

CHAPTER 3 [RE]

GENERAL REQUIREMENTS

User note:

About this chapter: Chapter 3 addresses broadly applicable requirements that would not be at home in other chapters having more specific coverage of subject matter. This chapter establishes climate zone by US counties and territories and includes methodology for determining climate zones elsewhere. It also contains product rating, marking and installation requirements for materials such as insulation, windows, doors and siding.

SECTION R301 CLIMATE ZONES

R301.1 General. *Climate zones* from Table R301.1 shall be used for determining the applicable requirements from Chapter 4.

SECTION R302 DESIGN CONDITIONS

R302.1 Interior design conditions. The interior design temperatures used for heating and cooling load calculations shall be a maximum of 72°F (22°C) for heating and minimum of 75°F (24°C) for cooling.

R302.2 Exterior design conditions. The heating or cooling outdoor design temperatures shall be selected from Appendix RC.

SECTION R303 MATERIALS, SYSTEMS AND EQUIPMENT

R303.1 Identification. Materials, systems and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this code.

R303.1.1 Building thermal envelope insulation. An *R*-value identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation 12 inches (305 mm) or greater in width. Alternatively, the insulation installers shall provide a certification listing the type, manufacturer and *R*-value of insulation installed in each element of the *building thermal envelope*. For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled *R*-value, installed density, coverage area and number of bags installed shall be listed on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and *R*-value of installed thickness shall be listed on the certification. For insulated siding, the *R*-value shall be labeled on the product's package and shall be listed on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

Exception: For roof insulation installed above the deck, the *R*-value shall be labeled as required by the material standards specified in Table 1508.2 of the *International*

**TABLE R301.1
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID DESIGNATIONS BY COUNTY**

WASHINGTON	
Key: A - Moist, B - Dry, C - Marine. Absence of moisture designation indicates moisture regime is irrelevant.	
5B Adams	4C Lewis
5B Asotin	5B Lincoln
5B Benton	4C Mason
5B Chelan	5B Okanogan
5C Clallam	4C Pacific
4C Clark	6B Pend Oreille
5B Columbia	4C Pierce
4C Cowlitz	5C San Juan
5B Douglas	4C Skagit
6B Ferry	5B Skamania
5B Franklin	4C Snohomish
5B Garfield	5B Spokane
5B Grant	6B Stevens
4C Grays Harbor	4C Thurston
5C Island	4C Wahkiakum
4C Jefferson	5B Walla Walla
4C King	4C Whatcom
5C Kitsap	5B Whitman
5B Kittitas	5B Yakima
5B Klickitat	

Building Code or Table R906.2 of the *International Residential Code*.

R303.1.1.1 Blown or sprayed roof/ceiling insulation. The thickness of blown-in or sprayed roof and ceiling insulation (fiberglass and cellulose) shall be written in inches (mm) on markers that are installed at least one for every 300 square feet (28 m²) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers a minimum of 1 inch (25 mm) in height. Each marker shall face the attic access opening. Sprayed polyurethane foam insulation thickness and installed *R*-value shall be listed on certification provided by the insulation installer.

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R303.1.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer’s *R*-value mark is readily observable upon inspection. For insulation materials that are installed without an observable manufacturer’s *R*-value mark, such as blown or draped products, an insulation certificate complying with Section R303.1.1 shall be left immediately after installation by the installer, in a conspicuous location within the building, to certify the installed *R*-value of the insulation material.

R303.1.3 Fenestration product rating. *U*-factors of fenestration products (windows, doors and *skylights*) shall be determined in accordance with NFRC 100.

Exception: Where required, garage door *U*-factors shall be determined in accordance with either NFRC 100 or ANSI/DASMA 105.

U-factors shall be determined by an accredited, independent laboratory, and labeled and certified by the manufacturer.

Products lacking such a labeled *U*-factor shall be assigned a default *U*-factor from Table R303.1.3(1), Table R303.1.3(2) or R303.1.3(4). The *solar heat gain coefficient* (SHGC) and *visible transmittance* (VT) of glazed fenestration products (windows, glazed doors and *skylights*) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC or VT shall be assigned a default SHGC or VT from Table R303.1.3(3).

Exceptions:

1. Units without NFRC ratings produced by a *small business* may be assigned default *U*-factors from Table R303.1.3(5) for vertical fenestration.
2. Owner-built, nonoperable wood frame window consisting of a double pane unit with low-*e* (*E*=0.04 or less), 1/2 -inch airspace with argon fill.

