

*Use this brochure
to answer these questions:*



- What are the recommended insulation values (R-values) for walls and attics?
- What are the recommended performance ratings (U-values) for windows and doors?
- How efficient should the heating and cooling equipment be?
- Does the home comply with the Model Energy Code?
- Is it easier to qualify for a loan on an energy-efficient home?
- How can I estimate what energy costs will be?

Tips for Purchasing an
Energy-Efficient
*Including Kansas Energy
Efficiency Disclosure
requirements* **Home**

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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. A copy of the form is on the back of this brochure. It is important for home buyers to understand the energy performance level recommended by the MEC for each component of a house. The MEC is a minimum standard and if the builder elects to state the performance level by component rather than by MEC compliance, the MEC values are a good standard of comparison.

Model Energy Code

The 1993 Model Energy Code establishes minimum levels of energy efficiency for new residential construction. Homes comply with the MEC when components meet minimum standards. Component tradeoffs permit higher performance in one component to offset poorer performance in others. For example, selection of high performance heating and cooling equipment will offset the selections of lower insulation levels. All homes must also meet “basic” requirements like air sealing, duct construction, and insulation standards. Compliance with the MEC is required for certain federally insured loan programs.

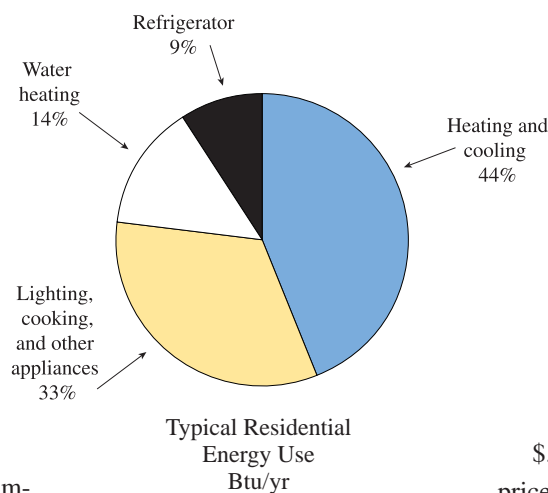
Recommendations

New home component recommendations of 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. “Better” column values provide additional savings and should be considered, especially when energy prices are medium to high as described under Fuel Prices. Kansas’ three climate zones are shown in Figure 1.

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 including air sealing, duct construction techniques, pipe and duct insulation levels, temperature controls, and vapor retarders. Home owners must operate the home efficiently. Set-back thermostats are recommended. House orientation, window placement, landscaping, and tree planting also affect long-term energy use.

Equipment maintenance will help assure long-term performance.



Fuel Prices

Prices of heating and cooling fuels affect cost-effectiveness of insulation levels and equipment performance. If the price of natural gas exceeds \$6.50 per MCF, propane exceeds \$.60 per gallon, or average electric prices exceed \$.055 per kWh, then the “Better” levels of performance should be selected.

Home Energy Ratings

Heating and cooling a home is often the second largest expense to a homeowner after a mortgage payment. A Home Energy Rating System (HERS) allows home buyers to compare estimated energy costs for homes they are considering as well as evaluate the cost-effectiveness (savings) of energy-efficient improvements. The HERS assigns a home a point score between 1 and 100, depending upon certain energy-saving characteristics such as amount of insulation, efficiency of heating and cooling equipment, performance of windows, and solar orientation of the home. When comparing rated homes, the buyer can evaluate the added cost for certain energy-conserving features. Home energy ratings can also be used to evaluate the cost-effectiveness of features during the design stage.

R- and U-values

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 conductance. 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	30	32	36
Better	36	38	40

- Attic insulation performs significantly better if all penetrations into the attic are sealed.
- Insulation in cathedral ceilings should approach these values.

Wall Insulation R-value

	Southeast	Central	Northwest
Minimum	13	15	19
Better	19	21	24

- Wall insulation includes insulation between the studs and sheathing.
- Air seal all construction joints.
- If window area exceeds 12 percent of wall area, better windows or higher levels of wall insulation should be used.

