



STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

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Adoption of the Washington State Energy Code WAC 51-11

On November 20, 2009, the Washington State Building Code Council voted to adopt changes to the Washington State Energy Code. The Council adopted the proposed rules published in Washington State Register Issue number 09-17-136, with the amendments listed below.

Link to the proposed rule:

<http://apps.leg.wa.gov/documents/laws/wsr/2009/17/09-17-136.htm>

Section 503.4.1 Fan Power. The Council removed this section from the rule. The proposal rule required a variable speed motor be included in furnaces. To reduce cost and allow flexibility, the Council did not adopt this provision.

~~503.4.1 Fan Power: Furnace and space conditioning air handling equipment covered under this section shall have direct induction fans (variable speed DC motors) with the capability of having reduced speed of at least 75 percent of the main rating power. The use of these fans for ventilation or circulation separate from space conditioning shall be restricted to a maximum of 50 percent of the rated fan power.~~

Section 505.1 Interior Lighting. This is a new section that applies to single family residences. The Council amended the section to change “lamp” to “luminaire”, consistent with the recommendations of the technical advisory group, including lighting designers and industry representatives.

505.1 A minimum of 50 percent of all luminaires shall have a high efficacy ~~lamp~~ luminaire.

Exception: Lighting that complies with the Prescriptive Lighting Option in Section 1520 or the Lighting Power Allowance Option in section 1530.

505.2 Exterior Lighting: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.

EXCEPTIONS: 1. Permanently installed outdoor luminaires that are not high efficacy shall be allowed provided they are controlled by a motion sensor(s) with integral photocontrol photosensor.

2. Permanently installed luminaires in or around swimming pools, water features.

505.3 Linear Fluorescent Fixtures: Linear fluorescent fixtures must be fitted with T-8 or smaller lamps (but not T-10 or T-12 lamps).

Table 6-1. The Council amended footnote 4 for consistency with the 2006 State Energy Code

**TABLE 6-1
PRESCRIPTIVE REQUIREMENTS^{0,1} FOR SINGLE-FAMILY RESIDENTIAL
CLIMATE ZONE 1**

Option	Glazing Area ¹⁰ : % of Floor	Glazing U-Factor		Door ⁹ U-Factor	Ceiling ²	Vaulted Ceiling ³	Wall ¹² Above Grade	Wall int ⁴ Below Grade	Wall ext ⁴ Below Grade	Floor ⁵	Slab ⁶ on Grade
		Vertical	Overhead ¹¹								
I.	13%	0.34	0.50	0.20	R-49 or R-38 adv	R-38	R-21 int ⁷	R-21 TB	R-10	R-30	R-10 2'
II.*	25%	0.32	0.50	0.20	R-49 or R-38 adv	R-38	R-21 int ⁷	R-21 TB	R-10	R-30	R-10 2'
III.	Unlimited	0.30	0.50	0.20	R-49 or R-38 adv	R-38	R-21 int ⁷	R-21 TB	R-10	R-30	R-10 2'

4. Below grade walls shall be insulated either on the exterior to a minimum level of ~~R-5~~ R-10, continuous or on the interior ~~as a framed wall~~ to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.

Table 6-2. The Council reinserted Table 6-2 for Climate Zone 2 including footnotes from the 2006 State Energy Code, modified to incorporate changes to ceiling and vaulted ceiling insulation to bring these requirements up to the level in proposed Table 6-1, and to incorporate a small improvement in glazing U-factor in recognition of the more severe weather in Climate Zone 2.

**TABLE 6-2
PRESCRIPTIVE REQUIREMENTS^{0,1} FOR SINGLE-FAMILY RESIDENTIAL
CLIMATE ZONE 2**

Option	Glazing Area ¹⁰ : % of Floor	Glazing U-Factor		Door ⁹ U-Factor	Ceiling ²	Vaulted Ceiling ³	Wall ¹² Above Grade	Wall int ⁴ Below Grade	Wall ext ⁴ Below Grade	Floor ⁵	Slab ⁶ on Grade
		Vertical	Overhead ¹¹								
I.	12%	0.32	0.50	0.20	R-49 or R-38 adv	R-38	R-21 int ⁷	R-21 TB	R-12	R-30	R-10 2'
II.*	15%	0.32	0.50	0.20	R-49 or R-38 adv	R-38	R-19 + R-5 ⁸	R-21 TB	R-12	R-30	R-10 2'
III.	Unlimited	0.30	0.50	0.20	R-49 or R-38 adv	R-38	R-19 + R-5 ⁸	R-21 TB	R-12	R-30	R-10 2'

* Reference Case

0. Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 13%, it shall comply with all of the requirements of the 15% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.

