



# Residential Energy Efficiency Measures Selection Form

DEPARTMENT USE ONLY
Permit no.:
Submittal Date:
Permit Issue Date:

*For the purpose of energy efficiency the Oregon Residential Specialty Code regulates exterior envelopes as well as the design, construction, and selection of heating, ventilation, air-conditioning systems, and insulation values. This form is intended to identify under which provision of the code your project will meet the requirements for energy conservation. Applicants are asked to complete this form by selecting which provision of the code their project meets and providing the required submittal information associated with that requirement either on this form or as part of the construction documents.*

APPLICANT INFORMATION
Name:
Address:
City/State/ZIP:
Phone:
Email:

JOB SITE INFORMATION AND LOCATION
Job site address:
City:
State/ZIP:
Occupancy Type: <input type="checkbox"/> Single-Family <input type="checkbox"/> Accessory Structure
<input type="checkbox"/> Townhouse <input type="checkbox"/> Duplex <input type="checkbox"/> Other

## INSTRUCTIONS

Select the type of construction. If the project is an addition, select the applicable addition type and enter the selected measures accordingly; print and sign your name. Submit this form with your permit application or your project will be placed on hold until the required information is provided.

- New construction.** All conditioned spaces within residential buildings shall comply with Table N1101.1(1) and one additional measure from Table N1101.1(2).
- Additions.** Additions to existing buildings or structures may be made without making the entire building or structure comply if the new additions comply with the requirements of this chapter.
  - Large additions.** Additions that are equal to or more than 600 square feet in area are required to select one measure from Table N1101.1(2).  
Enter the selected Table N1101.1(2) additional measure \_\_\_\_\_
  - Small additions.** Additions that are less than 600 square feet in area are required to select one measure from Table N1101.1(2) **or** select one measure from Table N1101.3.
    - Selected Table N1101.1(2) additional measure \_\_\_\_\_
    - Selected Table N1101.3 additional measure \_\_\_\_\_
  - Exception:** Additions that are less than 225 square feet in area are not required to comply with Table N1101.1(2) or Table N1101.3.

*Note: Depending on the additional measure you have selected, there may be sub-options that you will have to specify. Check the appropriate box, if provided.*

**TABLE N1101.1(2) – ADDITIONAL MEASURES**

<input type="checkbox"/>	<b>1a</b>	<b>HIGH-EFFICIENCY HVAC SYSTEM<sup>a</sup></b>
<input type="checkbox"/>	<b>1b</b>	a. Gas-fired furnace or boiler AFUE 94 percent, or
<input type="checkbox"/>	<b>1c</b>	b. Air-source heat pump HSPF 10.0/14.0 SEER cooling, or c. Ground-source heat pump COP 3.5 or Energy Star rated
<input type="checkbox"/>	<b>2a</b>	<b>HIGH-EFFICIENCY WATER HEATING SYSTEM</b>
<input type="checkbox"/>	<b>2b</b>	a. Natural gas/propane water heater with minimum UEF 0.90, or
<input type="checkbox"/>	<b>2c</b>	b. Electric heat pump water heater with minimum 2.0 COP, or c. Natural gas/propane tankless/instantaneous heater with minimum 0.80 UEF and Drain Water Heat Recovery Unit installed on minimum of one shower/tub-shower
<input type="checkbox"/>	<b>3</b>	<b>WALL INSULATION UPGRADE <sup>*</sup>(see page 5 of this form for commentary)</b> Exterior walls—U-0.045/R-21 conventional framing with R-5.0 continuous insulation
<input type="checkbox"/>	<b>4</b>	<b>ADVANCED ENVELOPE</b> Windows—U-0.21 (Area weighted average), and Flat ceiling <sup>b</sup> —U-0.017/R-60, and Framed floors—U-0.026/R-38 or slab edge insulation to F-0.48 or less (R-10 for 48”; R-15 for 36” or R-5 fully insulated slab)
<input type="checkbox"/>	<b>5</b>	<b>DUCTLESS HEAT PUMP</b> For dwelling units with all-electric heat, provide: Ductless heat pump of minimum HSPF 10 in primary zone replaces zonal electric heat sources, and programmable thermostat for all heaters in bedrooms
<input type="checkbox"/>	<b>6</b>	<b>HIGH EFFICIENCY THERMAL ENVELOPE UA<sup>c</sup></b> Proposed UA is 8 percent lower than the code UA
<input type="checkbox"/>	<b>7</b>	<b>GLAZING AREA</b> Glazing area, measured as the total of framed openings is less than 12 percent of conditioned floor area
<input type="checkbox"/>	<b>8</b>	<b>3 ACH AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION</b> Achieve a maximum of 3.0 ACH50 whole-house air leakage when third-party tested and provide a whole-house ventilation system including heat recovery with a minimum sensible heat recovery efficiency of not less than 66 percent.

