Chapter 13
Residential Provisions

SECTION 101

SCOPE

~~RC~~101.1 General. The provisions of this chapter are voluntary and replace specific requirements of the Oregon Residential Specialty Code. The provisions of this code shall promote increased conservation of energy within a dwelling over the requirements of the Oregon Residential Specialty Code. Materials, methods, or techniques not addressed in this code shall be installed in accordance with the requirements set forth in the Oregon Building Code.

All conditioned spaces within low-rise residential dwellings, built to this code, shall comply with one of the following:

1. Prescriptive Compliance Path:

   Residential dwellings using the prescriptive path shall comply with the provisions in section ~~RC~~201.

2. Selective Compliance Path:

   Residential dwellings using the selective path shall comply with the provisions in section ~~RC~~301.

3. Alternative Systems Analysis:

   Residential dwellings using the energy performance path shall comply with the provisions in section ~~RC~~401.

4. Additions, Alterations, and Change of Occupancies shall comply with the provisions of ~~RC~~501.

SECTION 102
DEFINITIONS

AFUE (ANNUAL FUEL UTILIZATION EFFICIENCY). The energy output divided by the energy input, calculated on an annual basis and including part load and cycling effects. AFUE ratings shall be determined using the U.S. Department of Energy test procedures (10 CFR Part 430) and listings in the Gas Appliance Manufacturers Association (GAMA) Consumer Directory of Certified Furnace and Boiler Efficiency Ratings.

ASHRAE. The American Society of Heating, Refrigerating and Air–conditioning Engineers, Inc.

AUTOMATIC. A self–acting device, operating by its own mechanism when actuated by some impersonal influence, such as a change in current strength, pressure, temperature or mechanical configuration. (See also "Manual.")

BASEMENT WALL. The opaque portion of walls which encloses a basement and is partially or totally below grade walls.

BELOW GRADE WALLS. The walls or the portion of walls entirely below the finished grade or which extend 2 feet (610 mm) or less above the finish grade.

BTU (British Thermal Unit). The amount of heat required to raise the temperature of 1 pound (0.454 kg) of water (about 1 pint) from 59ºF to 60ºF (15ºC to 16ºC).

BUILDING ENVELOPE. That element of a building which encloses conditioned spaces through which thermal energy may be transmitted to or from the exterior or to or from unconditioned spaces.

CONDITIONED SPACE. A space within the building, separated from unconditioned space by the exterior envelope which by introduction of conditioned air, by heated and/or cooled surfaces, or by air or heat transfer from directly conditioned spaces is maintained at temperatures of 55ºF (13ºC) or higher for heating and/or 85ºF (29.4ºC) or below for cooling. (Enclosed corridors between conditioned spaces shall be considered as conditioned space. Spaces where temperatures fall between this range by virtue of ambient conditions shall not be considered as conditioned space.)

ENERGY CONTROL DEVICE. A device which is installed within a dwelling that can provide near real-time data on whole dwelling energy consumption and is intended to operate energy consuming appliances and/or devices for a dwelling in order to reduce energy consumption. Consumption control systems are also known as Building Automation Control (BAC) or Building Management Control Systems (BMCS).

EXTERIOR DOOR. A permanently installed operable barrier by which an entry is closed and opened. Exterior doors include doors between conditioned and unconditioned spaces, such as a door between a kitchen and garage.

EXTERIOR ENVELOPE. See "Building Envelope."

EXTERIOR WALL. Any member or group of members, which defines the exterior boundaries of the conditioned space and which has a slope of 60 degrees or greater with the horizontal plane.

EXTERIOR WINDOW. An opening, especially in the wall of a building, for admission of light or air that is usually closed by casement or sashes containing transparent material (such as glass) and in some cases capable of being opened and shut. All areas, including frames, in the shell of a conditioned space that let in natural light, including skylights, sliding glass doors, glass block walls and the glazed portions of the doors.

When calculating the energy performance of the exterior envelope, the area of the window shall be the total area of glazing measured using the rough opening dimensions, and including the glass, sash and frame.

FENESTRATION. Windows and doors in the exterior envelope. See the definitions for "Exterior Door" and "Exterior Window."

FLOOR AREA. The area included within the surrounding exterior walls of a building or portion thereof, exclusive courts. The floor area of a building or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above.

