

Revised 2002



Use this *brochure*
to answer *these questions:*

- What are recommended insulation values (R-values) for walls, floors, and attics?
- What are recommended performance ratings (U-values) for windows and doors?
- How efficient should heating and cooling equipment be?
- Does the home comply with the International Energy Conservation Code?
- How much more efficient is an EPA Energy Star®-compliant home?
- What is a home energy rating?

Tips for Purchasing an

Energy-Efficient Home

*Including Kansas Energy
Efficiency Disclosure
requirements*



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Kansas Energy Efficiency Disclosure

Kansas law requires the builder or seller of a new, previously unoccupied home to provide the buyer a completed Kansas Energy Efficiency Disclosure form. The form will tell the buyer either 1) the home complies with the 1993 Model Energy Code (MEC), or 2) the energy performance level achieved by each home component. It is important for the homebuyer to understand the energy performance level currently recommended for each component of a house. This brochure provides these recommendations.

Energy Conservation Code

The 2000 International Energy Conservation Code (IECC) establishes minimum levels of energy performance for new residential construction. While not specifically adopted by Kansas statute, the IECC is the energy code most often adopted by local units of government and is more current than the 1993 MEC. The IECC allows several methods of compliance. The simplest method prescribes minimum R-values for walls, ceilings, and floors; maximum U-values for windows and doors; and minimum performance for heating and cooling equipment. Another compliance option allows trade-offs where higher performance by one component will offset lower performance by another. For example, higher performance windows would allow lower levels of wall insulation. All homes must also meet “basic” requirements like air sealing, duct construction and insulation, and vapor barriers.

Recommendations

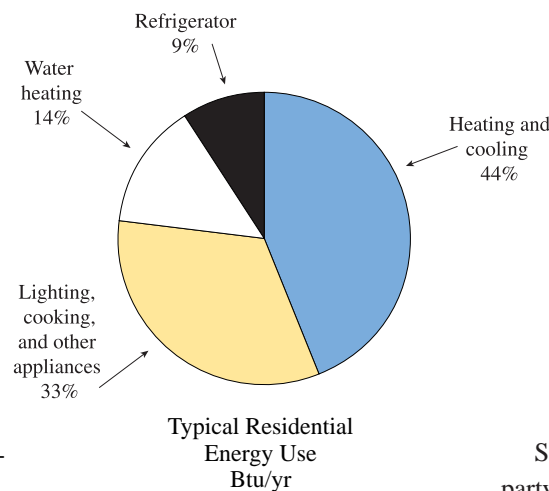
New home component recommendations for R-values for walls, ceilings, and floors; U-values for windows and doors; and performance ratings for heating and cooling equipment are given on the following pages. “Minimum” recommendations provide an acceptable level of performance and correspond to prescriptive recommendations from the IECC. “Better” column values provide additional savings and should be considered, especially where energy prices are higher. The “Better” recommendations generally correspond to Energy Star® performance levels. Kansas’ three climate zones are shown in Figure 1.

Home Energy Ratings

A home energy rating system (HERS) allows home buyers to compare estimated energy costs for homes they are considering, as well as evaluate savings from energy improvements. The HERS assigns a home a point score between 1 and 100, depending on certain characteristics such as insulation levels, heating and cooling efficiency, window placement, and orientation of the home. The buyer can compare the performance of several homes or evaluate the benefit of efficiency features during the design stage.

Energy Star® Homes

Energy Star®-labeled homes are designed to use 30 percent less energy than those built to the minimum standards of the IECC. Higher levels of insulation, better windows, more efficient heating and cooling equipment, and comprehensive air and duct sealing all contribute to the higher performance. To be labeled as Energy Star®, homes must undergo a third-party evaluation of their energy efficiency, including a blower door evaluation of the envelope and ducts. Homes must have a home energy rating of at least 86 or be built to meet climate-dependent construction specifications in order to be labeled Energy Star®.



Achieving Performance

Energy-efficient homes consist of quality components installed and operated in a manner to minimize energy use while providing high comfort levels. Plans must detail installation requirements, and construction crews must execute quality work to assure air sealing, airtight duct and return-air systems, continuous vapor retarders, and appropriate controls. Setback thermostats are recommended for conventional heating and cooling systems, as are special ramp-up thermostats for heat pump applications. House orientation, window placement, overhang design, landscaping, and tree planting also affect long-term energy use. Equipment maintenance will help assure long-term performance.

