Intent. The provisions of this code shall regulate the design of building envelopes for adequate thermal resistance and low air leakage and the design and selection of mechanical, electrical, service water-heating and illumination systems and equipment which will enable effective use of energy in new building construction. It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques to achieve effective utilization of energy. This code is not intended to abridge safety, health or environmental requirements under other applicable codes or ordinances.

101.4 Compliance. Compliance with this code shall be determined in accordance with Sections 101.4.1 and 101.4.2.

101.4.1 Residential buildings. For residential buildings the following shall be used as the basis for compliance assessment: a systems approach for the entire building (Chapter 4), an approach based on performance of individual components of the building envelope (Chapter 5), an approach based on performance of the total building envelope (Chapter 5), an approach based on acceptable practice for each envelope component (Chapter 5), an approach by prescriptive specification for individual components of the building envelope (Chapter 5), or an approach based on simplified, prescriptive specification (Chapter 6) where the conditions set forth in Section 101.4.1.1 or 101.4.1.2 are satisfied.

101.4.1.1 Detached one- and two-family dwellings. When the glazing area does not exceed 15 percent of the gross area of exterior walls.

101.4.1.2 Residential buildings, Group R-2, R-4 or townhouses. When the glazing area does not exceed 25 percent of the gross area of exterior walls.

101.4.2 Commercial buildings. For commercial buildings, a prescriptive or performance-based approach (Chapter 7) or as specified by acceptable practice (Chapter 8) shall be used as the basis for compliance assessment.

SECTION 102
MATERIALS, SYSTEMS AND EQUIPMENT

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

102.2 Materials, equipment and systems installation. All insulation materials, caulking and weatherstripping, fenestration assemblies, mechanical equipment and systems components, and water-heating equipment and system components shall be installed in accordance with the manufacturer's installation instructions.

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

102.4 Insulation installation. Roof/ceiling, floor, wall cavity and duct distribution systems insulation shall be installed in a manner that permits inspection of the manufacturer's *R*-value identification mark.

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

102.5 Identification. Materials, equipment and systems shall be identified in accordance with Sections 102.5.1, 102.5.2 and 102.5.3.

102.5.1 Building envelope insulation. A thermal resistance *(*R) identification mark shall be applied by the manufacturer to each piece of building envelope insulation 12 inches (305 mm) or greater in width. Alternatively, the insulation installer shall provide a signed and dated certification for the insulation installed in each element of the building envelope, listing the type of insulation installations in roof/ceilings, the manufacturer and the *R*-value. For blown-in or sprayed insulation, the installer shall also provide the initial installed thickness, the settled thickness, the coverage area and the number of bags installed. Where blown-in or sprayed insulation is installed in walls, floors and cathedral ceilings, the installer shall provide a certification of the installed density and *R*-value. The installer shall post the certification in a conspicuous place on the job site.

102.5.1.1 Roof/ceiling insulation. The thickness of roof/ceiling insulation that is either blown in or sprayed shall be identified by thickness markers that are labeled in inches or millimeters installed at least one for every 300 square feet (28 m^2) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness and minimum settled thickness with numbers a minimum of 1 inch (25 mm) in height. Each marker shall face the attic access. The thickness of installed insulation shall meet or exceed the minimum initial installed thickness shown by the marker.

102.5.2 Fenestration product rating, certification and labeling. *U*-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and

labeled and certified by the manufacturer. Where a shading coefficient for a fenestration product is used, it shall be determined by converting the product's SHGC, as determined in accordance with NFRC 200, to a shading coefficient, by dividing the SHGC by 0.87. Such certified and labeled *U*-factors and SHGCs shall be accepted for purposes of determining compliance with the building envelope requirements of this code.

When a manufacturer has not determined product *U*-factor in accordance with NFRC 100 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a default *U*-factor in accordance with Tables 102.5.2(1) and 102.5.2(2). When a SHGC or shading coefficient is used for code compliance and a manufacturer has not determined product SHGC in accordance with NFRC 200 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a default SHGC in accordance with Table 102.5.2(3). Product features must be verifiable for the product to qualify for the default value associated with those features. Where the existence of a particular feature cannot be determined with reasonable certainty, the product shall not receive credit for that feature. Where a composite of materials from two different product types is used, the product shall be assigned the higher *U*-factor.

102.5.3 Duct distribution systems insulation. A thermal resistance *(*R) identification mark shall be applied by the manufacturer in maximum intervals of no greater than 10 feet (3048 mm) to insulated flexible duct products showing the thermal performance R-value for the duct insulation itself (excluding air films, vapor retarders or other duct components).

TABLE 102.5.2(1)
U-FACTOR DEFAULT TABLE FOR WINDOWS, GLAZED DOORS AND SKYLIGHTS

FRAME MATERIAL AND PRODUCT TYPE[a]	SINGLE GLAZED	DOUBLE GLAZED
Metal without thermal break:		
Curtin wall	1.22	0.79
Fixed	1.13	0.69
Garden window	2.60	1.81
Operable (including sliding and swinging glass doors)	1.27	0.87
Site-assembled sloped/overhead glazing	1.36	0.82
Skylight	1.98	1.31
Metal with thermal break:		
Curtain wall	1.11	0.68
Fixed	1.07	0.63
Operable (including sliding and swinging glass doors)	1.08	0.65
Site-assembled sloped/overhead glazing	1.25	0.70
Skylight	1.89	1.11
Reinforced vinyl/metal clad wood:		
Fixed	0.98	0.56
Operable (including sliding and swinging glass doors)	0.90	0.57
Skylight	1.75	1.05
Wood/vinyl/fiberglass:		
Fixed	0.98	0.56
Garden window	2.31	1.61
Operable (including sliding and swinging glass doors)	0.89	0.55
Skylight	1.47	0.84

a. Glass block assemblies with mortar but without reinforcing or framing shall have a *U*-factor of 0.60.

TABLE 102.5.2(2)
U-FACTOR DEFAULT TABLE FOR NONGLAZED DOORS

DOOR TYPE	WITH FOAM CORE	WITHOUT FOAM CORE
Steel doors (1.75 inches thick)	0.35	0.60
	WITH STORM DOOR	**WITHOUT STORM DOOR**
Wood doors (1.75 inches thick)		
Hollow core flush	0.32	0.46
Panel with 0.438-inch panels	0.36	0.54
Panel with 1.125-inch panels	0.28	0.39
Solid core flush	0.26	0.40

For SI: 1 inch = 25.4 mm.

TABLE 102.5.2(3)
SHGC DEFAULT TABLE FOR FENESTRATION

PRODUCT DESCRIPTION	SINGLE GLAZED				DOUBLE GLAZED			
	Clear	Bronze	Green	Gray	Clear + Clear	Bronze + Clear	Green + Clear	Gray + Clear
Metal frames								
Fixed	0.78	0.67	0.65	0.64	0.68	0.57	0.55	0.54
Operable	0.75	0.64	0.62	0.61	0.66	0.55	0.53	0.52
Nonmetal frames								
Fixed	0.75	0.64	0.62	0.61	0.66	0.54	0.53	0.52
Operable	0.63	0.54	0.53	0.52	0.55	0.46	0.45	0.44

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

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

Compliance with specific provisions of this code may be determined through the use of deemed to comply computer software, worksheets, compliance manuals and other similar materials when they have been approved by the Arkansas Energy Office.