GLAZING. All areas including frames in the shell of a conditioned space that let in natural light, including windows, clerestories, skylights, sliding glass doors, glass block walls and the glazed portion of doors.

GROSS AREA OF EXTERIOR WALLS. Consists of wall areas, as measured on the exterior, including foundation walls above grade; peripheral edges of floors; window areas, including sash; and door areas, where such surfaces are exposed to outdoor air and enclose a heated or mechanically cooled space.

HEATED SPACE. A space within a building served by a mechanical, electrical or combustion source of heat. Spaces within a basement shall be defined as heated when any of the following apply: the space is finished, or has heating registers or contains heating devices.

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts.
2. 50 lumens per watt for lamps over 15 watts to 40 watts.
3. 40 lumens per watt for lamps 15 watts or less.

HSPF (HEATING SEASONAL PERFORMANCE FACTOR). The total heating output of a heat pump during its normal annual usage period for heating divided by the total electric power input in watt–hours during the same period.

HVAC (HEATING, VENTILATING AND AIR–CONDITIONING) SYSTEM. Refers to the equipment, distribution network, and terminals that provide either collectively or individually the processes of heating, ventilating, and/or air–conditioning processes to a building.

MANUAL. (non-automatic) Action that requires human intervention as the basis for control. (See "Automatic.")

***R* (THERMAL RESISTANCE).** See "Thermal Resistance."

RESIDENTIAL BUILDINGS. Buildings and structures, or portions thereof, housing Group R, occupancies which are three stories or less in height.

THERMAL RESISTANCE (*R*). The measure of the resistance of a material or building component to the passage of heat, has the value of (hr.–ft.^{2}–^{o}F)/Btu, and is the reciprocal of thermal conductance.

THERMAL TRANSMITTANCE (*U*). The coefficient of heat transfer. It is the time rate of heat flow per unit area under steady state conditions from the fluid on the warm side of the barrier to the fluid on the cold side, per unit temperature difference between the two fluids, Btu/(hr.–ft.^{2}–ºF).

THERMOSTAT. An instrument which measures changes in temperature and controls a device or devices to maintain a desired temperature.

TOTAL SOLAR RESOURCE FRACTION. The fraction of usable solar energy that is received by the solar panel/collector throughout the year. This accounts for the impacts due to external shading, collector tilt and collector orientation.

***U* (THERMAL TRANSMITTANCE).** See "Thermal Transmittance."

VAULTED CEILING. A residential building with a ceiling with a minimum slope of 2 in 12.

WINDOW. See "Exterior Window."

ZONE. A space or group of spaces within a building with heating or cooling requirements sufficiently similar so that comfort conditions can be maintained throughout by a single controlling device.

Section 301
Prescriptive Compliance Path

301.1 Prescriptive Compliance Path. Residential dwellings shall comply with Table RC201.1(1), one "Envelope Enhancement Measure" from Table RC201.1(2) and one "Conservation Measure" from Table RC201.1(2), and the requirements of this section.

Exception:

1. Dwelling units that are 1500 square feet or less of conditioned floor area, shall not be required to meet the envelope requirements specified in Table RC201.1(1). Dwelling units using this exception shall comply with Table N1101.1(1) of the Oregon Residential Specialty Code.

2. Dwelling that are greater than 3000 square feet of conditioned floor area shall select one additional measure from the "Conservation Measure" section of Table RC201.1(2).

301.2 Structural

301.2.1 EXTERIOR ENVELOPE REQUIREMENTS. Exterior building envelope shall comply with Table RC201.1(1) or may be demonstrated using Table RC201.2(1). The requirements specified in Table RC201.1(2) shall apply to both Tables RC201.1(1) and RC201.2(1).

301.3 Plumbing

<Reserved>

301.4 Mechanical

<Reserved>

301.5 Electrical

RC201.5.1 High-efficacy lighting. The provisions of this section apply to lighting equipment, related controls and electric circuits serving all conditioned and unconditioned interior floor space and exterior building facades of all dwelling units and guest rooms within residential buildings and structures, or portions thereof. A minimum of seventy-five (75) percent of the permanently installed lighting fixtures shall contain high-efficacy lamps. Screw-in compact florescent lamps comply with this requirement.