For SI: 1 square foot = 0.093 m<sup>2</sup>, 1 watt per square foot = 10.8 W/m<sup>2</sup>.

- a. Appliances located within the building thermal envelope shall have sealed combustion air installed. Combustion air shall be ducted directly from the outdoors.
- b. 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.
- c. In accordance with Table N1104.1(1), the Proposed UA total of the Proposed Alternative Design shall be a minimum of 8 percent less than the Code UA total of the Standard Base Case.

**TABLE N1101.3 – SMALL-ADDITION ADDITIONAL MEASURES (SELECT ONE)**

<input type="checkbox"/>	<b>1</b>	Increase the ceiling insulation of the existing portion of the home as specified in Table N1101.2.
<input type="checkbox"/>	<b>2</b>	Replace all existing single-pane wood or aluminum windows to the U-factor as specified in Table N1101.2
<input type="checkbox"/>	<b>3</b>	Insulate the existing floor, crawl space, or basement wall systems as specified in Table N1101.2 and install 100 percent of permanently installed lighting fixtures as CFL, LED, or linear fluorescent, or a minimum efficacy of 40 lumens per watt as specified in Section N1107.2.
<input type="checkbox"/>	<b>4</b>	Test the entire dwelling with a blower door and exhibit no more than 4.5 air changes per hour @ 50 Pascals.
<input type="checkbox"/>	<b>5</b>	Seal and performance test the duct system.
<input type="checkbox"/>	<b>6</b>	Replace existing 80-percent AFUE or less gas furnace with a 92-percent AFUE or greater system.
<input type="checkbox"/>	<b>7</b>	Replace existing electric radiant space heaters with a ductless mini split system with a minimum HSPF of 10.0.
<input type="checkbox"/>	<b>8</b>	Replace existing electric forced air furnace with an air source heat pump with a minimum HSPF of 9.5.
<input type="checkbox"/>	<b>9</b>	Replace existing water heater with a water heater meeting: Natural gas/propane water heater with minimum UEF 0.90, or Electric heat pump water heater with minimum 2.0 COP.

**NOTICE**

On April 1, 2021, the 2021 ORSC became effective, introducing new requirements and revisions to existing requirements for air sealing, insulation and installation of ducts, as well as new requirements for continuously-operating, balanced mechanical whole-house ventilation (WHV) and revised other requirements. A portion of the code sections outlining energy efficiency requirements and approved measures are included on page 5 of this document, and the code in its entirety can be viewed on the BCD website at [www.bcd.oregon.gov](http://www.bcd.oregon.gov)

**Air Sealing Requirements (ORSC N1104.8)**

All new construction shall now incorporate the former 2017 ORSC Table N1101.(2) Measure #5, regarding 'air sealing and ducts'. Building thermal envelopes shall be constructed to limit air leakage by the use of 'Air Barriers' in accordance with section N1104.8.1 and 'Sealing Requirements' in accordance with N1104.8.2.

**Insulation of Ducts (ORSC N1105.2)**

All new duct systems, or new portions of duct systems exposed to unconditioned spaces, and buried ductwork within insulation that meets the exception to Section N1105.3, shall be insulated to a minimum level of R-8. Duct systems, or new portions of duct systems, located entirely within the building thermal envelope may be insulated to a level less than R-8.

**Installation of Ducts (ORSC N1105.3 & M1601.4.11)**

All new duct systems, air handling equipment and appliances shall be located fully within the building thermal envelope. It may not always be practical, or technologically or economically feasible to construct all duct systems fully within the building thermal envelope, as such exceptions to this new requirement are offered. See the portion of code section copied below, and see additional BCD Technical Bulletin for additional commentary and diagrams.

**Whole House Ventilation (ORSC M1505.4)**

All new HVAC systems are now required to be provided with a balanced mechanical whole-house ventilation (WHV) systems. WHV systems shall be designed in accordance with Sections M1505.4.1 through M1505.4.4. Balanced ventilation systems are a combination of exhaust and supply methods providing approximately equal (within a 10% margin) indoor exhaust and outdoor supply air flow. Outside air should be taken from a known fresh air location then filtered and tempered before delivery to the conditioned space. Balanced ventilation should not affect the pressure of the interior space relative to outdoors. WHV systems shall provide outdoor air at a continuous rate as determined in accordance with Table M1505.4.3(1) or equation 15-1.