Windows U-value

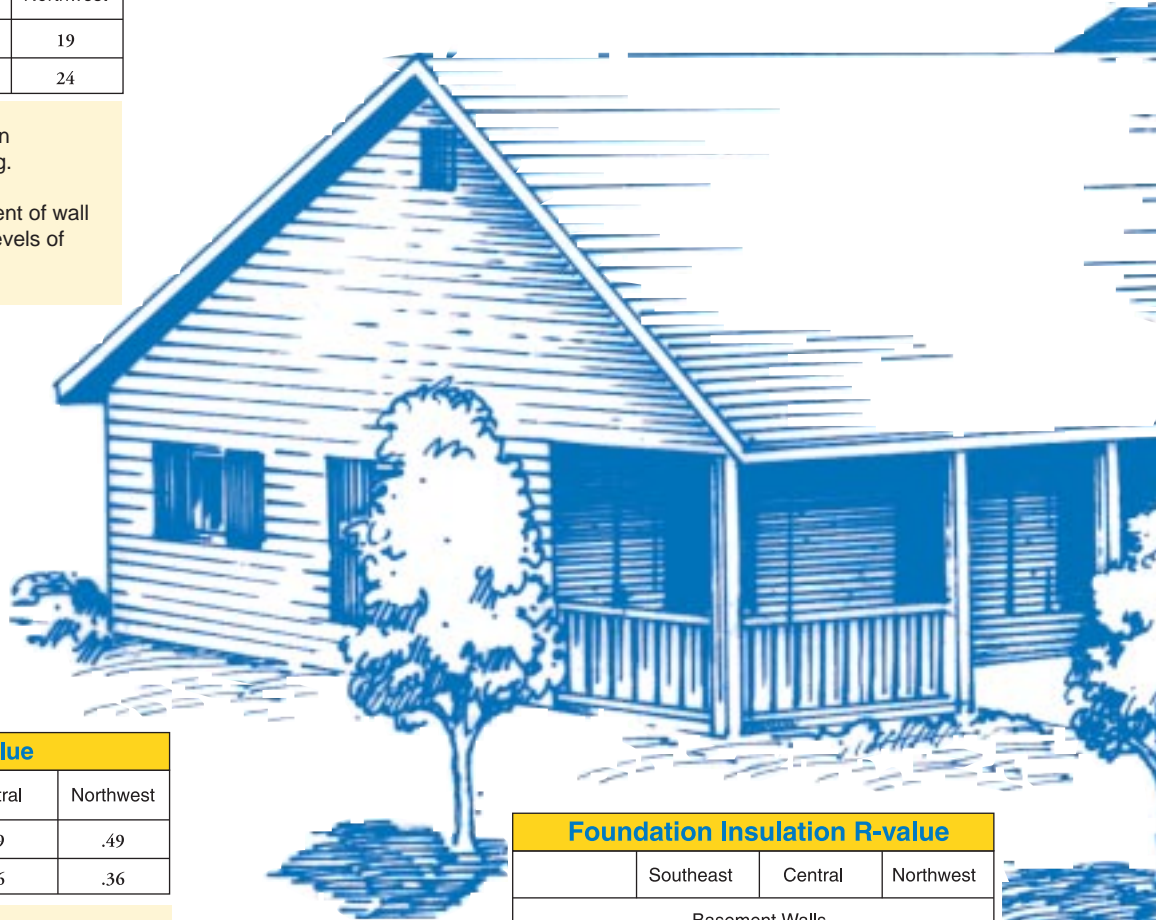
	Southeast	Central	Northwest
Minimum	.49	.49	.49
Better	.36	.36	.36

- Double-pane windows with a 1/2-inch air gap have a U-value of approximately .49.
- Using argon between the panes and a low e-coating reduces the U-value to .36.
- If window area exceeds 12 percent of wall area, use windows with a U-value not greater than .36.