The building official shall be notified in writing at the final inspection that a minimum of seventy-five (75) percent of the permanently installed lighting fixtures have met this requirement.

TABLE 301.1(1)
PRESCRIPTIVE ENVELOPE REQUIREMENTS [a]

Building Component	Standard Base Case		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, or[f]	U-0.025	R-49	???	???
Advanced framed flat ceilings[f]	U-0.026	R-38	U-0.025	R-49
Vaulted ceilings [g]	U-0.042	R-38[g]	U-0.027	R-38A[h]
Under floors	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-0.30	U-0.30	U-0.30	U-0.30
Window area limitation [j, k]	n/a	n/a	n/a	n/a
Skylights [l]	U-0.50	U-0.50	U-0.50	U-0.50
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~~32	U-0. 32~~40~~	U-0. 32~~40~~	U-0. 32~~40~~
Forced air duct insulation	n/a	R-8	n/a	R-8

a As allowed in Section RC201.2.1, 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 RC201.1(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.

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 in area may be reduced to not less than R-21. When reduced, the cavity shall be filled (except for required ventilation spaces).
Advanced framing construction for ceilings as defined in Section N1104.6 of the Oregon Residential Specialty Code.

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 may have a U-factor of 0.60. Skylight U-factor is tested in the 20 degree overhead plane per NFRC standards.

m A maximum of 28 square feet 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~~ 32 requirement.

Table 301.1(2)
Additional Measures

Envelope Enhancement Measure (Select One)	1	**High efficiency walls & windows:** (Cannot be used with Conservation Measure 2) Exterior walls – U-0.047 / (See Table FC201.2(2) for examples) Windows – Max 15% of conditioned area; or Windows – U-0.25
	2	**High efficiency thermal envelope UA:** (Cannot be used with Conservation Measure 2) Proposed UA is 15% lower than the Code UA when calculated in Table N1104.1(1)
	3	**Building tightness testing, ventilation & duct sealing:** (Cannot be used with Conservation Measure 1 or 6) A mechanical exhaust, supply, or combination system providing whole-building ventilation rates specified in table RC201.1(3),or ASHRAE 62.2, and The dwelling shall be tested with a blower door and found to exhibit no more than 4.0 air changes per hour[f] and Performance tested duct systems[b]
	4	**HVAC within conditioned space:** (Cannot be used with Conservation Measure 1 or 3) All ducts and air handler are contained within building envelope[I]
Conservation Measure (Select One)	1	**High efficiency gas forced air system and Duct Sealing:** Gas-fired furnace with minimum AFUE of 90%[a], and Performance tested duct systems[b,]
	2	**High efficiency gas forced air system:** Gas-fired furnace with minimum AFUE of 95%[a],
	3	**High efficiency electric forced air system:** Air-source heat pump with minimum HSPF of 9.0, designed at 30° balance point, or Closed-loop ground source heat pump with minimum COP of 3.0; and Performance tested duct systems[b,]
	4	**HVAC within conditioned space:** All ducts and air handler are contained within building envelope[I]
	5	**Ductless mini-split 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. Conventional electric resistance heating may be provided for any secondary zones in the dwelling.
	6	**High efficiency water heating & lighting:** Natural gas/propane water heating with min EF of 0.81, and A minimum 90 percent of permanently installed lighting fixtures as CFL or linear fluorescent or a min efficacy of 40 lumens per watt as specified in section RC201.5[c]
	7	**Energy management device, windows & duct sealing:** Whole building energy management device that is capable of monitoring or controlling energy consumption, and Performance tested duct systems[b,] and Windows U-Value= 0.25
	8	**Solar photovoltaic:** Minimum 1.5 watt / sq ft conditioned floor space[g]
	9	**Solar water heating:** Minimum of 40 ft² of gross collector area[h]

For SI: 1 square foot = 0.093 m², 1 watt per square foot = 10.8 W/m².

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 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 to be CFL or linear fluorescent or a min. efficacy of 40 lumens per watt. Each of these additional measures adds an additional percent to the 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 Pascals 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%.
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%
I. A total of 5%, five percent, of an HVAC systems 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.