**TABLE R303.1.3(1)
DEFAULT GLAZED WINDOW, GLASS DOOR
AND SKYLIGHT *U*-FACTORS**

FRAME TYPE	WINDOW AND GLASS DOOR		SKYLIGHT
	Single pane	Double pane	
Metal	1.20	0.80	See Table R303.1.3(4)
Metal with Thermal Break ^a	1.10	0.65	
Nonmetal or Metal Clad	0.95	0.55	
Glazed Block	0.60		

a. Metal Thermal Break = A metal thermal break framed window shall incorporate the following minimum design characteristics:

- 1) The thermal conductivity of the thermal break material shall be not more than 3.6 Btu-in/h/ft²/°F;
- 2) The thermal break material must produce a gap in the frame material of not less than 0.210 inches; and
- 3) All metal framing members of the products exposed to interior and exterior air shall incorporate a thermal break meeting the criteria in Items 1 and 2 above.

**TABLE R303.1.3(3)
DEFAULT GLAZED FENESTRATION SHGC AND VT**

	SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
	Clear	Tinted	Clear	Tinted	
SHGC	0.8	0.7	0.7	0.6	0.6
VT	0.6	0.3	0.6	0.3	0.6

R303.1.4 Insulation product rating. The thermal resistance (*R*-value) of insulation shall be determined in accordance with the US Federal Trade Commission *R*-value rule (CFR Title 16, Part 460) in units of h × ft² × °F/Btu at a mean temperature of 75°F (24°C).

R303.1.4.1 Insulated siding. The thermal resistance (*R*-value) of insulated siding shall be determined in accordance with ASTM C1363. Installation for testing shall be in accordance with the manufacturer’s instructions.

R303.1.5 Air-impermeable insulation. Insulation having an air permeability not greater than 0.004 cubic feet per minute per square foot [0.002 L/(s × m²)] under pressure differential of 0.3 inch water gauge (75 Pa) when tested in accordance with ASTM E2178 shall be determined air-impermeable insulation.

R303.2 Installation. All materials, systems and equipment shall be installed in accordance with the manufacturer’s instructions and the *International Building Code* or the *International Residential Code*, as applicable.

R303.2.1 Protection of exposed foundation insulation. Insulation applied to the exterior of *below grade walls*, crawl space walls and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation’s thermal performance. The protective covering shall cover the exposed exterior insulation and extend not less than 6 inches (153 mm) below grade.

R303.3 Maintenance information. Maintenance instructions shall be furnished for equipment and systems that require preventive maintenance. Required regular maintenance actions shall be clearly stated and incorporated on a readily visible label. The label shall include the title or publication number for the operation and maintenance manual for that particular model and type of product.

**TABLE R303.1.3(2)
DEFAULT OPAQUE DOOR U-FACTORS**

DOOR TYPE	NO GLAZED FENESTRATION	SINGLE GLAZING	DOUBLE GLAZING WITH 1/4 IN. AIRSPACE	DOUBLE GLAZING WITH 1/2 IN. AIRSPACE	DOUBLE GLAZING WITH e = 0.10, 1/2 IN. ARGON
Swinging Doors (Rough opening – 38 in. x 82 in.)					
Slab Doors					
Wood slab in wood frame ^a	0.46				
6% glazed fenestration (22 in. x 8 in. lite)	—	0.48	0.47	0.46	0.44
25% glazed fenestration (22 in. x 36 in. lite)	—	0.58	0.48	0.46	0.42
45% glazed fenestration (22 in. x 64 in. lite)	—	0.69	0.49	0.46	0.39
More than 50% glazed fenestration	Use Table R303.1.3(1)				
Insulated steel slab with wood edge in wood frame ^a	0.16				
6% glazed fenestration (22 in. x 8 in. lite)	—	0.21	0.20	0.19	0.18
25% glazed fenestration (22 in. x 36 in. lite)	—	0.39	0.28	0.26	0.23
45% glazed fenestration (22 in. x 64 in. lite)	—	0.58	0.38	0.35	0.26
More than 50% g glazed fenestration	Use Table R303.1.3(1)				
Foam insulated steel slab with metal edge in steel frame ^b	0.37				
6% glazed fenestration (22 in. x 8 in. lite)	—	0.44	0.42	0.41	0.39
25% glazed fenestration (22 in. x 36 in. lite)	—	0.55	0.50	0.48	0.44
45% glazed fenestration (22 in. x 64 in. lite)	—	0.71	0.59	0.56	0.48
More than 50% glazed fenestration	Use Table R303.1.3(1)				
Cardboard honeycomb slab with metal edge in steel frame ^b	0.61				
Style and Rail Doors					
Sliding glass doors/French doors	Use Table R303.1.3(1)				
Site-Assembled Style and Rail Doors					
Aluminum in aluminum frame	—	1.32	0.99	0.93	0.79
Aluminum in aluminum frame with thermal break	—	1.13	0.80	0.74	0.63

Note: Appendix A Tables A107.1(2) through A107.1(4) of the *Washington State Energy Code*—Commercial Provisions may also be used if applicable.

a. Thermally broken sill (add 0.03 for nonthermally broken sill).

b. Nonthermally broken sill.