R- and U-values

R-values listed below apply only to insulation products. The R-value is a measure of resistance to heat flow through materials. The higher the R-value, the greater the insulating value.

The U-value is a measure of heat conduction. It is used to rate doors and windows. The lower the U-value, the greater the insulation value.

Attic Insulation R-value

	Southeast	Central	Northwest
Minimum	38	38	38
Better	38	38	49

- Seal all wiring, plumbing, and other penetrations into the attic.
- Insulation in cathedral ceilings should also meet these values.
- Use raised-heel trusses to achieve recommended R-values above exterior wall top plates.

Wall Insulation R-value

	Southeast	Central	Northwest
Minimum	13	15	20
Better	16	19	22

- Air seal all construction joints.
- If window area exceeds 18 percent of wall area, better windows or higher levels of wall insulation should be used.

Windows U-value

	Southeast	Central	Northwest
Minimum	.40	.37	.37
Better	.36	.36	.33

- Double-pane windows with a 1/2-inch air gap have a U-value of approximately .55.
- Using argon gas between the panes and a low emissivity coating reduces the U-value to .36 with only a small increase in cost.
- If window area exceeds 18 percent of wall area, use windows with a U-value less than .36.
- Most windows have National Fenestration Rating Council U-value labels. See www.nfrc.org for more information.

Foundation Insulation R-value

	Southeast	Central	Northwest
Basement Walls			
Minimum	9	9	10
Better	10	10	10
Crawlspace Walls			
Minimum	6	7	8
Better	10	10	10
Slab-on-Grade			
Minimum	13	17	17
Better	13	17	17

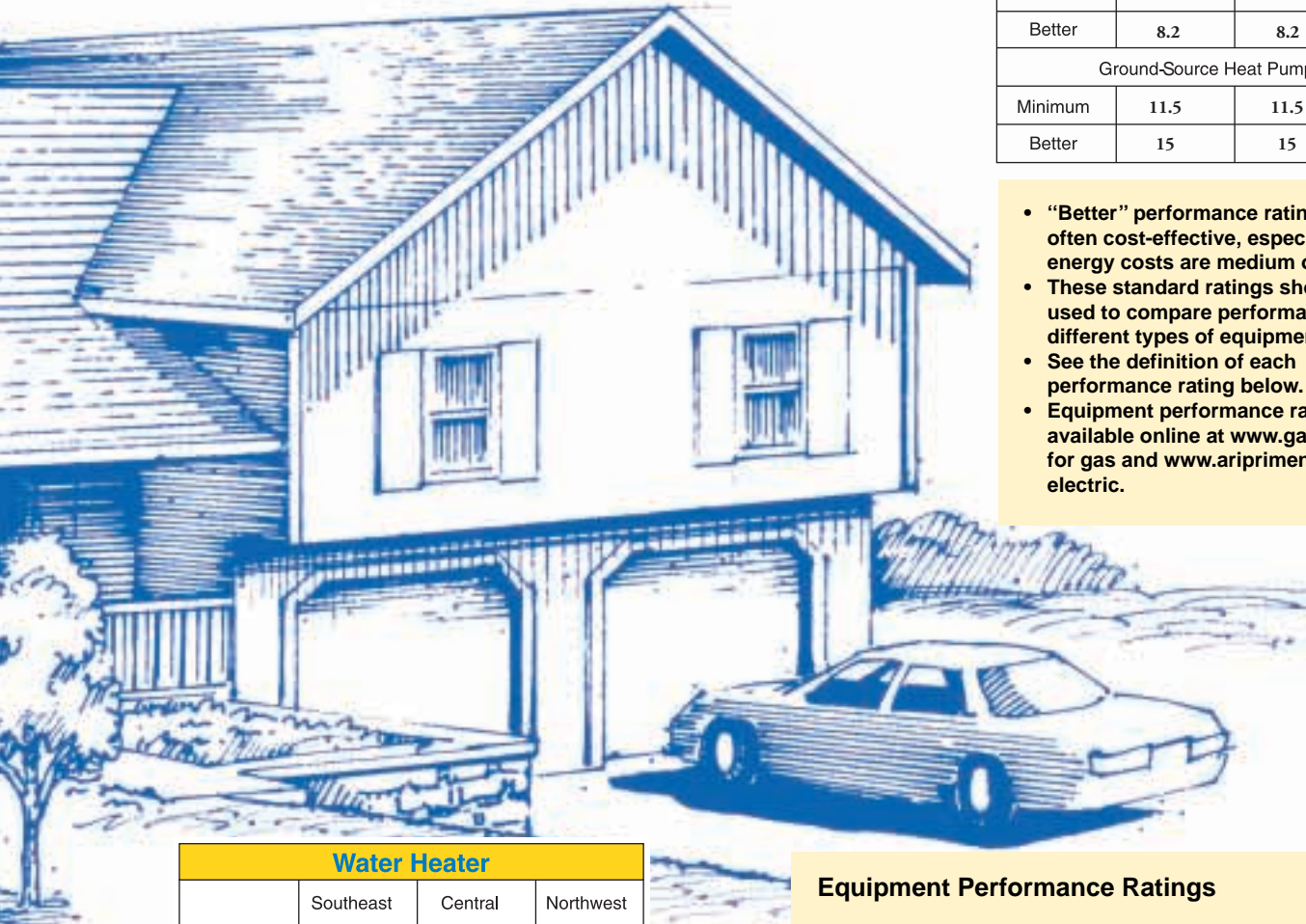
- Foundation insulation is cost-effective and represents the largest untapped opportunity for energy savings for otherwise energy-efficient homes.
- Foundation insulation improves comfort.



