



# Energy Conservation One- and Two- Family Dwellings

Planning and Development Services Department, **Building Safety**

913/ 895-6225

Energy efficiency data is found in Chapter 11 of the 2006 International Residential Code (IRC) and the 2006 International Energy Conservation Code (IECC). The IRC has two prescriptive methods for the dwelling’s envelope utilizing the minimum R value of the insulation only (table N1102.1) or the maximum U factor (table 1102.1.2) of the assembly of the envelope components. There is no restriction for the area of components of the envelope provided that all required R values or U factors comply with or are more efficient than the requirements of the table. There is an exception for one opaque door assembly to be omitted, all other opaque door U factors must be less than or equal to .40. There is an exception that allows 15 sq ft of glazing to be omitted; all other glazing U factors must be less than or equal to .40.

## Energy Compliance Verification

Tables N1102.1 and N1101.2 are for wood frame construction. When using steel framed ceiling, wall and, floor construction use table N1102.2.4 for the steel equivalent R value assembly to the wood frame R value.

If the components or assemblies do not comply with the values of tables N1102.1 or N1102.1.2 the Total UA alternative 402.1.4, Simulated Performance Alternative 404 of the IECC or, REScheck software (free download from <http://www.energycodes.gov/rescheck/download.stm>) shall be used. Before using the REScheck program click on the “code” selection tab at the top menu bar and select 2006 IECC. The contractor for any new dwelling is required to verify compliance with the City of Overland Park energy efficiency requirements of the IRC or IECC. Verification is required by either meeting the prescriptive requirements or thorough calculations. Since the City does not require concrete basement walls to be insulated until the adjacent spaces are finished, REScheck shall be used unless all basement walls are insulated and the building is in compliance with all of the prescriptive requirements.

Room additions are required to comply with the minimum energy efficiency requirements of the IRC or IECC although calculations are not required.

When the manufacturer’s information for the glazing or door U value is not available refer to tables N1101.5(1) and N1101.5(2) for the default U factors shall be used.

**TABLE N1102.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAMEWALL R-VALUE	MASSWALL R-VALUE	FLOOR R-VALUE	BASEMENT <sup>c</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE AND DEPTH	CRAWL SPACEWALL R-VALUE
1	1.2	0.75	0.40	30	13	3	13	0	0	0
2	0.75	0.75	0.40	30	13	4	13	0	0	0
3	0.65	0.65	0.40 <sup>e</sup>	30	13	5	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13 + 5 <sup>e</sup>	13	30 <sup>f</sup>	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13 + 5 <sup>e</sup>	15	30 <sup>f</sup>	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19	30 <sup>f</sup>	10/13	10, 4 ft	10/13

a. R-values are minimums. U-factors and SHGC are maximums. R-19 insulation shall be permitted to be compressed into a 2 x 6 cavity.

b. The fenestration U-factor column excludes skylights. The solar heat gain coefficient (SHGC) column applies to all glazed fenestration.

- c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
- d. *R*-5 shall be added to the required slab edge *R*-values for heated slabs.
- e. There are no solar heat gain coefficient (SHGC) requirements in the Marine Zone.
- f. Or insulation sufficient to fill the framing cavity, *R*-19 minimum.
- g. “13+5” means *R*-13 cavity insulation plus *R*-5 insulated sheathing. If structural sheathing covers 24% or less of the exterior, *R*-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least *R*-2.

**TABLE N1102.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR	SKYLIGHT <sup>b</sup> <i>U</i> -FACTOR	CEILING <i>U</i> -FACTOR	FRAME WALL <i>U</i> -VALUE	MASSWALL <i>U</i> -FACTOR	FLOOR <i>U</i> -FACTOR	BASEMENT <sup>c</sup> WALL <i>U</i> -FACTOR	CRAWL SPACE WALL <i>U</i> -FACTOR
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.06	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

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

**TABLE N1101.5(1)  
DEFAULT GLAZED FENESTRATION *U*-FACTORS**

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			Single	Double
Metal	1.2	0.8	2	1.3
Metal with thermal break	1.1	0.65	1.9	1.1
Nonmetal or metal clad	0.95	0.55	1.75	1.05
Glazed block	0.6			

**TABLE N1101.5(2)  
DEFAULT DOOR *U*-FACTORS**

DOOR TYPE	<i>U</i> -FACTOR
Uninsulated metal	1.2
Insulated metal	0.6
Wood	0.5
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	0.35

**TABLE N1101.5(3)**  
**DEFAULT GLAZED FENESTRATION SHGC**

SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
Clear	Tinted	Clear	Tinted	
0.8	0.7	0.7	0.6	0.6

**TABLE N1102.2.4**  
**STEEL-FRAME CEILING, WALL AND FLOOR INSULATION (R-VALUE)**

WOOD FRAME R-VALUE REQUIREMENT	COLD-FORMED STEEL EQUIVALENT R-VALUE <sup>d</sup>
Steel Truss Ceilings <sup>a</sup>	
R-30	R-38 or R-30 + 3 or R-26 + 5
R-38	R-49 or R-38 + 3
R-49	R-38 + 5
Steel Joist Ceilings <sup>b</sup>	
R-30	R-38 in 2 x 4 or 2 x 6 or 2 x 8
R-38	R-49 in 2 x 4 or 2 x 6 or 2 x 8 or 2 x 10
Steel Framed Wall	
R-13	R-13 + 5 or R-15 + 4 or R-21 + 3
R-19	R-13 + 9 or R-19 + 8 or R-25 + 7
R-21	R-13 + 10 or R-19 + 9 or R-25 + 8
Steel Joist Floor	
R-13	R-19 in 2 x 6 R-19 + R-6 in 2 x 8 or 2 x 10
R-19	R-19 + R-6 in 2 x 6 R-19 + R-12 in 2 x 8 or 2 x 10

For SI: 1 inch = 25.4 mm.