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TABLE R303.1.3(4)
DEFAULT U-FACTORS FOR SKYLIGHTS

FENESTRATION TYPE	FRAME TYPE			
	Aluminum Without Thermal Break	Aluminum With Thermal Break	Reinforced Vinyl/ Aluminum-Clad Wood or Vinyl	Wood or Vinyl- Clad Wood/Vinyl without Reinforcing
Single Glazing				
glass	U-1.58	U-1.51	U-1.40	U-1.18
acrylic/polycarb	U-1.52	U-1.45	U-1.34	U-1.11
Double Glazing				
air	U-1.05	U-0.89	U-0.84	U-0.67
argon	U-1.02	U-0.86	U-0.80	U-0.64
Double Glazing, $e = 0.20$				
air	U-0.96	U-0.80	U-0.75	U-0.59
argon	U-0.91	U-0.75	U-0.70	U-0.54
Double Glazing, $e = 0.10$				
air	U-0.94	U-0.79	U-0.74	U-0.58
argon	U-0.89	U-0.73	U-0.68	U-0.52
Double Glazing, $e = 0.05$				
air	U-0.93	U-0.78	U-0.73	U-0.56
argon	U-0.87	U-0.71	U-0.66	U-0.50
Triple Glazing				
air	U-0.90	U-0.70	U-0.67	U-0.51
argon	U-0.87	U-0.69	U-0.64	U-0.48
Triple Glazing, $e = 0.20$				
air	U-0.86	U-0.68	U-0.63	U-0.47
argon	U-0.82	U-0.63	U-0.59	U-0.43
Triple Glazing, $e = 0.20$ on 2 surfaces				
air	U-0.82	U-0.64	U-0.60	U-0.44
argon	U-0.79	U-0.60	U-0.56	U-0.40
Triple Glazing, $e = 0.10$ on 2 surfaces				
air	U-0.81	U-0.62	U-0.58	U-0.42
argon	U-0.77	U-0.58	U-0.54	U-0.38
Quadruple Glazing, $e = 0.10$ on 2 surfaces				
air	U-0.78	U-0.59	U-0.55	U-0.39
argon	U-0.74	U-0.56	U-0.52	U-0.36
krypton	U-0.70	U-0.52	U-0.48	U-0.32

Notes for Table R303.1.3(4)

1. U-factors are applicable to glass and plastic, flat and domed units, all spacers and gaps.
2. Emissivities shall be less than or equal to the value specified.
3. Gap fill shall be assumed to be air unless there is a minimum of 90-percent argon or krypton.
4. Aluminum frame with thermal break is as defined in Note 1 to Table R303.1.3(1).

**TABLE R303.1.3(5)
SMALL BUSINESS COMPLIANCE TABLE DEFAULT U-FACTORS FOR VERTICAL FENESTRATION**

VERTICAL FENESTRATION DESCRIPTION				FRAME TYPE		
Panes	Low-e ^a	Spacer	Fill	Any Frame	Aluminum Thermal Break ^b	Wood/Vinyl/ Fiberglass
Double ^c	A	Any	Argon	0.48	0.41	0.32
	B	Any	Argon	0.46	0.39	0.30
	C	Any	Argon	0.44	0.37	0.28
	C	High Performance	Argon	0.42	0.35	Deemed to comply ^e
Triple ^d	A	Any	Air	0.50	0.44	0.26
	B	Any	Air	0.45	0.39	0.22
	C	Any	Air	0.41	0.34	0.20
	Any double low-e	Any	Air	0.35	0.32	0.18

- a. Low-eA (emissivity) shall be 0.24 to 0.16.
 Low-eB (emissivity) shall be 0.15 to 0.08.
 Low-eC (emissivity) shall be 0.07 or less.
- b. Aluminum Thermal Break = An aluminum thermal break framed window shall incorporate the following minimum design characteristics:
 - 1) The thermal conductivity of the thermal break material shall be not more than 3.6 Btu-in/h/ft²/°F;
 - 2) The thermal break material must produce a gap in the frame material of not less than 0.210 inches; and
 - 3) All metal framing members of the products exposed to interior and exterior air shall incorporate a thermal break meeting the criteria in 1) and 2) above.
- c. A minimum air space of 0.375 inches between panes of glass is required for double glazing.
- d. A minimum air space of 0.25 inches between panes of glass is required for triple glazing.
- e. Deemed to comply glazing shall not be used for performance compliance.