SECTION 104
CONSTRUCTION DOCUMENTS

104.1 General. Construction documents and other supporting data shall be submitted in one or more sets with each application for a permit. The construction documents and designs submitted under the provisions of Chapter 4 shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the code official is authorized to require additional construction documents to be prepared by a registered design professional.

Exceptions:

1. The code official is authorized to waive the submission of construction documents and other supporting data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.

2. For residential buildings having a conditioned floor area of 5,000 square feet (465 m^2) or less, designs submitted under the provisions of Chapter 4 shall be prepared by anyone having qualifications acceptable to the code official.

104.2 Information on construction documents. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted when approved by the code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in sufficient detail pertinent data and features of the building and the equipment and systems as herein governed, including, but not limited to, design criteria, exterior envelope component materials, *U*-factors of the envelope systems, *U*-factors of fenestration products, *R*-values of insulating materials, size and type of apparatus and equipment, equipment and systems controls and other pertinent data to indicate compliance with the requirements of this code and relevant laws, ordinances, rules and regulations, as determined by the code official.

104.3 Design Professional: Architects and engineers employed to prepare plans and specifications for new buildings shall ensure the plans and specifications comply with the provisions of this Code in a manner consistent with their obligations under Arkansas State law (see also the *Arkansas Fire Prevention Code 2002 Edition,* Volume I Fire, Volume II Building).

SECTION 105
CONTRACTOR / BUILDER COMPLIANCE

105.1 General: Compliance with this Code shall be the obligation of the licensed builder or contractor.

105.1.1 Compliance: Compliance signifies that the licensed builder or contractor has constructed or will construct or renovate the building in compliance with the requirements of this Code, and that by inspection within a two-year period from the date of completion, if the building fails to meet the Code's specifications, understands that he or she is responsible for bringing the building into compliance with this Code.

105.1.2 Compliance Materials: Compliance materials, instructions and Arkansas Energy Office approved tools and third-party services, are made a part of this Code by reference.

105.1.3 Compliance by Self-Builders: Compliance with this Code by builders who build, or contract to build, single-family buildings for their own occupancy is voluntary.

105.2 Compliance Alternatives

105.2.1 Alternative Compliance Tools: Arkansas Energy Office approved alternative compliance tools may be used to validate code compliance.

105.2.2 Federally Financed Homes: Newly constructed single and multi-family buildings financed through HUD/FHA, VA, and USDA Rural Development programs shall meet the thermal performance requirements of this Code.

SECTION 106
INSPECTIONS

106.1 General. Construction or work that must comply with this code shall be subject to inspection by the Arkansas Energy Office or its agent, or by the code official if a county or municipality elects to adopt this Code.

106.2 Approvals required. No work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the code official. No construction shall be concealed without inspection approval from the code official.

106.3 Final inspection. Code officials within a county or municipality who have adopted this Code shall perform a final inspection and approval for buildings when completed and ready for occupancy.

106.4 Reinspection. The Arkansas Energy Office or its agent or code official may cause a structure to be reinspected.

SECTION 107
ENFORCEMENT

107.1 General: Enforcement of this Code shall be the responsibility of the Arkansas Energy Office or local government (if adopted).

107.2 Local Government: Any county or municipality may elect to adopt this Code for new construction, additions and renovation of existing structures. However, the local municipality shall not in any way modify the energy conservation standards in this Code or promulgate or adopt rules or regulations that are less stringent than this Code.

A local government may exercise other administrative and enforcement procedures that it deems necessary to affect the purposes of this Code, including, but not limited to, prior plan approval, building permit requirements, and inspections during the course of construction.

SECTION 108
APPEALS

108.1 Board of Appeals: Any appeal of the energy conservation standards contained in this Code shall be made to the Board of Appeals established by the Arkansas Energy Office, and a decision on an appeal will be made within 45 days of its filing.

108.2 Local Government: In any county or municipality where this Code is adopted, the governing body shall establish a Board of Appeals to adjudicate complaints arising from the application of the Code. When a Board of Appeals is established, the governing body shall prescribe procedures for providing a fair and reasonable hearing of the appeal.

SECTION 109
VALIDITY

109.1 General. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

SECTION 110
RESPONSIBILITY

110.1 These minimum standards shall not be construed as relieving the licensed builder or contractor of his or her responsibility for compliance with local ordinances, codes, and regulations.

SECTION 111
REFERENCED STANDARDS

111.1 General. The standards, and portions thereof, which are referred to in this code and listed in Chapter 10, shall be considered part of the requirements of this code to the extent of such reference.

111.2 Conflicting requirements. When a section of this code and a section of a referenced standard from Chapter 10 specify different materials, methods of construction or other requirements, the provisions of this code shall apply.

SECTION 112
EFFECTIVE DATE

112.1 The effective date of this Code for residential buildings, as defined herein, is 10/1/2004. The effective date of this Code for commercial buildings, as defined herein, is 10/1/2004.

CHAPTER 2
DEFINITIONS

* Revise Section 202 GENERAL DEFINITIONS to read as follows:

EFFICIENCY, HVAC SYSTEM. The ratio of useful energy output (at the point of use) to the energy input in consistent units for a designated time period, expressed in percent.

RECOOLING. The removal of heat by sensible cooling of the supply air (directly or indirectly) which has been previously heated above the temperature to which the air is to be supplied to the conditioned space for proper control of the temperature of that space.

RECOVERED ENERGY. Energy utilized which would otherwise be wasted (i.e., not contribute to a desired end use) from an energy utilization system.

RESET. Adjustment of the set point of a control instrument to a higher or lower value automatically or manually to conserve energy.

RESIDENTIAL BUILDING. Detached one- and two-family dwellings.

CHAPTER 3
DESIGN CONDITIONS

TABLE 302.1
EXTERIOR DESIGN CONDITIONS

* Revise footnotes *b* and *c* and add footnote *d* under table 302.1 as follows:

b. The degree days heating (base 68°F) and cooling (base 68°F) shall be selected from NOAA "Annual Degree Days to Selected Bases Derived from the 1961-1990 Normals," the ASHRAE *Handbook of Fundamentals*, data available from adjacent military installations, or other source of local weather data acceptable to the code official.

c. The climate zone shall be selected from the map provided in Figure 302.1(1) on the following page.

d. Load calculations may be determined by using ACCA Manual J for residential, and ACCA Manual N for commercial.

* Add the following FIGURE 302.1(1) showing the four climate zones in Arkansas with a list of counties and their associated climate zones, and add Table 302.2 Arkansas HDD and zones:

Arkansas Climate Zones

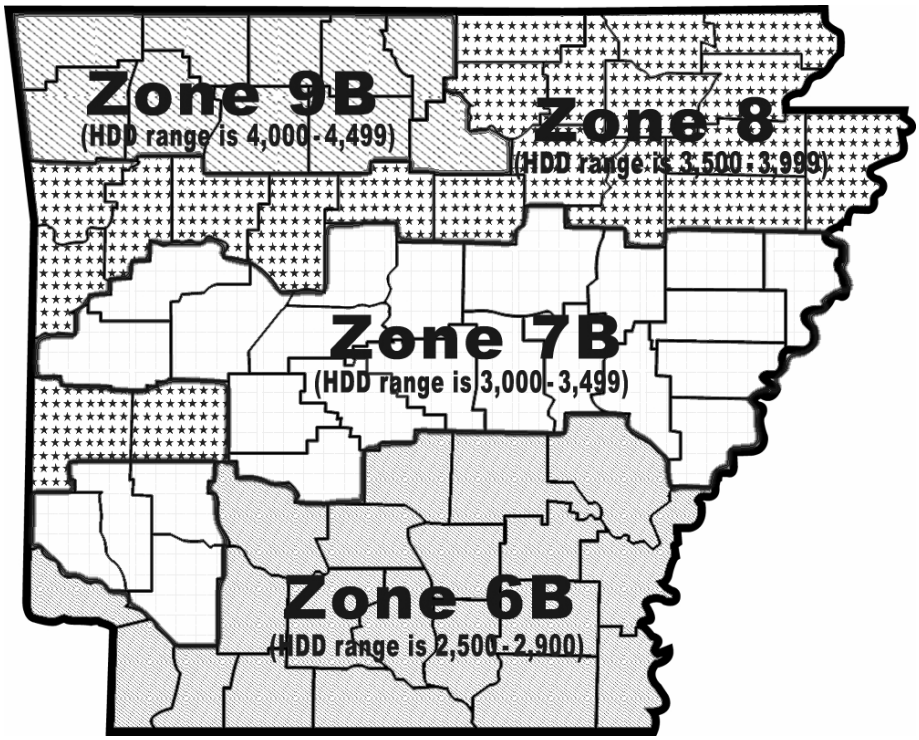


FIGURE 302.1(1)
ARKANSAS

Zone	County
6B	Arkansas (H)
6B	Ashley (H)
9B	Baxter
9B	Benton
9B	Boone
6B	Bradley (H)
6B	Calhoun (H)
9B	Carroll
6B	Chicot (H)
6B	Clark (H)
8	Clay
8	Cleburne
6B	Cleveland (H)
6B	Columbia (H)
7B	Conway (H)
8	Craighead
8	Crawford
7B	Crittenden (H)
7B	Cross (H)
6B	Dallas (H)
6B	Desha (H)
6B	Drew (H)
7B	Faulkner (H)
8	Franklin
8	Fulton
7B	Garland (H)
6B	Grant (H)
8	Greene
7B	Hempstead (H)
7B	Hot Spring (H)
7B	Howard (H)
8	Independence
8	Izard
8	Jackson
6B	Jefferson (H)
8	Johnson
6B	Lafayette (H)

Zone	County
8	Lawrence
7B	Lee (H)
6B	Lincoln (H)
6B	Little River (H)
7B	Logan (H)
7B	Lonoke (H)
9B	Madison
9B	Marion
6B	Miller (H)
8	Mississippi
7B	Monroe (H)
8	Montgomery
6B	Nevada (H)
9B	Newton
6B	Ouachita (H)
7B	Perry (H)
7B	Phillips (H)
7B	Pike (H)
8	Poinsett
8	Polk
8	Pope
7B	Prairie (H)
7B	Pulaski (H)
8	Randolph
7B	Saline (H)
7B	Scott (H)
9B	Searcy
8	Sebastian
7B	Sevier (H)
8	Sharp
7B	St Francis (H)
9B	Stone
6B	Union (H)
8	Van Buren
9B	Washington
7B	White (H)
7B	Woodruff (H)
7B	Yell (H)

Table 302.2 Arkansas HDD* and zones

Zone	HDD
6B	2,500 – 2,999
7B	3,000 – 3,499
8	3,500 – 3,999
9B	4,000 – 4,499

* HDD = Heating Degree Days

Note: Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

CHAPTER 4
RESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS AND DESIGN OF BUILDINGS UTILIZING RENEWABLE ENERGY SOURCES

* Delete Section 402.2.3.1.3 FENESTRATION SYSTEM SOLAR HEAT GAIN COEFFICIENT, STANDARD DESIGN without substitution.

CHAPTER 5
RESIDENTIAL BUILDING DESIGN BY COMPONENT PERFORMANCE APPROACH

* Revise Exception 2 in Section 502.1.1 MOISTURE CONTROL as follows:

2. Vapor retarders shall not be required where the county in which the building is being constructed is considered a hot and humid climate area and identified as such in Figure 302.1(1).

* Delete Section 502.1.5 FENESTRATION SOLAR HEAT GAIN COEFFICIENT without substitution.

* Revise Table 503.3.3.3 MINIMUM DUCT INSULATION as follows:

TABLE 503.3.3.3
MINIMUM DUCT INSULATION [a]

ANNUAL HEATING DEGREE DAYS	Insulation *R*-value [d]			
	Ducts in unconditioned attics or outside building		Ducts in unconditioned basements, crawl spaces, garages, and other unconditioned spaces [c]	
	Supply	Return	Supply	Return
< 1,500	8	4	4	0
1,500 to 3,500	5.6	5.6	5.6	5.6
3,501 to 7,500	5.6	5.6	5.6	5.6
> 7,500	11	6	11	2

* Delete footnote b in Table 503.3.3.3 without substitution.

SECTION 503
BUILDING MECHANICAL SYSTEMS AND EQUIPMENT

* Replace the *International Mechanical Code* with the *Arkansas Mechanical Code* in Sections 503.3.3.4 DUCT CONSTRUCTION, 503.3.3.4.1 HIGH-AND MEDIUM-PRESSURE DUCT SYSTEMS and 503.3.3.4.2 LOW-PRESSURE DUCT SYSTEMS.

CHAPTER 6
SIMPLIFIED PRESCRIPTIVE REQUIREMENTS FOR DETACHED ONE- AND TWO-FAMILY DWELLINGS AND GROUP R-2, R-4 OR TOWNHOUSE RESIDENTIAL BUILDINGS

* Revise Section 601.2 COMPLIANCE to include deemed to comply tools that are approved by the Arkansas Energy Office.

601.2 Compliance. Compliance shall be demonstrated in accordance with Section 601.2.1 or 601.2.2. Deemed to comply tools that are approved by the Arkansas Energy Office shall be permitted to demonstrate compliance.

* Revise Section 601.3.2.1 DEFAULT FENESTRATION PERFORMANCE as follows:

601.3.2.1 Default fenestration performance. Where a manufacturer has not determined a fenestration product's *U*-factor in accordance with NFRC 100, compliance shall be determined by assigning such products a default *U*-factor from Tables 102.5.2(1) and 102.5.2(2).

* Modify Exception in Section 602.1.6 SLAB-ON-GRADE FLOORS as follows:

Exception: Slab perimeter insulation is not required for unheated slabs in areas of moderate to very heavy termite infestation probability as shown in Figure 502.2(7). Where this exception is used, building envelope compliance shall be demonstrated by using Section 502.2.2 or Chapter 4 with the actual "Slab perimeter *R*-value and depth" in Table 602.1, or by using Section 502.2.4.

* Delete Section 602.2 MAXIMUM SOLAR HEAT GAIN COEFFICIENT FOR FENESTRATION PRODUCTS without substitution.

CHAPTER 7

BUILDING DESIGN FOR ALL COMMERCIAL BUILDINGS

* Revise ASHRAE/IESNA 90.1 to ANSI/ASHRAE/IESNA 90.1-2001 in the following section:

701.1 Scope. Commercial buildings shall meet the requirements of ANSI/ASHRAE/IESNA 90.1-2001.

CHAPTER 8
DESIGN BY ACCEPTABLE PRACTICE FOR COMMERCIAL BUILDINGS

* Replace the *International Mechanical Code* with the *Arkansas Mechanical Code* in Sections 803.2.5 VENTILATION, 803.2.6 COOLING WITH OUTDOOR AIR, 803.2.8.1 DUCT CONSTRUCTION, 803.2.8.1.1 HIGH- AND MEDIUM-PRESSURE DUCT SYSTEMS, 803.2.8.1.2 LOW-PRESSURE DUCT SYSTEMS, 803.3.4 REQUIREMENTS FOR COMPLEX MECHANICAL SYSTEMS SERVING MULTIPLE ZONES, and 803.3.8.1 AIR SYSTEM BALANCING.