Foundation Insulation R-value

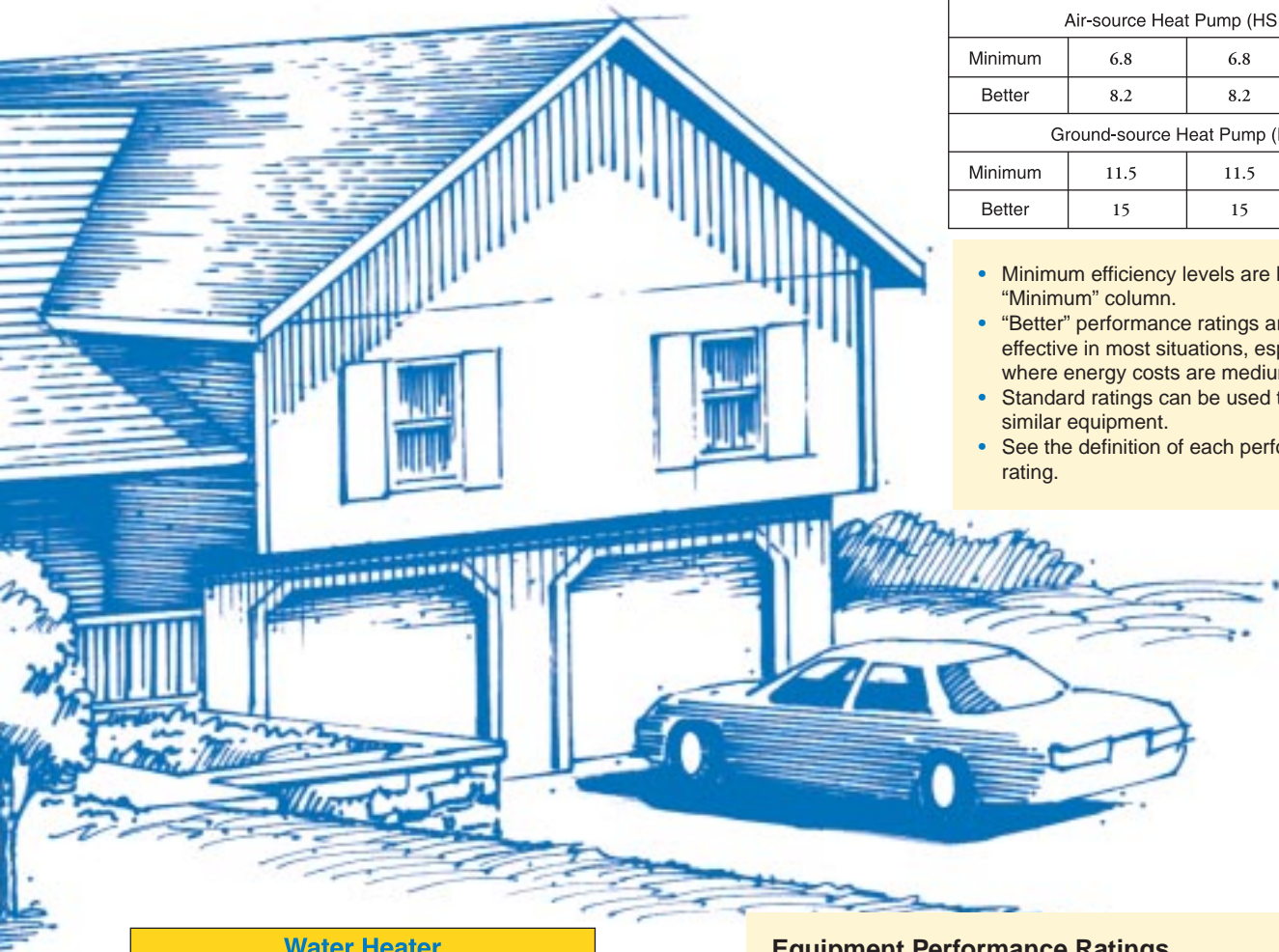
	Southeast	Central	Northwest
Basement Walls			
Minimum	9	9	10
Better	13	15	15
Crawlspace Walls			
Minimum	10	16	16
Better	10	16	16
Slab-on-Grade			
Minimum	5	5	5
Better	10	10	10

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



Floors Over Unheated Spaces R-value			
	Southeast	Central	Northwest
Minimum	20	20	20
Better	24	24	24

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



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	13	13	13
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

