

RC11res26

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New Section: Appendix RC

Repeals: ICC 700

Modifications Submitted by Steve Strawn JELD-WEN inc.

#### Section RC102 Definitions

**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.

Modify to read: Building Component whose primary function is to allow human egress from/to the building

Reason: To be consistent with NFRC 600 Glossary. Definition does not exist in IBC or IRC. Allows consistency in use.

**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.

Modify to read: An assembled unit consisting of a frame/sash component holding one or more pieces of glazing functioning to admit light and or air to an enclosure.

Reason: To be consistent with NFRC 600 Glossary. Definition does not exist in IBC or IRC. Allows consistency in use.

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

Modify to read: Products that fill openings in a building envelope, such as windows, doors, skylights, curtain walls, etc., designed to permit or limit the passage of air, light, vehicles or people.

Reason: To be consistent with NFRC 600 Glossary. Definition does not exist in IBC or IRC. Allows consistency in use.

**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.

Modify to read: The transparent or semi-transparent in-fill material in a glazing system.

Reason: To be consistent with NFRC 600 Glossary. Definition does not exist in IBC or IRC. Allows consistency in use.

**TABLE RC201.1(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-0.060	R-21 <sup>c</sup>	d	d
Wall insulation-below grade <sup>e</sup>	F-0.565	R-15	F-0.565	R-15
Flat ceilings, or <sup>f</sup>	U-0.025	R-49	???	???
Advanced framed flat ceilings <sup>f</sup>	U-0.026	R-38	U-0.025	R-49
Vaulted ceilings <sup>g</sup>	U-0.042	R-38 <sup>h</sup>	U-0.027	R-38A <sup>h</sup>
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 <sup>i</sup>	n/a	R-10	n/a	R-10
Windows <sup>j</sup>	U-0.30	U-0.30	U-0.30	U-0.30
Window area limitation <sup>j, k</sup>	n/a	n/a	n/a	n/a
Skylights <sup>l</sup>	U-0.50	U-0.50	U-0.50	U-0.50
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

- <sup>a</sup> 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).
- <sup>b</sup> R-values used in this table are nominal, for the insulation only in standard wood framed construction and not for the entire assembly.
- <sup>c</sup> Wall insulation requirements apply to all exterior wood framed, concrete or masonry walls that are above grade. This includes cripple walls and rim joint 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.
- <sup>d</sup> The wall component shall be a minimum solid log or timber wall thickness of 3.5 inches.
- <sup>e</sup> 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.
- <sup>f</sup> 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.
- <sup>g</sup> 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.
- <sup>h</sup> A=advanced frame construction, which shall provide full required insulating value to the outside of exterior walls.
- <sup>i</sup> 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.
- <sup>j</sup> 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.
- <sup>k</sup> Reduced window area may not be used as a trade-off criterion for thermal performance of any component.
- <sup>l</sup> 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.
- <sup>m</sup> A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.54 or less.
- <sup>n</sup> 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.

Modify the table:

Strike row titled Window area limitation.

Reason: Unless it is a placeholder it adds no value

Exterior doors w/>2.5ft<sup>2</sup> glazing; Change required performance U-Factor from 0.40 to 0.32

Reason: Many side hinged full lite doors listed in the NFRC Certified Product Directory (CPD) are able to meet the proposed 0.32 U-Factor. This is intended to be a “codes plus” or “Reach” code. Lets ask for products that can provide the better performance.

Eliminate footnote j.

Reason A search of skylight products in the NFRC CPD shows that skylights of many material types are able to meet the 0.50 U factor performance and still provide a reasonable SHGC and VT in the .5 - .7 range. Products rated at .6 include those that do not employ low-e glass.

Strike footnote m.

Reason: not needed. Doors can easily meet the .32 range and again this is a “reach “ code.

Strike footnote n

Reason: All products can be rated and performance verified by NFRC labels. With change in the prescriptive performance rating to a 0.32 U the performance should be verified and traceable to the NFRC CPD.

**TABLE RC201.2(1)**  
**RESIDENTIAL THERMAL PERFORMANCE CALCULATIONS**

BUILDING COMPONENTS <sup>a</sup>	Standard base case <sup>a</sup>		Proposed alternative				
	Area <sup>e</sup>	U-factor	Area x U	R-value <sup>d</sup>	Area <sup>e</sup>	U-factor <sup>e</sup>	Area x U
Flat ceilings		0.025					
Vaulted ceilings <sup>f</sup>		0.042					
Conventional wood-framed walls		0.060					
Underfloor		0.028					
Slab edge		(perimeter ft. =) $F=0.52^g$					
Windows		0.30					
Skylights <2% <sup>h</sup>		0.60					
Skylights >2% <sup>h</sup>		0.50					
Exterior doors <sup>i</sup>		0.20					
Doors with >2.5 ft <sup>2</sup> glazing		0.40					
	CODE UA =				Proposed UA <sup>j</sup> =		

- <sup>a</sup> Base path 1 represents Standard Base Case from Table N1101.1(1).
- <sup>b</sup> 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.
- <sup>c</sup> Areas from plan take-off. All areas must be the same for both Standard Base Case and Proposed Alternative. 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.
- <sup>d</sup> Minimum Component Requirements: Walls R-15; Floors R-21; Flat Ceilings R-38; Vault 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 0.34 (Nominal R-7). A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.34 or less and shall not be included in calculations.
- <sup>e</sup> 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.
- <sup>f</sup> Vaulted area, unless insulated to R-38, U-0.031, may not exceed 50 percent of the total heated space floor area.
- <sup>g</sup> F=The heat loss coefficient, BTU/hr./ft.<sup>2</sup>/°F, per foot of perimeter.
- <sup>h</sup> 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.
- <sup>i</sup> A maximum of 28 square feet of exterior door area per dwelling unit can have a U-factor of 0.34 or less. Default U-factor for an unglazed wood door is 0.54.
- <sup>j</sup> Proposed UA must be less than or equal to Code UA.

Modify table to eliminate the skylight percentage area and just list skylight and a required U-Factor of .50

Strike footnote h consistent with previous change.

Strike footnote i consistent with previous change

**Table RC301.2(2)**  
**Measures Table**

Measure #	Measure	Pts	Measure Notes:
<b>Envelope Measures</b>			
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	

Add doors to measure 4.

Reason: though doors will make up a small percentage of the area and a small percentage of the area weighted average they should be included.

**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.

Identify the table N1101.2 as being from the ORSC 2011

**TABLE RC503.1  
EXISTING BUILDING COMPONENT REQUIREMENTS**

Building Components	Required Performance	Equiv. Value
Wall Insulation*	U-0.60	R-15+3.5 or R-21
Flat Ceiling	U-0.025	R-49
Vaulted Ceiling $\geq$ 10 inches nominal rafter depth.	U-0.040	R-25
Vaulted Ceiling $\geq$ 8 inches nominal rafter depth.	U-0.047	R-21
Under floor $\geq$ 10 inches nominal joist depth.	U-0.028	R-30
Under floor $\geq$ 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 <sup>2</sup> glazing	U-0.40	R-2.5
Forced Air Ducts	n/a	R-8

\*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.

Modify criteria for skylights to 0.50 U-factor

Modify Exterior doors w/>2.5ft<sup>2</sup> glazing to prescribe 0.32 U-factor