***** Replace ASHRAE/IESNA 90.1 with ANSI/ASHRAE/IESNA 90.1-2001 in Sections 801.2 APPLICATIONS, SECTION 802 BUILDING ENVELOPE REQUIREMENTS, 802.1 GENERAL, and 802.2 CRITERIA.

CHAPTER 10
REFERENCED STANDARDS

* Revise Chapter 10 REFERENCED STANDARDS to include the following:

AFC

Arkansas Fire Prevention Code
State Fire Marshal's Office
#1 State Police Plaza Dr
Little Rock, AR 72209
(501) 618-8624
Fax (501) 618-8621

Standard Reference Number	Title	Referenced in Code Section Number
AFC		104.3

AMC

Arkansas Mechanical Code
Department of Health
Division of Protective Health Codes
4815 West Markham Street, Slot 24
Little Rock, AR 72205-3867
(501) 661-2642
Fax (501) 661-2671
http://www.healthyarkansas.com/phc/

Standard Reference Number	Title	Referenced in Code Section Number
AMC		503.3.3.4, 503.3.3.4.1, 503.3.3.4.2, 803.2.5, 803.2.6, 803.2.8.1, 803.2.8.1.1, 803.2.8.1.2, 803.3.4, 803.3.8.1

Introduction – Residential Construction

Effective October 1, 2004, Arkansas adopts the *International Energy Conservation Code (IECC), 2003 Edition*, published and copyrighted by the International Codes Council and the Southern Building Code Congress International, Inc. When the IECC 2003 Edition is used in conjunction with the *Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code*, this shall constitute the official *2004 Arkansas Energy Code for New Building Construction*.

Questions, inquiries or request for hard copies of the *2004 Arkansas Energy Code for New Building Construction*, which includes the *Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code*, may be addressed to:

Arkansas Energy Office
Attn: *2004 Arkansas Energy Code for New Building Construction*
One State Capitol Mall
Little Rock, AR 72201
Phone: 800-558-2633 or 501-682-6103
Fax: 501-682-2703
Email: energy@1-800-ARKANSAS.com
Download code information and compliance tools at: www.1800arkansas.com/energy/energycode

To order copies of the *International Energy Conservation Code, 2003 Edition* with the *2004 Arkansas Supplements and Amendments to the International Energy Conservation Code*, contact:

International Code Council
900 Montclair Road
Birmingham, Alabama 35213-1206
Phone: 1-800-786-4452, Fax: 205-591-0775
Telecommunications Device for the Deaf: 205-599-9742

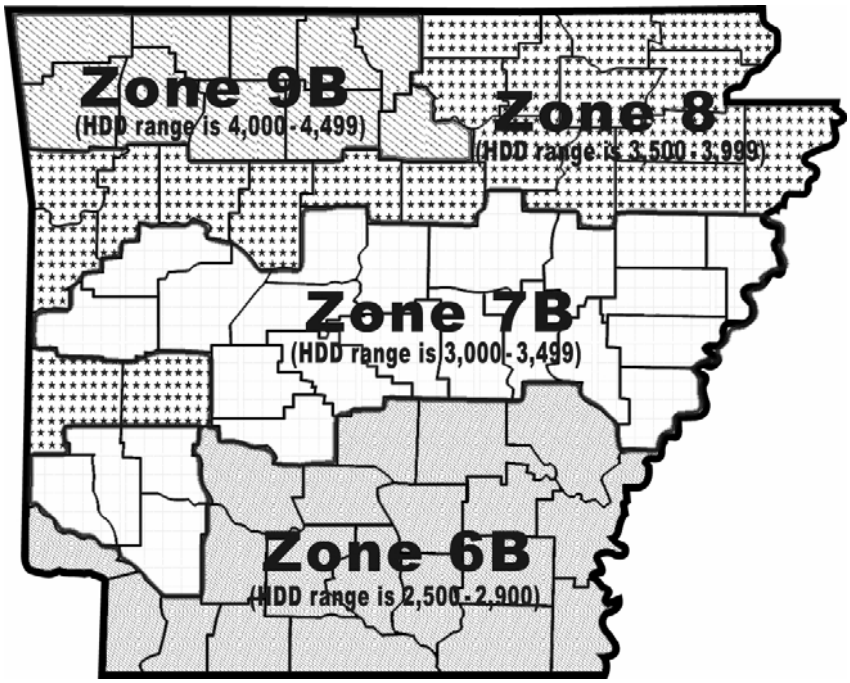
Residential Compliance Tools

A simplified code compliance tool was developed to evaluate compliance with the *2004 Arkansas Energy Code for New Building Construction* based on current Arkansas building practices, technologies and product availability. There are four distinct climate zones in Arkansas; a simplified compliance tool was developed for each of the four climate zones. The Arkansas climate zone map (next page) establishes groups of counties into climate zones labeled 6B, 7B, 8 or 9B.

Each climate zone's compliance tool prescribes efficiency levels for walls and ceilings. When these prescribed insulation levels are used in conjunction with the maximum allowable window percentage (of the gross wall area) for a particular window frame type, then the home will comply with the thermal requirements of the proposed 2004 Arkansas Energy Code for New Building Construction.

To view any of the simplified compliance tools, click on the county in the climate zone map (next page) where the home is being built.

Arkansas Climate Zones



ARKANSAS' CLIMATE ZONES - CLICK ZONE TO VIEW INFO

Zone	County
6B	Arkansas (H)
6B	Ashley (H)
9B	Baxter
9B	Benton
9B	Boone
6B	Bradley (H)
6B	Calhoun (H)
9B	Carroll
6B	Chicot (H)
6B	Clark (H)
8	Clay
8	Cleburne
6B	Cleveland (H)
6B	Columbia (H)
7B	Conway (H)
8	Craighead
8	Crawford
7B	Crittenden (H)
7B	Cross (H)
6B	Dallas (H)
6B	Desha (H)
6B	Drew (H)
7B	Faulkner (H)
8	Franklin
8	Fulton
7B	Garland (H)
6B	Grant (H)
8	Greene
7B	Hempstead (H)
7B	Hot Spring (H)
7B	Howard (H)
8	Independence
8	Izard
8	Jackson
6B	Jefferson (H)
8	Johnson
6B	Lafayette (H)

Zone	County
8	Lawrence
7B	Lee (H)
6B	Lincoln (H)
6B	Little River (H)
7B	Logan (H)
7B	Lonoke (H)
9B	Madison
9B	Marion
6B	Miller (H)
8	Mississippi
7B	Monroe (H)
8	Montgomery
6B	Nevada (H)
9B	Newton
6B	Ouachita (H)
7B	Perry (H)
7B	Phillips (H)
7B	Pike (H)
8	Poinsett
8	Polk
8	Pope
7B	Prairie (H)
7B	Pulaski (H)
8	Randolph
7B	Saline (H)
7B	Scott (H)
9B	Searcy
8	Sebastian
7B	Sevier (H)
8	Sharp
7B	St Francis (H)
9B	Stone
6B	Union (H)
8	Van Buren
9B	Washington
7B	White (H)
7B	Woodruff (H)
7B	Yell (H)

Table 302.2 Arkansas HDD* and zones

Zone	HDD
6B	2,500 – 2,999
7B	3,000 – 3,499
8	3,500 – 3,999
9B	4,000 – 4,499

* HDD = Heating Degree Days

Note: Counties identified with (H) shall be considered "hot and humid climate areas" for purposes of the application of Section 502.1.1.