2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings complying with note 3. 'Adv' denotes Advanced Framed Ceiling.
3. Requirement applicable only to single rafter or joist vaulted ceilings.
4. Below grade walls shall be insulated either on the exterior to a minimum level of R-12, continuous or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.
5. Floors over crawl spaces or exposed to ambient air conditions.
6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4. For slabs inside a foundation wall, the insulation shall be installed to provide a thermal break between the slab edge and the foundation. Monolithic slabs shall include insulation, installed outside the foundation wall, and shall extend downward from the top of the slab for a minimum distance of 24 inches or downward and then horizontally for a minimum combined distance of 24 inches. Monolithic slabs shall also include R-10 insulation under the non-load bearing portions of the slab.
7. Int. denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.
8. This wall insulation requirement denotes R-19 wall cavity insulation plus R-5 foam sheathing.
9. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.
10. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of $U = 0.35$ or less is not included in glazing area limitations.
11. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.
12. Log and solid timber walls with a minimum average thickness of 3.5" are exempt from this insulation requirement.

Chapter 9 Additional Single Family Energy Efficiency Requirements. To reduce cost and increase flexibility, the Council reduced the number of credits required for compliance from 2 to 1.

Section 901 Additional Single Family Energy Efficiency Requirements. Dwelling units permitted under this Code shall comply with all provisions of Chapter 5 of this code and develop ~~2~~ 1 credits from Table 9-1.

Table 10-5B mass wall U values. The Council did not adopt changes in U-factors (thermal transmittance value) for concrete and masonry walls. The Council retained default U-factors from the 2006 energy code, to reduce cost impact on the masonry industry and provide flexibility.

**TABLE 10-5(B)1
Default U-Factors for Concrete and Masonry Walls**

Section 1132.3 Lighting Alterations. The Council removed changes to this section from the rule. The proposed rule changed the threshold for lighting compliance where 60 percent of light fixtures are altered or replaced to 20 per cent. The amendment maintains the 60 percent threshold found in the 2006 WSEC. References to the revised lighting power tables were also removed, consistent with the Council's amendment to those tables.

Chapter 12 Energy Metering. The Council amended the proposed rule to address access to the tenant utility meters within individual spaces.

1201--General. All buildings shall comply with Chapter 12. Whole building energy supply sources shall be metered to supply energy consumption data to the building owner to effectively manage energy. The building shall have a totalizing meter for each energy source.

Section 1314.6 Vestibules The Council removed section 1314.6 from the rule, to reduce cost and the burden on businesses and enforcement agencies, and because the code has no definition of building entrance.

~~**1314.6 Vestibules.** Building entrances that separate conditioned space from the exterior shall be protected with an enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. Interior and exterior doors shall have a minimum distance between them of not less than 7 ft when in the closed position. The exterior envelope of conditioned vestibules shall comply with the requirements for a conditioned space. Either the interior or exterior envelope of unconditioned vestibules shall comply with the requirements for a conditioned space.~~

~~**EXCEPTIONS:** 1. Building entrances with revolving doors.~~

~~2. Doors not intended to be used as a building entrance.~~

~~3. Building entrances in buildings that are less than 1,000 ft² in area.~~

~~4. Doors that open directly from a space that is less than 3,000 ft² in area and is separate from the building entrance.~~

Section 1322 Opaque envelope. This amendment deletes a footnote under the general requirements section for building envelope.

1322 Opaque Envelope: Roof/ceilings, opaque exterior walls, opaque doors, floors over unconditioned space, below-grade walls, slab-on-grade floors and radiant floors enclosing conditioned spaces shall be insulated according to Section 1311 and Tables 13-1 or 13-2

EXCEPTION: Opaque smoke vents are not required to meet insulation requirements.

