



# Prescriptive Residential Energy Conservation Requirements

**TABLE N1101.1(1)  
PRESCRIPTIVE ENVELOPE REQUIREMENTS <sup>a</sup>**

Building Component	Standard Base Case		Log Homes Only	
	Required Performance	Equiv. Value <sup>b</sup>	Required Performance <sup>d</sup>	Equiv. Value <sup>b</sup>
Wall insulation-above grade	U-0.060	R-21 <sup>c</sup>		
Wall insulation-below grade <sup>e</sup>	F-0.565	R-15	F-0.565	R-15
Flat ceilings <sup>f</sup>	U-0.031	R-38	U-0.025	R-49
Vaulted ceilings <sup>g</sup>	U-0.042	R-38 <sup>g</sup>	U-0.027	R-38A <sup>h</sup>
Underfloors	U-0.028	R-30	U-0.028	R-30
Slab edge perimeter	F-0.520	R-15	F-0.520	R-15
Heated slab interior <sup>i</sup>	n/a	R-10	n/a	R-10
Windows <sup>j</sup>	U-0.35	U-0.35	U-0.35	U-0.35
Window area limitation <sup>k</sup>	n/a	n/a	n/a	n/a
Skylights <sup>l</sup>	U-0.60	U-0.60	U-0.60	U-0.60
Exterior doors <sup>m</sup>	U-0.20	U-0.20	U-0.54	U-0.54
Exterior doors w/>2.5 ft <sup>2</sup> glazing <sup>n</sup>	U-0.40	U-0.40	U-0.40	U-0.40
Forced air duct insulation	n/a	R-8	n/a	R-8

- a As allowed in Section N1104.1, thermal performance of a component may be adjusted provided that overall heat loss does not exceed the total resulting from conformance to the required *U*-value standards. Calculations to document equivalent heat loss shall be performed using the procedure and approved *U*-values contained in Table N1104.1(1).
- b R-values used in this table are nominal, for the insulation only in standard wood framed construction and not for the entire assembly.
- c Wall insulation requirements apply to all exterior wood framed, concrete or masonry walls that are above grade. This includes cripple walls and rim joist areas. R-19 Advanced Frame or 2 x 4 wall with rigid insulation may be substituted if total nominal insulation R-value is 18.5 or greater.
- d The wall component shall be a minimum solid log or timber wall thickness of 3.5 inches (90 mm).
- e Below-grade wood, concrete or masonry walls include all walls that are below grade and does not include those portions of such wall that extend more than 24 inches above grade.
- f Insulation levels for ceilings that have limited attic/rafter depth such as dormers, bay windows or similar architectural features totaling not more than 150 square feet (13.9 m<sup>2</sup>) in area may be reduced to not less than R-21. When reduced, the cavity shall be filled (except for required ventilation spaces).
- g The maximum vaulted ceiling surface area shall not be greater than 50 percent of the total heated space floor area unless area has a U-factor no greater than U-0.031. The U-factor of 0.042 is representative of a vaulted scissor truss. A 10-inch deep rafter vaulted ceiling with R-30 insulation is U-0.033 and complies with this requirement, not to exceed 50 percent of the total heated space floor area.
- h A=advanced frame construction, which shall provide full required insulating value to the outside of exterior walls.
- i Heated slab interior applies to concrete slab floors (both on and below grade) that incorporate a radiant heating system within the slab. Insulation shall be installed underneath the entire slab.
- j Sliding glass doors shall comply with window performance requirements. Windows exempt from testing in accordance with NF1111.2 Item 3 shall comply with window performance requirements if constructed with thermal break aluminum or wood, or vinyl, or fiberglass frames and double-pane glazing with low-emissivity coatings of 0.10 or less. Buildings designed to incorporate passive solar elements may include glazing with a U-factor greater than 0.35 by using Table N1104.1(1) to demonstrate equivalence to building envelope requirements.
- k Reduced window area may not be used as a trade-off criterion for thermal performance of any component.
- l Skylight area installed at 2% or less of total heated space floor area shall be deemed to satisfy this requirement with vinyl, wood, or thermally broken aluminum frames and double-pane glazing with low-emissivity coatings. Skylight U-factor is tested in the 20 degree overhead plane per NFRC standards.
- m A maximum of 28 square feet (2.6 m<sup>2</sup>) of exterior door area per dwelling unit can have a U-factor of 0.54 or less.
- n Glazing that is either double pane with low-e coating on one surface, or triple pane shall be deemed to comply with this U-0.40 requirement.