Additional Code Facts

Compliance with this Code shall be the responsiblity of the licensed homebuilder.

Enforcement of this Code shall be the responsibility of the local government (if adopted).

Exempt buildings include the following: (1) Unconditioned buildings that are neither heated nor cooled, (2) mobile homes and temporary use structures such as hunting and fishing camps, and (3) boat houses and remote cabins that are not defined as “dwelling units.”

HVAC Equipment: The Arkansas Mechanical Code requires a heating and cooling load analysis (Manual J or other approved calculation method) to match the appropriate capacity of the systems to the load of the house in your climate. Request a Manual J load analysis from your HVAC company to verify that the systems have been properly sized.

Duct Insulation: Supply and return-air metal ducts in crawlspaces, uninsulated basements, attics and framed wall cavities must be vapor sealed and insulated to R-5.6. If ductwork is located on the exterior, it must be insulated to R-8.

Duct Construction: All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or UL-approved tapes. Standard duct tape is not permitted.

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Helpful Resources

ARKcheck™

These compliance options are not all-inclusive and may not reflect your construction practices, product choices or unique designs. As an alternative approach to code compliance, the Arkansas Energy Unit offers the ARKcheck™ program — an easy-to-use code compliance software tool that can evaluate any home with any combination of R-values, window U-factors and specific component areas. For example, depending on window type, a two-story home might comply with the code with a slightly greater window percentage. The computer program provides the flexibility for tradeoffs between all envelope components, window efficiencies and higher-than-minimum heating/cooling equipment.

Energy Performance Tune-up

This booklet provides Arkansas’ builders with many helpful tips on building better-performing new homes. Improving performance increases comfort, improves longevity and reduces builder callbacks. Ask the ADED Energy Unit for a free copy of the *Energy Performance Tune-up.*

Code Materials and Assistance

All Energy Code materials and compliance tools are free. Call 1-800-558-2633 or 501-682-1370 to request hard copies or view and download materials at www.1800arkansas.com/energy and click on “residential.”

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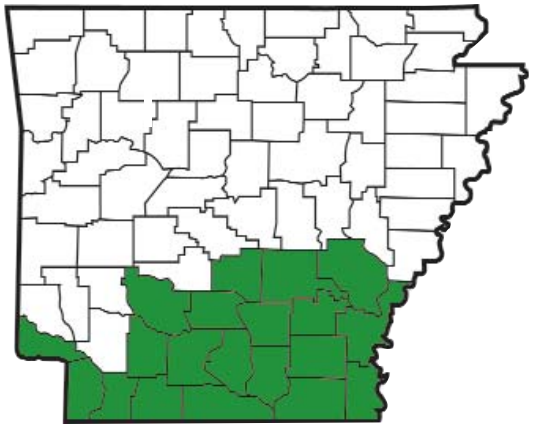
Arkansas Department of Economic Development

Arkansas 2004 Residential Energy Code



ARKANSAS

Zone 6B

(HDD range is 2500-2999)

Arkansas • Ashley
Bradley • Calhoun • Chicot
Clark • Cleveland
Columbia • Dallas • Desha
Drew • Grant • Jefferson
Lafayette • Lincoln
Little River • Miller
Nevada • Ouachita • Union

Code Compliance

The 2004 Arkansas Energy Code for new home construction helps to ensure that the state's housing stock continues to retain its value, quality and affordability. This simplified code brochure has been developed for builders to more easily understand, use and comply with the Arkansas Energy Code.

A new home in **ZONE 6** complies with the standards for the *2004 Arkansas Energy Code for New Construction* if the following conditions are met:

- Ceiling insulation is R-30. If R-38 is used, add 1 percent to window area.
- Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to allowable window area.
- The percentage of double-glazed window area to gross wall area does not exceed values in the Maximum Allowable Window Percentages table.
- Floors over crawlspaces are R-19. If slab insulation is to be installed, then a minimum of R-4 is required. See the "Slab Insulation" section in this brochure.
- The heating and cooling system efficiencies are at least national minimums.

Ceiling: R-30. One percent of window area can be added to any of the above window percentages if the ceiling insulation is increased to R-38 or if a raised-heel truss or other construction technique is used that allows the full R-30 to extend over the top plate of the exterior walls.

Walls: Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to window percentage.

Maximum Allowable Window Percentages:

Window frame type	R-0 slab	R-4 slab or R-19 floor
Wood or vinyl with low-e and gas filled (U-0.41*)	19%	27%
Vinyl or wood (U-0.56*)	13%	19%
Thermal break aluminum (U-0.65*)	11%	15%
Aluminum — non-thermal (U-0.87*)	8%	11%

* *These U-factors are recognized default values for each window type. The maximum allowable window percentage may increase if a more efficient window (lower U-factor) is used.*

Percentage Window Area: Estimate percent window in the wall by dividing the total rough opening of the window area by the gross wall area. The window percentage is a ratio of the window area in the heated and cooled space to the gross wall area. This includes, but is not limited to, decorative windows, glass doors and basement windows but excludes opaque doors and skylights.

Percent Window Area Example: The total rough opening window area is 180 square feet. The building's perimeter is 150 feet, and the walls are 10 feet high. Therefore, the gross wall area is 150 x 10 = 1,500 square feet. For this example, the percent of window in the wall is:
180 / 1,500 = 0.12 or 12 percent.

Floor R-Value: R-19. Requirements apply to floors over unconditioned spaces — such as unconditioned crawl spaces, basements and garages. Floors over outside air — such as cantilevers, bay windows, etc. — must meet the ceiling requirements.

Slab Insulation: R-4 or greater. Slab insulation is not required to meet minimum thermal code compliance. However, if slab insulation is installed, the code requires a total of twenty-four (24) inches of insulation. The first four (4) inches are critical and should be placed vertically around the perimeter of the slab. The remaining twenty (20) inches can run horizontally or vertically under the slab. Any exposed insulation shall be protected.

For most slab foundation types, there is a slab insulation technique that meets these specifications. If perimeter slab insulation is under consideration, check with a pest control company for approved methods in your area.

National Minimums: The national minimum for heating is 78 AFUE (Annual Fuel Utilization Efficiency); for cooling, it is 10 SEER (Seasonal Energy Efficiency Ratio).

Air Leakage: All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc.

For questions, call the Energy Code Hotline at 1-800-558-2633 or 501-682-1370, or e-mail your question to energy@1800arkansas.com

Additional Code Facts

Compliance with this Code shall be the responsiblity of the licensed homebuilder.

Enforcement of this Code shall be the responsibility of the local government (if adopted).

Exempt buildings include the following: (1) Unconditioned buildings that are neither heated nor cooled, (2) mobile homes and temporary use structures such as hunting and fishing camps, and (3) boat houses and remote cabins that are not defined as “dwelling units.”

HVAC Equipment: The Arkansas Mechanical Code requires a heating and cooling load analysis (Manual J or other approved calculation method) to match the appropriate capacity of the systems to the load of the house in your climate. Request a Manual J load analysis from your HVAC company to verify that the systems have been properly sized.

