



# Table 13-B: Residential Thermal Performance Calculations

**Table No. 13-B  
Residential Thermal Performance Calculations**

BUILDING COMPONENTS <sup>1</sup> (Areas from Plan Take-offs in sq. ft.)	U-VALUES						
	Areas <sup>2</sup>	Base Path 1		R-Value <sup>3</sup>	Proposed Alternate		
		U-Value	Areas x U		Areas <sup>2</sup>	U-Value <sup>4</sup>	Areas x U
Flat Ceilings		0.031					
Vaulted Ceilings <sup>5</sup>		0.033					
Opaque Walls		0.060					
Windows (Use A or B) <sup>5</sup>							
A. If glazing area is greater than 13% of heated space floor area:	Take-off area	0.400			Take-off area		
B. If glazing area is less than 13% of heated space floor area and trade-off is desired:	13% of floor area	0.400			Take-off area		
Skylights		0.500					
Main entry door		0.540					
Other exterior doors		0.200					
Underfloor		0.032					
Slab Edge (perimeter ft.)		F=0.520 <sup>6</sup>					
<b>CODE UA=</b>					<b>Proposed UA<sup>7</sup>=</b>		

- Performance trade-offs are limited to those listed in Column 1. Heat plant efficiency, duct insulation levels, passive and active solar heating, and similar measures may not be considered in this method of calculation.
- Areas from plan take-offs. All areas must be the same for both Base Path 1 and proposed Alternate, except for window areas allowed in Note 5 below. The vaulted ceiling area for Base Path 1 must be the actual area from the plan take-off, not to exceed 50 percent of the heated floor space. Any areas in excess of 50 percent for Base Path 1 must be entered at U-0.031 (R-38), with "Flat Ceilings" area. The skylight for Base Path 1 must be the actual area from the plan take-off, not to exceed 2 percent of the heated floor space. Any areas in excess of 2 percent for Base Path 1 must be entered at U-0.40, with "Windows" area. The main entry door area for Base Path 1 must be the actual area from the plan take-off, not to exceed 24 square feet. Any areas in excess of 24 square feet for Base Path 1 must be entered at U-0.20, with "Other Exterior Doors" area.
- MINIMUM COMPONENT REQUIREMENTS: Walls R-15; Floors R-21; Flat Ceilings R-38; Vaults R-21; Basement Walls R-21; Slab Edge R-10; Duct Insulation R-8. R-values used in this table are nominal, for the insulation only and not for the entire assembly. Window and Skylight U-values shall not exceed 0.65 (CL65). Door U-values shall not exceed 0.54 (Nominal R-2). The minimum wall component for Path 9 shall be an average solid log or timber wall thickness of 3.5 inches (88.9 mm).
- U-values for wood frame ceilings, walls and floor assemblies shall be as listed below. U-values for other assemblies which may include brick or other masonry, stucco, etc., shall be calculated using standard ASHRAE procedures.
- Component U-value trade-offs may be made against window area in detached single family dwellings when window area is less than 13 percent of heated space floor area. The base window area in this case shall be set at 13 percent of the heated space floor area.

APPROVED U-VALUES FOR COMMON ASSEMBLIES							
Flat Ceilings		Vaulted Ceilings		Walls		Floors	
R-38	0.031	(rafter) R-21	0.047	R-15	0.080	Under floor	Slab edge
R-49	0.025	(rafter) R-30	0.033	R-19	0.065	R-21	
R-49A	0.020	(rafter) R-38	0.027	R-19A	0.061	R-25	0.035
		(truss) R-30	0.046	R-21	0.060	R-30	0.032
		(truss) R-38	0.042	R-21A	0.055		0.028
				R-24A	0.044	R-10	F=0.54 <sup>6</sup>
						R-15	F=0.52 <sup>6</sup>

- F= The heat loss coefficient, Btu/hr/ft<sup>2</sup>/°F per foot (304.7 mm) of perimeter.
- Proposed UA must be less than or equal to code UA.
- Vaulted area, unless insulated to R-38, may not exceed 50 percent of total heated space floor area.

*This pamphlet is one in a series that describes residential energy conservation requirements of the Oregon One and Two Family Dwelling Code and the Structural Specialty Code for Group R buildings three stories and less in height. Other pamphlets in this series may be obtained from local code authorities or from Oregon Building Codes Division.*

Information presented in this publication supports the Oregon Residential Energy Code, or Chapter 13 of the 1996 Oregon Structural Specialty Code. This publication does not include all requirements of the code. Refer to the code and check with your code official for additional requirements. If information in this publication conflicts with the code or your local officials, follow the requirements of the code and your local officials.

For more information about the new residential energy code, call the Building Codes Division at 378-4133 or the Oregon Office of Energy — 378-4040 in Salem or toll-free, 1-800-221-8035.

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