



LANE COUNTY PUBLIC WORKS

Residential Energy Efficiency

LAND MANAGEMENT DIVISION 125 E 8th AVENUE, EUGENE OR 97401

The Oregon Residential Specialty Code, Section N1101.1, includes a requirement to provide two “additional measures” beyond the prescriptive envelope requirements for all conditioned spaces within residential buildings. These “additional measures” include an envelope enhancement as well as a conservation measure.

Applicability: The two additional measures must be selected for all new construction. Certain alterations, additions and changes of occupancy must also comply with this requirement. Reference ORSC N1101.2-3 for additional details on the applicability of these tables.

References: Table N1101.1(1), included at the bottom of the page, outlines prescriptive envelope requirements. Table N1101.1(2), included on the back of this sheet, lists six additional envelope enhancement measures as well as the seven additional conservation measures to choose from. Refer to Chapter 11 of the Oregon Residential Specialty Code for additional information.

Alternate System Proposals: Permit applicants will be asked to indicate which additional measures they intend to use and show all pertinent details and data as required by N1101.4. Alternate designs may be approved as long as the proposed design will not result in an increase in energy consumption. These alternate proposals must be accompanied by an energy analysis and are only allowed trade-offs between building envelope components in accordance with N1103.

TABLE N1101.1(1) PRESCRIPTIVE ENVELOPE REQUIREMENTS^a

Building Component	Standard Base		Log Homes Only	
	Required Performance	Equiv. Value ^b	Required Performance	Equiv. Value ^b
Wall insulation-above grade	U-0.060	R-21 ^c	^d	^d
Wall insulation-below grade ^e	F-0.565	R-15	F-0.565	R-15
Flat ceilings ^f	U-0.031	R-38	U-0.025	R-49
Vaulted ceilings ^g	U-0.042	R-38 ^g	U-0.027	R-38A ^h
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 ⁱ	n/a	R-10	n/a	R-10
Windows ^j	U-0.35	U-0.35	U-0.35	U-0.35
Window area limitation ^j	n/a	n/a	n/a	n/a
Skylights ^l	U-0.60	U-0.60	U-0.60	U-0.60
Exterior doors ^m	U-0.20	U-0.20	U-0.54	U-0.54
Exterior doors w>2.5 ft ² glazing ⁿ	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 be 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 (609.6 mm) 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 m²) 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 (2.6m²) 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 requirements.

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TABLE N1101.1(2) ADDITIONAL MEASURES

Envelope Enhancement Measure (Select One)	1	High efficiency walls & windows: Exterior walls - U-0.047/R-19+5 (insulation sheathing)/SIPS, and one of the following options: Windows - Max 15 percent of conditioned area; or Windows - U-0.30
	2	High efficiency envelope: Exterior walls - U-0.058/R-21 Intermediate framing, and Vaulted ceilings – U-0.033 / R-30A ^{d, e} , and Flat ceilings – U-0.025 / R-49, and Framed floors - U-0.025/R-38, and Windows - U.030; and Doors - All doors U-0.20, or Additional 15 percent of permanently installed lighting fixtures as high-efficacy lamps of Conservation Measure D and E
	3	High efficiency ceiling, windows & duct sealing: (Cannot be used with Conservation Measure E) Vaulted ceilings – U-0.033 / R-30A ^{d, e} , and Flat ceilings - U-0.025/R-49, and Windows - U-0.30, and performance tested duct systems ^b
	4	High efficiency thermal envelope UA: Proposed UA is 15% lower than the Code UA when calculated in Table N1104.1(1)
	5	Building tightness testing, ventilation and duct sealing: A mechanical exhaust, supply, or combination system providing whole-building ventilation rates specified in Table N1101.1(3), or ASHRAE 62.2, and The dwelling shall be tested with a blower door and found to exhibit no more than: 1. 6.0 air changes per hour ^f , or 2. 5.0 air changes per hour ^f when used with Conservation Measure E, and Performance tested duct systems ^b
	6	Ducted HVAC systems within conditioned space: (Cannot be used with Conservation Measure B or C) All ducts and air handler are contained within building envelope ⁱ
Conservation Measure (Select One)	A	High efficiency HVAC system: Gas-fired furnace or boiler with minimum AFUE of 90% ^a , or air-source heat pump with minimum HSPF of 8.5 or Closed-loop ground source heat pump with minimum COP of 3.0
	B	Ducted HVAC systems within conditioned space: (Cannot be used with Conservation Measure B or C) All ducts and air handler are contained within building envelope ⁱ
	C	Ductless heat pump: Replace electric resistance heating in at least the primary zone of dwelling with at least one ductless mini-split heat pump having a minimum HSPF of 8.5. Unit shall not have integrated backup resistance heat, and the unit (or units, if more than one is installed in the dwelling) shall be sized to have capacity to meet the entire dwelling design heat loss rate at outdoor design temperature condition. Conventional electric resistance heating may be provided for any secondary zones in the dwelling. A packaged terminal heat pump (PTHP) with comparable efficiency ratings may be used when no supplemental zonal heaters are installed in the building and integrated backup resistance heat is allowed in a PTHP.
	D	High efficiency water heating & lighting Natural gas/propane, on demand water heating with min EF of 0.80, and A minimum 75 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt as specified in Section N1107.2 ^c
	E	Energy management devise & duct sealing: Whole building energy management device that is capable of monitoring or controlling energy consumption, and Performance tested duct systems ^b , and A minimum 75 percent of permanently installed lighting fixtures as high-efficacy lamps
	F	Solar photovoltaic: Minimum 1 watt / sq ft conditioned floor space ^g
	G	Solar water heating: Minimum of 40 ft ² of gross collector area ^h

- a. Furnaces located within the building envelope shall have sealed combustion air installed. Combustion air shall be ducted directly from the outdoors.
- b. 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.
- c. Section N1107.2 requires 50 percent of permanently installed lighting fixtures contain high efficacy lamps. Each of these additional measures adds an additional percent to the Section N1107.2 requirement.
- d. A = advanced frame construction, which shall provide full required ceiling insulation value to the outside of exterior walls.
- e. 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.
- f. Building tightness test shall be conducted with a blower door depressurizing the dwelling 50 Pascal's from ambient conditions. Documentation of blower door test shall be submitted to the Building Official upon completion of work.
- g. Solar electric system size shall include documentation indicating that Total Solar Resource Fraction is not less than 75 percent.
- h. 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 percent.
- i. A total of 5 percent of an HVAC system's ductwork shall be permitted to be located outside of the conditioned space, Ducts located outside the conditioned space shall have insulation installed as required in this code.