Duct Insulation: Supply and return-air metal ducts in crawlspaces, uninsulated basements, attics and framed wall cavities must be vapor sealed and insulated to R-5.6. If ductwork is located on the exterior, it must be insulated to R-8.

Duct Construction: All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or UL-approved tapes. Standard duct tape is not permitted.

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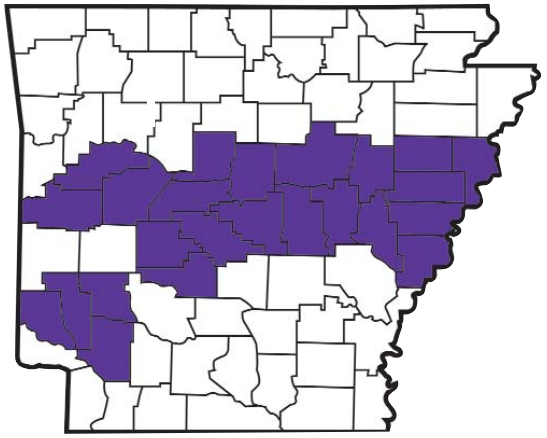
Arkansas 2004 Residential Energy Code



ARKANSAS

Zone 7B

(HDD range is 3000-3499)

Conway • Crittenden • Cross
Faulkner • Garland
Hempstead • Hot Spring
Howard • Lee • Logan
Lonoke • Monroe • Perry
Phillips • Pike • Prairie
Pulaski • Saline • Scott
Sevier • St. Francis • White
Woodruff • Yell

Code Compliance

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A new home in **ZONE 7** complies with the standards for the *2004 Arkansas Energy Code for New Construction* if the following conditions are met:

- Ceiling insulation is R-30. If R-38 is used, add 1 percent to window area.
- Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to allowable window area.
- The percentage of double-glazed window area to gross wall area does not exceed values in the Maximum Allowable Window Percentages table.
- Floors over crawlspaces are R-19. If slab insulation is to be installed, then a minimum of R-4 is required. See the "Slab Insulation" section in this brochure.
- The heating and cooling system efficiencies are at least national minimums.

Ceiling: R-30. One percent of window area can be added to any of the above window percentages if the ceiling insulation is increased to R-38 or if a raised-heel truss or other construction technique is used that allows the full R-30 to extend over the top plate of the exterior walls.

Walls: Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to window percentage.

Maximum Allowable Window Percentages

Window frame type	R-0 slab	R-4 slab or R-19 floor
Wood or vinyl with low-e and gas filled (U-0.41*)	17%	25%
Vinyl or wood (U-0.56*)	12%	17%
Thermal break aluminum (U-0.65*)	10%	14%
Aluminum — non-thermal (U-0.87*)	7%	10%

* *These U-factors are recognized default values for each window type. The maximum allowable window percentage may increase if a more efficient window (lower U-factor) is used.*

Percentage Window Area: Estimate percent window in the wall by dividing the total rough opening of the window area by the gross wall area. The window percentage is a ratio of the window area in the heated and cooled space to the gross wall area. This includes, but is not limited to, decorative windows, glass doors and basement windows but excludes opaque doors and skylights.

Percent Window Area Example: The total rough opening window area is 180 square feet. The building's perimeter is 150 feet, and the walls are 10 feet high. Therefore, the gross wall area is 150 x 10 = 1,500 square feet. For this example, the percent of window in the wall is:
180 / 1,500 = 0.12 or 12 percent.

Floor R-Value: R-19. Requirements apply to floors over unconditioned spaces — such as unconditioned crawl spaces, basements and garages. Floors over outside air — such as cantilevers, bay windows, etc. — must meet the ceiling requirements.

Slab Insulation: R-4 or greater. Slab insulation is not required to meet minimum thermal code compliance. However, if slab insulation is installed, the code requires a total of twenty-four (24) inches of insulation. The first four (4) inches are critical and should be placed vertically around the perimeter of the slab. The remaining twenty (20) inches can run horizontally or vertically under the slab. Any exposed insulation shall be protected.

For most slab foundation types, there is a slab insulation technique that meets these specifications. If perimeter slab insulation is under consideration, check with a pest control company for approved methods in your area.

National Minimums: The national minimum for heating is 78 AFUE (Annual Fuel Utilization Efficiency); for cooling, it is 10 SEER (Seasonal Energy Efficiency Ratio).

Air Leakage: All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc.

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Additional Code Facts

Compliance with this Code shall be the responsiblity of the licensed homebuilder.

Enforcement of this Code shall be the responsibility of the local government (if adopted).

Exempt buildings include the following: (1) Unconditioned buildings that are neither heated nor cooled, (2) mobile homes and temporary use structures such as hunting and fishing camps, and (3) boat houses and remote cabins that are not defined as “dwelling units.”

HVAC Equipment: The Arkansas Mechanical Code requires a heating and cooling load analysis (Manual J or other approved calculation method) to match the appropriate capacity of the systems to the load of the house in your climate. Request a Manual J load analysis from your HVAC company to verify that the systems have been properly sized.

Duct Insulation: Supply and return-air metal ducts in crawlspaces, uninsulated basements, attics and framed wall cavities must be vapor sealed and insulated to R-5.6. If ductwork is located on the exterior, it must be insulated to R-8.

Duct Construction: All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or UL-approved tapes. Standard duct tape is not permitted.

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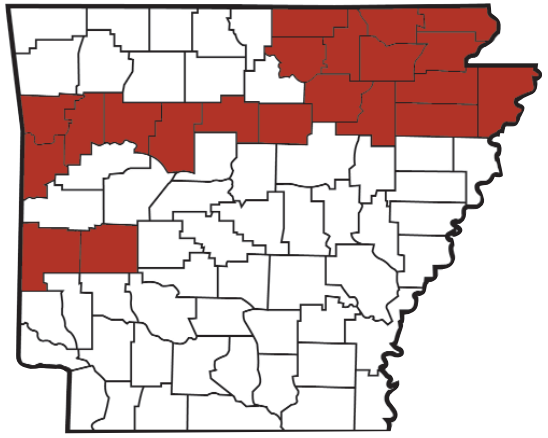
Arkansas Department of Economic Development

Arkansas 2004 Residential Energy Code



ARKANSAS

Zone 8

(HDD range is 3500-3999)

Clay • Cleburne • Craighead
Crawford • Franklin • Fulton
Greene • Independence
Izard • Jackson • Johnson
Lawrence • Mississippi
Montgomery • Poinsett • Polk
Pope • Randolph
Sebastian • Sharp
Van Buren

Code Compliance

The 2004 Arkansas Energy Code for new home construction helps to ensure that the state's housing stock continues to retain its value, quality and affordability. This simplified code brochure has been developed for builders to more easily understand, use and comply with the Arkansas Energy Code.

A new home in **ZONE 8** complies with the standards for the *2004 Arkansas Energy Code for New Construction* if the following conditions are met:

- Ceiling insulation is R-30. If R-38 is used, add 1 percent to window area.
- Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to allowable window area.
- The percentage of double-glazed window area to gross wall area does not exceed values in the Maximum Allowable Window Percentages table.
- Floors over crawlspaces are R-19. If slab insulation is to be installed, then a minimum of R-4 is required. See the "Slab Insulation" section in this brochure.
- The heating and cooling system efficiencies are at least national minimums.