TABLE 301.1(3)
VENTILATION AIR REQUIREMENTS, cfm

Floor Area	Bedrooms				
(ft^2)	0-1	2-3	4-5	6-7	>7
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7501	105	120	135	160	185

TABLE 301.2(1)
RESIDENTIAL THERMAL PERFORMANCE CALCULATIONS

BUILDING COMPONENTS [b]	Standard base case [a]			Proposed alternative			
	Areas [c]	U-factor	Areas x U	R-value[d]	Areas[c]	U-factor [e]	Areas x U
Flat ceilings Vaulted ceilings [f] Conventional wood-framed walls Underfloor Slab edge		0.025 0.042 0.060 0.028 (perimeter ft. =) F=0.52 [g]					
Windows ~~Skylights <2%~~ [h] Skylights ~~>2%~~ [h]		0.30 ~~0.60~~ 0.50					
Exterior doors [i] Doors with >2.5 ft^2 glazing		0.20 0.~~40~~32					
		CODE UA =				**Proposed UA [j] =**	

[a] Base path 1 represents Standard Base Case from Table N1101.1(1).

[b] Performance trade-offs are limited to those listed in column 1. Heat plant efficiency, duct insulation levels, passive and active solar heating, air infiltration and similar measures including those not regulated by code may not be considered in this method of calculation.

[c] Areas from plan take-offs. All areas must be the same for both Standard Base Case and Proposed Alternate. The vaulted ceiling surface area for Standard Base Case must be the actual surface area from the plan take-off not to exceed 50 percent of the total heated space floor area. Any areas in excess of 50 percent for Base Case must be entered at U-0.031 (R-38) with "Flat Ceilings" area.

[d] Minimum Component Requirements: Walls R-15; Floors R-21; Flat Ceilings R-38; Vaults R-21; Below-Grade Wood, Concrete or Masonry Walls R-15; 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). A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.54 or less and shall not be included in calculations.

[e] *U*-values for wood frame ceilings, walls and floor assemblies shall be as specified in Table N1104.1(2). *U*-values for other assemblies, which include steel framing, brick or other masonry, stucco, etc., shall be calculated using standard ASHRAE procedures.

[f] Vaulted area, unless insulated to R-38, U-0.031**,** may not exceed 50 percent of the total heated space floor area.

[g] F=The heat loss coefficient, BTU/hr./$ft.^2$/^{o}F. per foot of perimeter.

[h] Whenever skylight area for Proposed Alternative exceeds 2 percent of the total heated space floor area, enter 2 percent of area under Standard Base Case at U-0.60 then the remaining area under Standard Base Case at U-0.50. For Proposed Alternative skylights, enter the actual skylight area and U-factor of those to be installed in residence.

[i] A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.54 or less. Default U-factor for an unglazed wood door is 0.54**.**

[j] Proposed UA must be less than or equal to Code UA.

Section 401
Selective Compliance Path

401.1 Selective Compliance Path. Residential dwellings electing to build to the selective compliance path shall comply with the requirements of the Oregon Residential Specialty Code and follow the additional requirements of this section.

401.2 Additional measures. In addition to the requirements of Chapter 11 of the Oregon Residential Specialty Code, dwellings shall install additional energy conservation measures, in accordance with Table RC301.2(1), from the provisions in Table RC301.2(2).

Formatted: Number of columns: 1

Table 401.2(1)
Additional Measures Required

Conditioned Space (Square Footage)	Number of Points Required
≤ 1,500	8
1,501-2,250	10
2,251 – 3,000	15
≥ 3,001	20