Floors Over Unheated Spaces R-value

	Southeast	Central	Northwest
Minimum	19	19	19

- Floors over outside air should be insulated to the same level as ceilings.



Water Heater

	Southeast	Central	Northwest
Gas or Propane (Energy Factor)			
Minimum	.55	.55	.55
Better	.60	.60	.60
Electric (Energy Factor)			
Minimum	.88	.88	.88
Better	.92	.92	.92

- Water heating is the third largest energy use in most homes.
- Energy factor rates overall water heater efficiency, including jacket and off-cycle losses.

Heating and Cooling Equipment

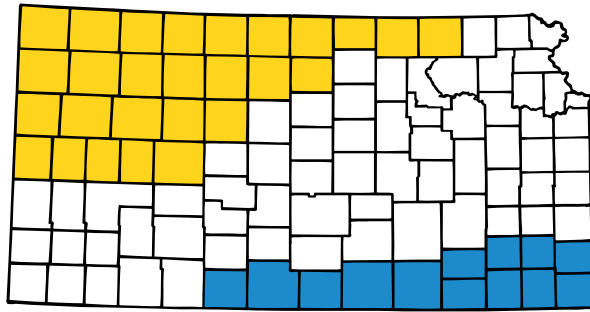
	Southeast	Central	Northwest
Warm-Air Furnace (AFUE)			
Minimum	78%	78%	78%
Better	94%	94%	94%
Air Conditioner (SEER)			
Minimum	10	10	10
Better	12	12	12
Air-Source Heat Pump (HSPF)			
Minimum	6.8	6.8	6.8
Better	8.2	8.2	8.2
Ground-Source Heat Pump (EER)			
Minimum	11.5	11.5	11.5
Better	15	15	15

- “Better” performance ratings are often cost-effective, especially where energy costs are medium or high.
- These standard ratings should not be used to compare performance of the different types of equipment.
- See the definition of each performance rating below.
- Equipment performance ratings are available online at www.gamanet.org for gas and www.ariprimer.net for electric.

Equipment Performance Ratings

- Annual Fuel Utilization Efficiency, AFUE** – used to rate gas or propane warm-air furnaces and small boilers.
- Seasonal Energy Efficiency Ratio, SEER** – performance indicator for residential central air conditioners.
- Heating Seasonal Performance Factor, HSPF** – measures performance of air-source heat pumps.
- Energy Efficiency Ratio, EER** – used to rate window air conditioners and ground-source heat pumps.

For each performance rating, the higher the number, the more efficient the equipment.



Northwest
 Central
 Southeast

Figure 1

Financing Energy Performance

For a new home, the cost of better windows, a more efficient furnace, and higher levels of insulation will be included in the home mortgage. The measure of cost-effectiveness for these upgrades should be: “Will my combined mortgage and utility payments be less with the energy-efficient upgrades?” If the answer is “Yes,” then the upgrades are cost-effective. Energy Star® estimates an average Kansas home built to meet Energy Star® criteria will save \$25 per month on utility costs, which will pay for an additional \$6,780 in energy upgrades with an eight percent loan.