Ceiling: R-30. One percent of window area can be added to any of the above window percentages if the ceiling insulation is increased to R-38 or if a raised-heel truss or other construction technique is used that allows the full R-30 to extend over the top plate of the exterior walls.

Walls: Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to window percentage.

Maximum Allowable Window Percentages

Window frame type	R-0 slab	R-4 slab or R-19 floor
Wood or vinyl with low-e and gas filled (U-0.41*)	16%	24%
Vinyl or wood (U-0.56*)	11%	16%
Thermal break aluminum (U-0.65*)	9%	13%
Aluminum — non-thermal (U-0.87*)	6%	9%

* *These U-factors are recognized default values for each window type. The maximum allowable window percentage may increase if a more efficient window (lower U-factor) is used.*

Percentage Window Area: Estimate percent window in the wall by dividing the total rough opening of the window area by the gross wall area. The window percentage is a ratio of the window area in the heated and cooled space to the gross wall area. This includes, but is not limited to, decorative windows, glass doors and basement windows but excludes opaque doors and skylights.

Percent Window Area Example: The total rough opening window area is 180 square feet. The building's perimeter is 150 feet, and the walls are 10 feet high. Therefore, the gross wall area is 150 x 10 = 1,500 square feet. For this example, the percent of window in the wall is:
180 / 1,500 = 0.12 or 12 percent.

Floor R-Value: R-19. Requirements apply to floors over unconditioned spaces — such as unconditioned crawl spaces, basements and garages. Floors over outside air — such as cantilevers, bay windows, etc. — must meet the ceiling requirements.

Slab Insulation: R-4 or greater. Slab insulation is not required to meet minimum thermal code compliance. However, if slab insulation is installed, the code requires a total of twenty-four (24) inches of insulation. The first four (4) inches are critical and should be placed vertically around the perimeter of the slab. The remaining twenty (20) inches can run horizontally or vertically under the slab. Any exposed insulation shall be protected.

For most slab foundation types, there is a slab insulation technique that meets these specifications. If perimeter slab insulation is under consideration, check with a pest control company for approved methods in your area.

National Minimums: The national minimum for heating is 78 AFUE (Annual Fuel Utilization Efficiency); for cooling, it is 10 SEER (Seasonal Energy Efficiency Ratio).

Air Leakage: All penetrations to the building envelope must be sealed, caulked, gasketed, weatherstripped or otherwise sealed. This includes, but is not limited to, areas around windows, doors, HVAC ductwork, plumbing pipe, electrical penetrations, etc.

For questions, call the Energy Code Hotline at 1-800-558-2633 or 501-682-1370, or e-mail your question to energy@1800arkansas.com

Additional Code Facts

Compliance with this Code shall be the responsiblity of the licensed homebuilder.

Enforcement of this Code shall be the responsibility of the local government (if adopted).

Exempt buildings include the following: (1) Unconditioned buildings that are neither heated nor cooled, (2) mobile homes and temporary use structures such as hunting and fishing camps, and (3) boat houses and remote cabins that are not defined as “dwelling units.”

HVAC Equipment: The Arkansas Mechanical Code requires a heating and cooling load analysis (Manual J or other approved calculation method) to match the appropriate capacity of the systems to the load of the house in your climate. Request a Manual J load analysis from your HVAC company to verify that the systems have been properly sized.

Duct Insulation: Supply and return-air metal ducts in crawlspaces, uninsulated basements, attics and framed wall cavities must be vapor sealed and insulated to R-5.6. If ductwork is located on the exterior, it must be insulated to R-8.

Duct Construction: All joints, seams and connections must be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric or UL-approved tapes. Standard duct tape is not permitted.

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Helpful Resources

ARKcheck™

These compliance options are not all-inclusive and may not reflect your construction practices, product choices or unique designs. As an alternative approach to code compliance, the Arkansas Energy Unit offers the ARKcheck™ program — an easy-to-use code compliance software tool that can evaluate any home with any combination of R-values, window U-factors and specific component areas. For example, depending on window type, a two-story home might comply with the code with a slightly greater window percentage. The computer program provides the flexibility for tradeoffs between all envelope components, window efficiencies and higher-than-minimum heating/cooling equipment.

Energy Performance Tune-up

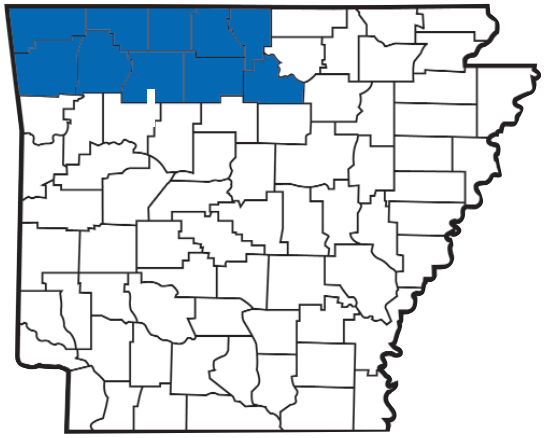
This booklet provides Arkansas’ builders with many helpful tips on building better-performing new homes. Improving performance increases comfort, improves longevity and reduces builder callbacks. Ask the ADED Energy Unit for a free copy of the *Energy Performance Tune-up.*

Code Materials and Assistance

All Energy Code materials and compliance tools are free. Call 1-800-558-2633 or 501-682-1370 to request hard copies or view and download materials at www.1800arkansas.com/energy and click on “residential.”

ARKANSAS
Arkansas Department of Economic Development

Arkansas 2004 Residential Energy Code



ARKANSAS

Zone 9B

(HDD range is 4000-4499)

Baxter • Benton
Boone • Carroll
Madison • Marion
Newton • Searcy
Stone • Washington

Code Compliance

The 2004 Arkansas Energy Code for new home construction helps to ensure that the state's housing stock continues to retain its value, quality and affordability. This simplified code brochure has been developed for builders to more easily understand, use and comply with the Arkansas Energy Code.

A new home in **ZONE 9** complies with the standards for the *2004 Arkansas Energy Code for New Construction* if the following conditions are met:

- Ceiling insulation is R-38.
- Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to allowable window area.
- The percentage of double-glazed window area to gross wall area does not exceed values in the Maximum Allowable Window Percentages table.
- Floors over crawlspaces are R-19. If slab insulation is to be installed, then a minimum of R-4 is required. See the "Slab Insulation" section in this brochure.
- The heating and cooling system efficiencies are at least national minimums.

Ceiling: R-38. Only where a raised-heel truss or other construction technique is employed to obtain the full height of ceiling insulation extending over the exterior wall's top plate may an R-30 be sutstituted for an R-38.

Walls: Exterior walls are R-13. With an additional R-3 exterior sheathing, add 1 percent to window percentage.

Maximum Allowable Window Percentages

Window frame type	R-0 slab	R-4 slab or R-19 floor
Wood or vinyl with low-e and gas filled (U-0.41*)	14%	21%
Vinyl or wood (U-0.56*)	10%	15%
Thermal break aluminum (U-0.65*)	8%	13%
Aluminum — non-thermal (U-0.87*)	6%	9%

* *These U-factors are recognized default values for each window type. The maximum allowable window percentage may increase if a more efficient window (lower U-factor) is used.*

Percentage Window Area: Estimate percent window in the wall by dividing the total rough opening of the window area by the gross wall area. The window percentage is a ratio of the window area in the heated and cooled space to the gross wall area. This includes, but is not limited to, decorative windows, glass doors and basement windows but excludes opaque doors and skylights.