Table RC301.2(2)
Measures Table

Measure #	Measure	Pts	Measure Notes:
	Envelope Measures		
1	Walls - U- 0.047	5	
	Walls - U- 0.038	9	
	Walls - U- 0.027	15	
2	BIBS wall insulation (blown in blanket)	2	
3	Ceiling - U- 0.027 (vaulted only)	2	
	Ceiling - U- 0.025 (R38 advanced flat)	3	
	Ceiling - U- 0.020 (R49 advanced flat)	6	
	Ceiling - U- 0.017 (R60 advanced flat)	7	
4	Windows - .25 (area-weighted average)	9	
	Windows - .22 (area-weighted average)	11	
	Windows - .20 (area-weighted average)	13	
	Windows max 12% of floor area	6	
5	Floor - R38	1	
6	Envelope UA is 5% lower than 2011 code	6	
	Envelope UA is 10% lower than 2011 code	10	
	Envelope UA is 15% lower than 2011 code	15	
	Envelope UA is 20% lower than 2011 code	18	
7	5.0 ACH, proper ventilation required	6	
	4.0 ACH, proper ventilation required	13	
	3.0 ACH, balanced ventilation required	19	
	<2.0 ACH, balanced ventilation required	26	
	HVAC Measures		
8	Gas fired furnace w/ minimum AFUE of 95%	5	
	Air sourced heat pump w/ HSPF 8.5	2	
	Air sourced heat pump w/ HSPF 9.0	3	
	Ductless mini split for at least 1 living zone(w/min HSPF of 8.5)	10	
	Closed loop ground source w/ COP 3.3	14	
9	ECM motor on any forced air furnace	1	
10	Ducts sealed with mastic	3	
	Performance tested ducts and sealing with mastic	8	
	Ducts and HVAC in condition space	9	
11	Heat Recovery Ventilator	4	
	Energy Recovery Ventilator	4	
12	Direct-Vent Fireplace installed with Electronic ignition and controlled by a thermostat.	1	Points are awarded to only one fireplace if multiple are installed.
	Plumbing Measures		
13	Water heating gas EF > 0.88	15	
	Water heating gas EF >= .81	12	
	Water heating gas EF >= .67	5	
	water heating electric EF .95	1	
	Water heating heat pump EF 2.0 or COP 2.5	13	
14	Insulate all hot water lines (R4 min)	1	

15	Lower flow showerheads (< 1.75 gpm)	2	
16	Drain-water heat recovery system	4	
	Onsite Generation		
17	Solar 1.0 watt/sqft of conditioned space	19	
	Solar 1.5 watt/sqft of conditioned space	28	
18	Solar water 40 sqft of collector area	15	
	Miscellaneous Measures		
19	75% CFL	1	
	90% CFL	2	
20	Meets Energy Star Standards	12	
21	Energy Star Thermal ~~Inspection~~ by-pass check list	3	

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

SECTION 402
ALTERNATIVE SYSTEMS ANALYSIS

RC401.1 General. The building official shall approve alternative designs, when it has been demonstrated that the proposed annual energy consumption will be lower than the annual energy consumption if the dwelling was designed in accordance with the provisions of Chapter 11 of the Oregon Residential Specialty Code. Dwellings shall provide a reduction in the projected annual energy consumption as specified in Table RC401.1.

Table 402.1
Annual Energy Consumption Reduction

Conditioned Space (Square Footage)	Percentage Below the ORSC
≤ 1,500	8
1,501-2,250	10
2,251 – 3,000	15
≥ 3,001	20

RC402.1 Design parameters. The baseline design, conforming to requirements specified in the Oregon Residential Specialty Code and the proposed design shall be analyzed using the same procedures. The analyses shall use equal floor area, equal fenestration area, equal orientation, and equal environmental requirements. The foundation type of the dwelling shall be consistent between the baseline design and the proposed design. Changes in foundation materials shall be permitted within a foundation type. The comparison shall be expressed in millions of Btu (MBTU) per year.

RC402.1.1 Allowable Trade-Offs. When satisfying the energy consumption savings set forth in section RC401.1, trade-offs to the requirements of the Oregon Residential Specialty Code shall be allowed as specified in this section. Trade-offs in this analysis shall be from building envelope components, HVAC distribution systems, or a combination thereof.

Exception: HVAC Equipment efficiencies may be allowed when the efficiencies comply with those set forth in Table RC201.1(2), and the distribution system is <5% of the duct area is outside conditioned space or tested to demonstrate duct leakage that does not exceed 7% of nominal system design flow rate.

RC403.1 Documentation. Proposed alternative designs for the Reach Code shall be accompanied by an energy analysis comparison report prepared by a registered design professional, certified home energy rater/auditor, or other approved energy analysis organization. The report shall provide sufficient technical detail describing the differences between the two building, systems designs, and the data used in and resulting from the comparative analysis.

Where the dwelling proposes a u-factor for an envelope component that does not meet the performance requirements in Table N1101.1(1) of the Oregon Residential Specialty Code, the dwelling shall demonstrate compliance by completing Table N1104.1(1).