Air and Duct Sealing

Air infiltration and conditioned air lost from leaking ducts represent a significant heating and cooling penalty. Openings in the building envelope should be sealed during construction. Common locations that require sealing include the following:

- Between wall assemblies and ceilings, floors, and window and door frames.
- Between sill plates and foundations.
- At openings for utility, plumbing, and electrical penetrations, especially in the attic, basement, and crawlspace. Supply and return ducts should be sealed with mastic or pressure-sensitive tape. Special sealing is required if building cavities are used for return-air ducts.



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To obtain more information on:

Buying an Energy-Efficient Home

Kansas State University Engineering Extension,
785-532-6026, www.engext.ksu.edu

National Association of Home Builders, 800-368-5242,
www.nahb.com

U.S. DOE’s Energy Efficiency and Renewable Energy
Clearinghouse, 800-363-3732,

www.eren.doe.gov/buildings

U.S. Building Standards and Guidelines Program,
www.eren.doe.gov/building/codes-standards/buildings

EPA Energy Star®, www.energystar.gov/consumer.shtml
Heating and Cooling Equipment and
Home Appliances

EPA Energy Star®, www.energystar.gov/products

American Council for an Energy-Efficient Economy,
www.aceee.org/consumerguide

Windows

National Fenestration Rating Council, www.nfrc.org

Efficient Windows Collaborative,

www.efficientwindows.org

Insulation

Cellulose Insulation Manufacturers Association,
937-222-2462, www.cellulose.org

North American Manufacturers Association,
703-684-0084, www.naima.org

Heating and Cooling Equipment

Gas Appliance Manufacturers Association,

703-525-9565, www.gamanet.org

Air-Conditioning and Refrigeration Institute,

703-524-8800, www.ariprimer.net

Solar Energy

American Solar Energy Society,

303-443-3130, www.ases.org

Florida Solar Energy Center, 407-638-1000,

www.fsec.ucf.edu

Solar Energy Industries Association, 202-383-2600,

www.seia.org

Home Energy Ratings

Energy and Environmental Ratings Alliance,

www.ratingsalliance.org

Kansas Building Science Institute,

www.kansasbuildingscience.com

Residential Energy Services Network,

www.natresnet.org

KANSAS ENERGY EFFICIENCY DISCLOSURE

Kansas law requires the person building or selling a previously unoccupied new residential structure to disclose to the buyer information regarding the thermal efficiency of the structure (single or multifamily units, three floors and under).

Common Address or Legal Description: _____

This residence (select one of the following options):

- _____ 1. Has been built to meet the energy-efficiency standards of the Model Energy Code of 1993 (CABO MEC 93), or
- _____ 2. Has been built to include the following energy-efficiency elements: (If option 2 is selected, complete the following which apply.)

(1) Insulation values (R-value of insulation installed) for each of the following:

Attic	(R-value) _____	Cathedral ceiling	(R-value) _____
Opaque walls	(R-value) _____	Floors over unheated spaces	(R-value) _____
Floors over outside air	(R-value) _____		

Foundation type: Slab-on-grade _____
 Crawlspace _____
 Basement (R-value, if applicable) _____
 Percent of basement walls underground _____

(2) Thermal properties of windows and doors for each of the following:

Entry door(s)	(U-value or R-value) _____
Patio door(s) (sliding or hinged)	(U-value) _____
Other exterior doors	(R-value) _____
Garage-to-house door	(R-value) _____
Windows (determined from NFRC rating)	(U-value) _____

(3) HVAC equipment efficiency levels:

Heating systems:	Gas-fired, forced-air furnace	(AFUE rating) _____
	Electric heat pump	(HSPF rating) _____
Air-conditioning systems:	Electric unit	(SEER rating) _____
	Electric heat pump	(EER rating) _____
	Ground-source heat pump	(EER rating) _____
Duct insulation levels:	Insulation _____	(R-value of ducts outside building envelope)
Thermostat:	Manual control type	_____
	Automatic setback type	_____

(4) Water heating efficiency levels:

Water heater fuel type	_____
Water heater capacity	_____
NAECA energy factor	_____

Additional Information: (Attach additional sheet if necessary.)

Seller signature: _____ Date: _____

Seller name/address: _____

Buyer Signature: _____ Date: _____

Buyer Signature: _____ Date: _____

This form may be reproduced. Form available from Kansas Corporation Commission, Energy Programs, 1500 SW Arrowhead Road, Topeka, KS 66604; Phone: 785-271-3170; Fax: 785-271-3268; or for downloading at www.kcc.state.ks.us/energy/documents/energyform.pdf. (Rev. 10-27-99)