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

b. Insulation exceeding the height of the framing shall cover the framing.

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

Supply and return ducts that are completely located within the building thermal envelope are not required to be insulated.

Mechanical system piping capable of carrying fluids above 105° F (40° C) or below 51° F (13° C) shall be insulated a minimum of R-2.

All circulating service hot water piping shall be insulated to a minimum of R-2.

Outdoor air intakes and exhaust shall have automatic or gravity dampers that close when the system is not operating.

All new heating and cooling equipment shall comply with the minimum requirements of the 2006 IECC see tables 503.2.

**TABLE 503.2  
MINIMUM EQUIPMENT PERFORMANCE**

EQUIPMENT CATEGORY	SUBCATEGORY <sup>c</sup>	REFERENCED STANDARD	MINIMUM PERFORMANCE
Air-cooled heat pumps, Heating mode < 65,000 Btu/h cooling capacity	Split systems Single package	ARI 210/240	6.8 HSPF <sup>a,b</sup> 6.6 HSPF <sup>a,b</sup>
Gas-fired or oil-fired furnace < 225,000 Btu/h	–	DOE 10CFR Part 430, Subpart B, Appendix N	AFUE 78% <sup>b</sup> <i>E</i> 80% <sup>c</sup>
Gas-fired or oil-fired steam and hot-water boilers < 300,000 Btu/h	–	DOE 10 CFR Part 430, Subpart B, Appendix N	AFUE 80% <sup>b,d</sup>
Air-cooled air conditioners and heat pumps. Cooling mode < 65,000 Btu/h cooling capacity	Split systems Single package	ARI 210/240	10.0 SEER <sup>b</sup> 9.7 SEER <sup>b</sup>

For SI: 1 British thermal unit per hour = 0.291 W.

a. For multicapacity equipment, the minimum performance shall apply to each capacity step provided. Multicapacity refers to manufacturer-published ratings for more than one capacity mode allowed by the product's controls.

b. This is used to be consistent with the National Appliance Energy Conservation Act (NAECA) or 1987 (Public Law 100-12).

c. These requirements apply to combination units not covered by NAECA (three-phase power or cooling capacity 65,000 Btu/h).

d. Except for gas fired steam boilers for which the minimum AFUE shall be 75 percent.

e. Seasonal rating.

A state or local jurisdiction that has adopted the IECC for their building energy code can use amending language similar to the following:

Delete Table 503.2, Minimum Equipment Performance and replace it with the following table:

**TABLE 503.2  
MINIMUM EQUIPMENT PERFORMANCE**

EQUIPMENT CATEGORY	SUBCATEGORY <sup>c</sup>	REFERENCED STANDARD	MINIMUM PERFORMANCE <sup>f</sup>
Air-cooled heat pumps, Heating mode < 65,000 Btu/h cooling capacity, single phase	Split systems and single package Through-the-wall split systems Through-the-wall single package	ARI 210/240	7.7 HSPF <sup>a,b</sup> 7.1 HSPF <sup>a,b</sup> 7.0 HSPF <sup>a,b</sup>
Gas-fired or oil-fired furnace < 225,000 Btu/h	–	DOE 10CFR Part 430, Subpart B, Appendix N	AFUE 78% <sup>b</sup> <i>E<sub>i</sub></i> 80% <sup>c</sup>
Gas-fired or oil-fired steam and hot-water boilers < 300,000 Btu/h	–	DOE 10 CFR Part 430, Subpart B, Appendix N	AFUE 80% <sup>b,d</sup>
Air-cooled air conditioners and heat pumps. Cooling mode < 65,000 Btu/h cooling capacity, single phase	Split systems and single package Through-the-wall split systems <sup>g</sup> Through-the-wall single package <sup>g</sup>	ARI 210/240	13.0 SEER <sup>b</sup> 10.9 SEER <sup>b</sup> 10.6 SEER <sup>b</sup>

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

a. For multicapacity equipment, the minimum performance shall apply to each capacity step provided. Multicapacity refers to manufacturer-published ratings for more than one capacity mode allowed by the product's controls.

b. This is used to be consistent with the National Appliance Energy Conservation Act (NAECA) or 1987 (Public Law 100-12), as amended.

c. These requirements apply to combination units not covered by NAECA (three-phase power or cooling capacity 65,000 Btu/h).

d. Except for gas-fired steam boilers for which the minimum AFUE shall be 75 percent.

e. Seasonal rating.

f. Heat pumps manufactured before January 23, 2006 may have a HSPF of 6.8 for split systems and 6.7 for single package units, and air-conditioners manufactured before January 23, 2006 may have a SEER of 10 for split systems and 9.7 for single package units. Trade-offs between equipment and other building components are not allowed for equipment that does not exceed the minimums in this table.

g. These requirements apply to through-the-wall products with cooling capacities less or equal to 30,000 Btu/h manufactured prior to January 23, 2010.