Section RC501
Additions, Alterations, and Change of Occupancies

RC501.1 General. Additions, Alterations, and Change of Occupancies shall comply with the provisions of this code and the provisions of the Oregon Residential Specialty Code.

RC502.1 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 section, Table RC201.1(1), and the requirements of the Oregon Residential Specialty Code.

RC502.1.1 Large Additions. Additions that are equal to or more than 40 percent of the existing building heated floor area or 600 square feet in area, whichever is less, shall be required to comply with Tables RC201.1(1) and RC201.1(2)

RC502.1.2 Small Additions. Additions that are less than 40 percent of the existing building heated floor area or less than 600 square feet in area, whichever is less, shall be required to select one measure from Table RC201.1(2) or comply with Table RC502.2.2.

Exception: Additions that are less than 15 percent of existing building heated floor area or 200 square feet in area, whichever is less, shall not be required to comply with Table RC201.1(2) or Table RC502.2.2.

TABLE RC502.2.2
SMALL ADDITION ADDITIONAL MEASURES (Select Two)

1	Increase the ceiling insulation of the existing portion of the home as specified in Table N1101.2.
2	Replace all existing single-pane wood or aluminum windows to the u-value as specified in Table N1101.2.
3	Insulate the floor system as specified in Table N1101.2 and install 50 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.
4	Test the entire dwelling with a blower door and exhibit no more than 7.0 air changes per hour @ 50 Pascal's.
5	Seal and performance test the duct system.
6	Replace existing 78% AFUE or less gas furnace with a 92% AFUE or greater system.
7	Replace existing electric radiant space heaters with a ductless mini split system with a minimum HSPF of 8.5.
8	Replace existing electric forced air furnace with an air source heat pump with a minimum HSPF of 8.5.
9	Replace existing water heater for a natural gas/propane water heater with min EF of 0.67.
10	Install a solar water heating system with a minimum of 40 ft^2 of gross collector area.

RC503.1 Alteration and repair. Alterations or repairs, which affect components of existing conditioned spaces, those components shall comply with chapter 11 of the Oregon Residential Specialty Code.

Exception: The minimum component requirements as specified in Table RC503.1 shall be used to the maximum extent practical.

TABLE RC503.1
EXISTING BUILDING COMPONENT REQUIREMENTS

Building Components	Required Performance	Equiv. Value
Wall Insulation[a]	U-0.60	R-15+3.5 or R-21
Flat Ceiling	U-0.025	R-49
Vaulted Ceiling ≥ 10 inches nominal rafter depth.	U-0.040	R-25
Vaulted Ceiling ≥ 8 inches nominal rafter depth.	U-0.047	R-21
Under floor ≥10 inches nominal joist depth.	U-0.028	R-30
Under floor ≥8 inches nominal joist depth.	U-0.032	R-25
Slab edge perimeter	F-0.52	R-15
Windows	U-0.30	U-0.30
Skylights	U-0.60	U-0.60
Exterior Doors	U-0.20	R-5
Exterior Doors w/> 2.5 ft^2 glazing	U-0.40	R-2.5
Forced Air Ducts	n/a	R-8

[a] The addition of exterior insulation is only required when the dwelling is also receiving a whole dwelling siding replacement. If a whole dwelling siding replacement is not being completed, the cavity shall be filled as feasible.

RC504.1 Change of Use or Occupancy. A building that changes use or occupancy, without any changes to the components shall comply with Table RC503.1 to the greatest extent practical.

Section RC601
Alternate Methods and Materials

RC601.1 Alternate Methods and Materials. The materials, methods, or techniques contained in this section maybe used when building to the provisions of the Reach Code. Materials, methods, or techniques used to satisfy the requirements of this code shall be documented within the construction documents.

RC602 Structural.

RC602.1 Structural Insulated Panels. Structural Insulated Panels maybe used in seismic category D_1 and D_2 when designed by a registered design professional.

RC602.2 Structural Sheathing Applied Over Foam. When designed by a registered design professional, the application of structural sheathing installed over foam sheathing shall be allowed.

RC603.1 Plumbing

<Reserved>

RC604.1 Mechanical

<Reserved>

RC605.1 Electrical