**WHOLE HOUSE BALANCED VENTILATION SPECIFICATIONS**

Describe method of balanced WHV and list associated equipment below: \_\_\_\_\_

WHV Intake/Supply - Make & Model # (specify local intake, furnace if serves as intake, central fan integrated supply, or other): \_\_\_\_\_

WHV Exhaust - Make & Model #: \_\_\_\_\_

WHV Control/Interlock Unit - Make & Model #: \_\_\_\_\_  Intermittent Operation

WHV HRV/ERV, Dampers, Misc. - Make & Model #: \_\_\_\_\_

WHV System Mechanical Ventilation Rate (outdoor air): \_\_\_\_\_ CFM

Min. Required Mechanical Ventilation Rate (outdoor air) Table M1505.43(1) or Equation 15-1: \_\_\_\_\_ CFM

Equation 15-1: Ventilation rate in cubic feet per minute = (0.01 x Total square foot area of house) + ([7.5 x (number of bedrooms + 1)])

Exception: Intermittent WHV Ventilation Rate Factor Table M1505.4.3(2): \_\_\_\_\_ x \_\_\_\_\_ CFM = \_\_\_\_\_ CFM

**APPLICANT SIGNATURE**

I hereby certify I have read and examined this application and know the same to be true and correct. All provisions of laws and ordinances governing this type of work will be complied with whether specified herein or not.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print name: \_\_\_\_\_

# Blower Door Results Reporting

## 2021 Oregon Residential Specialty Code (ORSC) Compliance

This form provides the necessary information to demonstrate compliance with the sealing requirements of Section N1104.8.2 or Additional Measure #8 from Table N1101.1(2) in Chapter 11 of the Oregon Residential Specialty Code (ORSC). Where applicable, this form shall be provided to the local building official after testing and before the Certificate of Occupancy is issued.

### Jurisdiction:

### COMPANY INFORMATION

Company name:	CCB/EEAST no.:	
Address (Street or P.O. Box):	Phone:	
City:	State:	Zip:
Technician's name:	Email:	

### PROJECT INFORMATION

Builder:	Community:	Lot:
Street address:		
City:	State: <b>OR</b>	Zip:
One-family, two-family, or townhouse:	Number of stories:	
Permit #:	Conditioned floor area (SF):	Conditioned volume (CF):

### Section N1104.8.2 – Sealing Required

If selecting an Additional Measures #1-7 from Table N1101.1(2) enter the Blower Door Test Results below.

I hereby certify that the blower door test results are: \_\_\_\_\_ ACH50 and \_\_\_\_\_ CFM@50Pa and have been determined using standard industry protocol such as ANSI/RESNET/ICC 380.

PASS – Less than or equal to 4.0 ACH50

FAIL – Greater than 4.0 ACH50

### Table N1101.1(2) – Additional Measure No. 8

If selecting an Additional Measures #8 from Table N1101.1(2) enter the Blower Door Test Results below.

I hereby certify that the blower door test results are \_\_\_\_\_ ACH50 and \_\_\_\_\_ CFM@50Pa and have been determined using standard industry protocol such as ANSI/RESNET/ICC 380.

PASS – Less than or equal to 3.0 ACH50

FAIL – Greater than 3.0 ACH50

### BLOWER DOOR CALCULATIONS

$ACH50 = (CFM50 \times 60) / \text{Conditioned Volume}$

### TECHNICIANS NAME & SIGNATURE

Print name:

Signature:

Test Date:

## REFERENCED CODE SECTIONS

**N1104.8 Air leakage.** The building thermal envelope shall be constructed to limit air leakage in accordance with this section

**N1104.8.1 Air barriers.** A continuous air barrier shall be installed and fully aligned with the building thermal envelope on every vertical portion of air-permeable insulation and on the warm side of horizontal, air-permeable insulation. Air-permeable insulation shall not be used as a sealing material.

**Exception:** Unvented attics, continuous insulation walls and similar conditions where an impermeable insulation layer forms an air barrier.

**N1104.8.2 Sealing required.** Exterior joints around window and door frames, between wall cavities and window or door frames, between walls and foundation, between walls and roof, between wall panels, at penetrations or utility services through walls, floors and roofs and all other openings in the exterior envelope shall be sealed in a manner approved by the building official.

Sealing for the purpose of creating a continuous air barrier shall be in accordance with the applicable requirements of Table N1104.8, or the dwelling shall be tested to demonstrate a blower door result not greater than 4.0 ACH50.

**N1104.8.2.1 Top plate sealing.** At all walls in contact with vented attics, the wall covering (gypsum board or other) shall be sealed to the top plate with caulk, sealant, gasket or other approved material.

**N1105.3 Installation of Ducts.** All new duct systems and air handling equipment and appliances shall be located fully within the building thermal envelope.