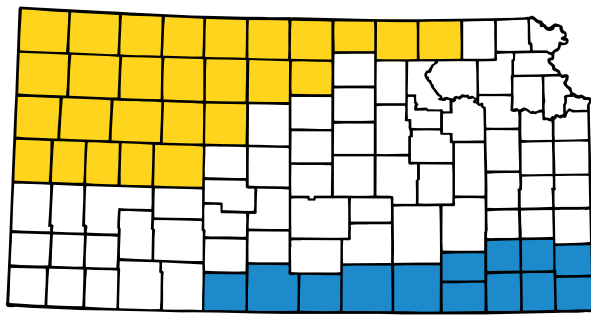
- Minimum efficiency levels are listed in the "Minimum" column.
- "Better" performance ratings are cost-effective in most situations, especially where energy costs are medium or high.
- Standard ratings can be used to compare similar equipment.
- See the definition of each performance rating.

Water Heater			
	Southeast	Central	Northwest
Gas or Propane (Energy Factor)			
Minimum	.55	.55	.55
Better	.65	.65	.65
Electric (Energy Factor)			
Minimum	.88	.88	.88
Better	.92	.92	.92

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

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 as a rating on 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

Energy-Efficient Mortgages

Energy-efficient mortgages (EEM) allow buyers of energy-efficient homes to qualify for larger home loans because the total mortgage and utility payment will be less than for a non-efficient home. To qualify, the home must receive a 4 Star Home Energy Rating or meet the 1993 MEC. In addition, an EEM will also allow new home buyers to finance the cost of energy efficiency improvements as part of their first mortgages. The table below shows the additional mortgage justified for several annual energy costs savings.

Annual Energy Savings	Additional Mortgage (30 years @ 8%)
\$500	\$5,657
\$750	\$8,485
\$1,000	\$11,314

Air Sealing

Air infiltration represents a significant heating and cooling penalty. Openings in the home envelope should be sealed with durable caulking or other material during construction. Common locations that require sealing include the following:

- Between window or door frames and wall assemblies
- Between wall assemblies and ceilings and floors
- Between sill plates and foundations
- At openings for utility and service penetrations
- At openings for electrical or plumbing connections

Careful sealing of openings in ceilings and floors separating conditioned from unconditioned space is critical to reduce infiltration.

To obtain more information on:

Buying an Energy-Efficient Home, Kansas State University Engineering Extension, 785-532-6026, e-mail: enggextn@ksu.edu, National Association of Home Builders (NAHB), 800-368-5242, www.nahb.com, U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), 800-363-3732, www.eren.doe.gov, or U.S. DOE's Building Standards and Guidelines Program, www.energycodes.org.

Energy-Efficient Mortgages, request the Energy-Efficient Mortgage Home Owner Guide through the Consumer Information Center, 719-948-4000, www.pueblo.gsa.gov/.

Heating and Cooling Equipment, Air-Conditioning and Refrigeration Institute (ARI), 703-524-8800, www.ari.org, or

Gas Appliance Manufacturers Association (GAMA), 703-525-9565, www.gamanet.org.

Home Appliances, Association of Home Appliance Manufacturers (AHAM), 202-872-5955, www.aham.org.

Home Energy Ratings, Kansas Energy Star Program, Kansas Department of Commerce and Housing, 785-296-5865, e-mail: housing@ink.org.

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

North American Insulation Manufacturers Association (NAIMA), 703-684-0084, www.naima.org, or Polyisocyanurate Insulation Manufacturers Association (PIMA), 202-624-2709.

Solar Energy, American Solar Energy Society (ASES), 303-443-3130, www.ases.org, Florida Solar Energy Center (FSEC), 407-638-1000, or 407-638-1015. www.fsec.ucf.edu, or

Solar Energy Industries Association (SERI), 202-383-2600, www.seia.org.

Windows, National Fenestration Rating Council (NFRC), 301-589-6372, www.nfrc.org.



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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	(SEER rating) _____
	Ground-source heat pump	(SEER 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: (If necessary, attach additional sheet.)

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; 785-271-3170 Fax: 785-271-3268 (Rev. 5-9-97) or for downloading at www.kcc.state.ks.us/energy/documents/energyform.pdf.