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Slab Insulation: R-4 or greater. Slab insulation is not required to meet minimum thermal code compliance. However, if slab insulation is installed, the code requires a total of twenty-four (24) inches of insulation. The first four (4) inches are critical and should be placed vertically around the perimeter of the slab. The remaining twenty (20) inches can run horizontally or vertically under the slab. Any exposed insulation shall be protected.

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National Minimums: The national minimum for heating is 78 AFUE (Annual Fuel Utilization Efficiency); for cooling, it is 10 SEER (Seasonal Energy Efficiency Ratio).

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For questions, call the Energy Code Hotline at 1-800-558-2633 or 501-682-1370, or e-mail your question to energy@1800arkansas.com

ARKcheck™ -- Compliance Software

The ARKcheck™ compliance software is currently under construction and will be available soon.

Introduction—Commercial

Effective October 1, 2004, Arkansas adopts the *International Energy Conservation Code (IECC), 2003 Edition*, published and copyrighted by the International Codes Council and the Southern Building Code Congress International, Inc. When the IECC 2003 Edition is used in conjunction with the *Arkansas Supplements and Amendments to the 2003 International Energy Conservation Code*, this shall constitute the official *2004 Arkansas Energy Code for New Building Construction*.

For commercial structures, the 2003 International Energy Conservation Code adopts by reference the *American Society of Heating, Refrigerating, and Air Conditioning Engineers* (ASHRAE) *ANSI / ASHRAE /IESNA Standard 90.1-2001—Energy Standard for Buildings Except Low-Rise Residential Buildings.* The 2003 IECC, which includes both the prescriptive requirements in Chapter 8 of the IECC and also a direct reference to ANSI/ASHRAE/IESNA Standard 90.1-2001 in Chapter 7 of the IECC.

To order copies of the International Energy Conservation Code, 2003 Edition contact:

International Code Council
900 Montclair Road
Birmingham, Alabama 35213-1206
Phone: 1-800-786-4452, Fax: 205-591-0775 (TDD 205-599-9742)

The *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* is available for viewing only, without charge, on the ASHRAE website: http://www.ashrae.org/template/AssetDetail/assetid/16730.

To order copies of *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* contact:

American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, N.E.
Atlanta, GA 30329
Phone: 404-636-8400, Fax: 404-321-5478
Web: http://www.ashrae.org

A separate Users Manual and CD are available and sold separately.

For specific questions, contact ASHRAE directly at 404-636-8400 and talk to Technical Services Engineer Steve Hammerling.

For questions, contact Susan Recken at the Arkansas Energy Office at (501) 682-7334, or e-mail to srecken@1-800-ARKANSAS.com.

Arkansas Climate Zones

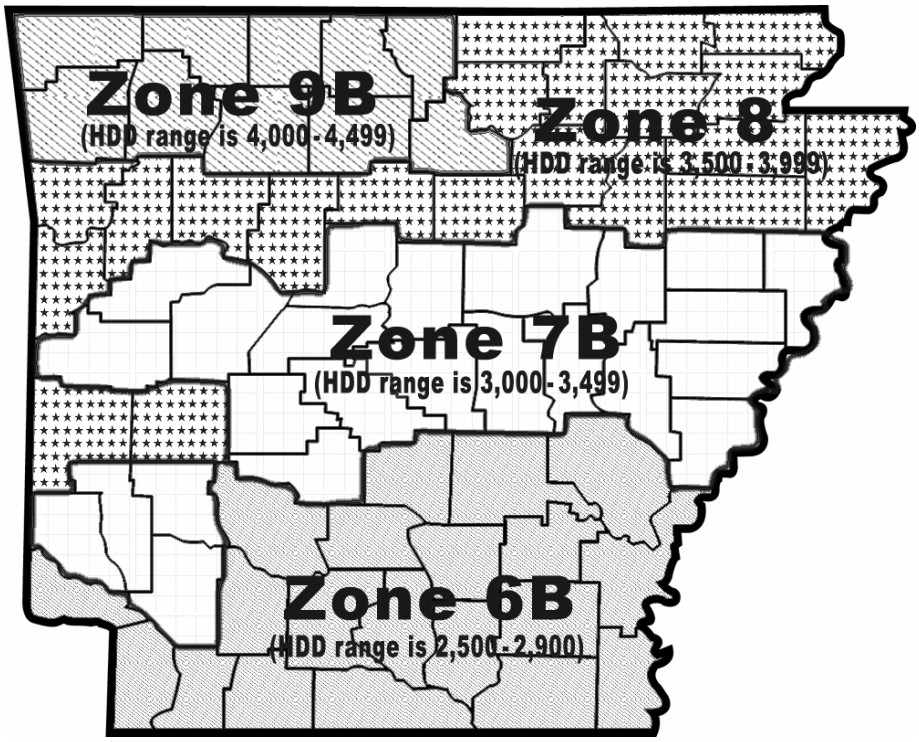

FIGURE 302.1(1)

ARKANSAS

Zone	County
6B	Arkansas (H)
6B	Ashley (H)
9B	Baxter
9B	Benton
9B	Boone
6B	Bradley (H)
6B	Calhoun (H)
9B	Carroll
6B	Chicot (H)
6B	Clark (H)
8	Clay
8	Cleburne
6B	Cleveland (H)
6B	Columbia (H)
7B	Conway (H)
8	Craighead
8	Crawford
7B	Crittenden (H)
7B	Cross (H)
6B	Dallas (H)
6B	Desha (H)
6B	Drew (H)
7B	Faulkner (H)
8	Franklin
8	Fulton
7B	Garland (H)
6B	Grant (H)
8	Greene
7B	Hempstead (H)
7B	Hot Spring (H)
7B	Howard (H)
8	Independence
8	Izard
8	Jackson
6B	Jefferson (H)
8	Johnson
6B	Lafayette (H)

Zone	County
8	Lawrence
7B	Lee (H)
6B	Lincoln (H)
6B	Little River (H)
7B	Logan (H)
7B	Lonoke (H)
9B	Madison
9B	Marion
6B	Miller (H)
8	Mississippi
7B	Monroe (H)
8	Montgomery
6B	Nevada (H)
9B	Newton
6B	Ouachita (H)
7B	Perry (H)
7B	Phillips (H)
7B	Pike (H)
8	Poinsett
8	Polk
8	Pope
7B	Prairie (H)
7B	Pulaski (H)
8	Randolph
7B	Saline (H)
7B	Scott (H)
9B	Searcy
8	Sebastian
7B	Sevier (H)
8	Sharp
7B	St Francis (H)
9B	Stone
6B	Union (H)
8	Van Buren
9B	Washington
7B	White (H)
7B	Woodruff (H)
7B	Yell (H)

Table 302.2 Arkansas HDD* and zones

Zone	HDD
6B	2,500 – 2,999
7B	3,000 – 3,499
8	3,500 – 3,999
9B	4,000 – 4,499

* HDD = Heating Degree Days

Note: Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

Commercial Compliance Tool

The Arkansas Energy Office recognizes COM*check*-EZ™ as a "deem to comply" tool as a means to determine compliance with ARSHRAE/IES 90.1-2001. Please note that COM*check*-EZ™ may not be suitable as a compliance tool with large, complex buildings and mechanical systems.

Click on the link below to download COM*check*-EZ™.

 http://www.energycodes.gov/comcheck/ez_download.stm