**TABLE N1101.1(2)  
ADDITIONAL MEASURES (select one)<sup>a</sup>**

Measure	
1	High efficiency HVAC system: Gas-fired furnace or boiler with minimum AFUE of 90% <sup>a</sup> , or Air-source heat pump with minimum HSPF of 8.5 or Closed-loop ground source heat pump with minimum COP of 3.0
2	High efficiency duct sealing: Certified performance tested duct systems <sup>b</sup> or All ducts and air handler are contained within building envelope <sup>a</sup>
3	High efficiency building envelope: Replace corresponding Table N1101.1(1) components with all of the following: Wall above grade – U-0.047 / R-19+R-5 continuous, and Vaulted ceilings – U-0.033 / R-30A <sup>c, d</sup> , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32
4	Zonal electric, ductless furnace or ductless heat pumps: 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt, or Windows – U-0.32, or Flat ceilings – U-0.025 / R-49 and vaulted ceilings – U-0.033 / R-30A or Exterior walls – U-0.047 / R-19+R-5 continuous
5	High efficiency ceilings & windows/lighting: Replace corresponding Table N1101.1(1) components with all of the following: Vaulted ceilings – U-0.033 / R-30A <sup>c, d</sup> , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32, and 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt
6	High efficiency ceilings & windows / water heating: Replace corresponding Table N1101.1(1) components with all of the following: Vaulted ceilings – U-0.033 / R-30A <sup>c, d</sup> , and Flat ceilings – U-0.025 / R-49, and Windows – U-0.32, and Natural gas/propane, on-demand water heating with min EF of 0.80
7	High efficiency water heating / lighting: Natural gas/propane, on-demand water heating with min EF of 0.80 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min. efficacy of 40 lumens per watt
8	Solar photovoltaic: Minimum 1 Watt / sq ft. conditioned floor space <sup>e</sup>
9	Solar water heating: Minimum of 40 ft <sup>2</sup> of gross collector area <sup>f</sup>

<sup>a</sup> Furnaces located within the building envelope shall have sealed combustion air installed. Combustion air shall be ducted directly from the outdoors.

<sup>b</sup> Documentation of Performance Tested Ductwork shall be submitted to the Building Official upon completion of work. This work shall be performed by a contractor that is certified by the Oregon Department of Energy's (ODOE) Residential Energy Tax Credit program and documentation shall be provided that work demonstrates conformance to ODOE duct performance standards.

<sup>c</sup> A=advanced frame construction, which shall provide full required ceiling insulation value to the outside of exterior walls.

<sup>d</sup> The maximum vaulted ceiling surface area shall not be greater than 50 percent of the total heated space floor area unless vaulted area has a U-factor no greater than U-0.026.

<sup>e</sup> Solar electric system size shall include documentation indicating that Total Solar Resource Fraction is not less than 75%.

<sup>f</sup> Solar water heating panels shall be Solar Rating and Certification Corporation (SRCC) Standard OG-300 certified and labeled, with documentation indicating that Total Solar Resource Fraction is not less than 75%.

This pamphlet is one in a series that describes residential energy conservation requirements of the Oregon Residential Specialty Code and Structural Specialty Code. Other pamphlets in this series may be downloaded from Oregon Department of Energy web site at <http://egov.oregon.gov/ENERGY/CONS/Codes/cdpub.shtm> or local building departments or from Oregon Building Codes Division.

## Actual requirements

Table N1101.1(1) specifies the measure required performance as an overall U-factor (or F-factor). It also lists an *insulation only* R-value for that assembly when it is installed within standard wood frame construction.

A non-typical construction may have an equivalent U-factor and not comply (have a lower value) with insulation R-value. An example of this would be a 2-by-4 wall with R-15 batt insulation and continuous exterior R-3 rigid insulation is U-0.058. While the “insulation R-value is only R-18, the overall U-factor is 0.058 and complies with the 0.060 performance requirement.

*The following text is excerpted from Chapter 11 of the 2008 Oregon Residential Specialty Code*

**N1101.1 General.** The provisions of this chapter regulate the exterior envelope; the design, construction and selection of heating, ventilating and air-conditioning systems, lighting and piping insulation, required for the purpose of effective conservation of energy within a building or structure governed by this code.

All conditioned spaces within residential buildings shall comply with Table N1101.1(1) and one additional measure from Table N1101.1(2).

### Exceptions:

1. Application to existing buildings shall comply with Section N1101.2.
2. Application to additions shall comply with Section N1101.3.

**N1107.2 High-efficiency interior lighting systems.** A minimum of fifty percent of the permanently installed lighting fixtures shall be compact or linear fluorescent, or a lighting source that has a minimum efficacy of 40 lumens per input watt. Screw-in compact fluorescent lamps comply with this requirement.

The building official shall be notified in writing at the final inspection that a minimum of fifty percent of the permanently installed lighting fixtures are compact or linear fluorescent, or a minimum efficacy of 40 lumens per input watt.

*Note: Fifty percent of the permanently installed lighting fixtures includes fixtures in the garage and attached to the outside of the building.*

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

For more information about the residential energy code, call the Building Codes Division at (503) 378-4133 or the Oregon Dept of Energy (503) 378-4040 in Salem or toll-free, 1-800-221-8035.

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