**Exception:**

1. Ventilation intake ductwork and exhaust ductwork.
2. Up to 5% of the length of HVAC system ductwork shall be permitted to be located outside of the thermal envelope.
3. Ducts deeply buried in insulation in accordance with all of the following:
  - 3.1. Insulation shall be installed to fill gaps and voids between the duct and ceiling, and a minimum of R-19 insulation shall be installed above the duct between the duct and the unconditioned attic.
  - 3.2. Insulation depth marker flags shall be installed on the ducts every 10 feet or as approved by the building official.

## COMMENTARY

**\*TABLE N1101.1(2) - ADDITIONAL MEASURES - #3 WALL INSULATION UPGRADE;** consists of minimum stud cavity insulation and a continuous layer of R-5 rigid exterior insulation boards such as; expanded polystyrene (EPS), extruded polystyrene (XPS), polyisocyanurate (PIC), or rigid mineral fiber (MF). Be advised cladding attachment shall be done in accordance with manufacturers installation instructions, and or in accordance with ORSC R703.9 Exterior Insulation and Finish Systems (EIFS) or other prescriptive code methods for 'installation over foam plastic sheathing'. Additionally, the provisions of R703.1.1 Exterior Wall Envelope shall be followed.

### TABLE N1104.8 AIR BARRIER INSTALLATION AND AIR SEALING REQUIREMENTS

COMPONENT	AIR BARRIER CRITERIA
General requirements	A continuous air barrier shall be installed in alignment with the building thermal envelope.
	Breaks or joints in the air barrier shall be sealed.
Ceiling/attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed.
	Access openings, drop-down stairs, or knee wall doors to unconditioned attic spaces shall be gasketed and sealed.
Walls	The junction of the foundation and sill plate shall be sealed.
	The junction of the top plate and the top of interior walls shall be sealed between wall cavities and windows or door frames.
	All penetrations or utility services through the top and bottom plates shall be sealed.
	Knee walls shall be sealed.
Windows, skylights and doors	The space between framing and skylights, and the jambs of windows and doors shall be sealed.
Rim/band joists	Rim/band joists shall be a part of the thermal envelope and have a continuous air barrier.
Floors Including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations and flue shafts opening to exterior or unconditioned space shall be sealed.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the finished surface.
Shower/tub on exterior walls	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.

**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	Equiv. Value <sup>b</sup>
Wall insulation—above grade	U-0.059 <sup>c</sup>	R-21 Intermediate <sup>c</sup>	Note d	Note d
Wall insulation—below grade <sup>e</sup>	C-0.063	R-15 <u>c.i.</u> /R-21	C-0.063	R-15/R-21
Flat ceilings <sup>f</sup>	U-0.021	R-49	U-0.020	R-49 A <sup>h</sup>
Vaulted ceilings <sup>g</sup>	U-0.033	R-30 Rafter or R-30A <sup>g, h</sup> Scissor Truss	U-0.027	R-38A <sup>h</sup>
Underfloors	U-0.033	R-30	U-0.033	R-30
Slab-edge perimeter <sup>m</sup>	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>	<b><u>U-0.27</u></b>	<b><u>U-0.27</u></b>	<b><u>U-0.27</u></b>	<b><u>U-0.27</u></b>
Skylights	U-0.50	U-0.50	U-0.50	U-0.50
Exterior doors <sup>k</sup>	U-0.20	U-0.20	U-0.54	U-0.54
Exterior doors with > 2.5 ft <sup>2</sup> glazing <sup>l</sup>	U-0.40	U-0.40	U-0.40	U-0.40

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>, 1 degree = 0.0175 rad, n/a = not applicable.

- 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-factor standards. Calculations to document equivalent heat loss shall be performed using the procedure and approved U-factors 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. Nominal compliance with R-21 insulation and Intermediate Framing (N1104.5.2) with insulated headers.
- d. The wall component shall be a minimum solid log or timber wall thickness of 3.5 inches.
- e. Below-grade wood, concrete or masonry walls include all walls that are below grade and do not include those portions of such wall that extend more than 24 inches above grade. R-21 for insulation in framed cavity; R-15 continuous insulation.
- 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 in area may be reduced to not less than R-21. When reduced, the cavity shall be filled (except for required ventilation spaces). R-49 insulation installed to minimum 6-inches depth at top plate at exterior of structure to achieve U-factor.
- g. Vaulted ceiling surface area exceeding 50 percent of the total heated space floor area shall have a U-factor no greater than U-0.026 (equivalent to R-38 rafter or scissor truss with R-38 advanced framing).
- h. A = Advanced frame construction. See Section N1104.6.
- 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 Section 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 thermal envelope requirements.
- k. A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.54 or less.
- l. Glazing that is either double pane with low-e coating on one surface, or triple pane shall be deemed to comply with this requirement.
- m. Minimum 24-inch horizontal or vertical below-grade.