Table 13-1 & 13-2 Building Envelope Requirements. The Council amended the required U-factors for mass walls (concrete and masonry) to be consistent with the 2006 energy code, to reduce cost impact on the masonry industry and provide flexibility.

**TABLE 13-1
BUILDING ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 1**

	Nonresidential		Residential, Other than Single-Family	
Opaque Elements	Assembly Max.	Insulation Min. R-Value	Assembly Max.	Insulation Min. R-Value
Roofs				
Insulation Entirely above Deck	U-0.034	R-30 c.i.	U-0.031	R-38 c.i.
Metal Building	U-0.031	R-25 + R-11 Ls	U-0.031	R-25 + R-11 Ls
Single-Rafter	U-0.027	R-38	U-0.027	R-38
Attic and Other	U-0.027	R-38 adv or R-49	U-0.027	R-38 adv or R-49
Walls, Above-grade				
Mass ¹	U-0.060 U-0.15	R-15 c.i. R-5.7 c.i.	U-0.057 U-0.09	R-16 c.i. R-11.4 c.i.
Metal Building	U-0.064	R-13 + R-7.5 c.i.	U-0.057	R-19 + R-8.5 c.i.
Steel Framed	U-0.064	R-13 + R-7.5 c.i.	U-0.057	R-19 + R-8.5 c.i.
Wood Framed and Other	U-0.057	R-21	U-0.057	R-13 + R-6 c.i.
Wall, Below Grade				
Below Grade Wall		Same as above grade		Same as above grade
Floors				
Mass	U-0.029	R-30 c.i.	U-0.029	R-30 c.i.
Steel Joist	U-0.029	R-38 + R-4 c.i.	U-0.029	R-38 + R-4 c.i.
Wood Framed and Other	U-0.029	R-30	U-0.029	R-30
Slab-On-Grade Floors				
Unheated	F-0.540	R-10 for 24 in. (with thermal break)	F-0.540	R-10 for 24 in. (with thermal break)
Heated	F-0.360	R-10 c.i. (with thermal break)	F-0.360	R-10 c.i. (with thermal break)
Opaque Doors				
Swinging	U-0.600		U-0.400	
Non-Swinging	U-0.600		U-0.400	
Fenestration 0-40% of Wall				
	Assembly Max. U	Assembly Max. SHGC	Assembly Max. U	Assembly Max. SHGC
Vertical Fenestration		(see 1323.4 & 1323.5)		(see 1323.4 & 1323.5)
Nonmetal framing: all	U-0.32	SHGC-0.40 all, OR	U-0.32	
Metal framing: fixed/operable	U-0.40	SHGC-0.45 all PLUS	U-0.40	
Entrance doors	U-0.60	permanent PF > 0.50 on west, south, and east	U-0.60	
Skylights				
Without curb (i.e. sloped glazing)	U-0.50	SHGC-0.35 all	U-0.45	SHGC-0.35 all
With curb (i.e. individual unit skylights)	U-0.60		U-0.60	

The following definitions apply: c.i. = continuous insulation, Ls = liner system (see definitions)

1. Nonresidential walls may be ASTM C90 concrete block walls, ungrouted or partially grouted at 32 in. or less on center vertically and 48 in. or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu.in/h.ft².F.

**TABLE 13-2
BUILDING ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 2**

	Nonresidential		Residential, Other than Single-Family	
Opaque Elements	Assembly Max.	Insulation Min. R-Value	Assembly Max.	Insulation Min. R-Value
<i>Roofs</i>				
Insulation Entirely above Deck	U-0.034	R-30.0 c.i.	U-0.031	R-38.0 c.i.
Metal Building	U-0.031	R-25 + R-11 Ls	U-0.031	R-25 + R-11 Ls
Single-Rafter	U-0.027	R-38.0	U-0.027	R-38.0
Attic and Other	U-0.027	R-38 adv or R-49	U-0.027	R-38 adv or R-49
<i>Walls, Above-grade</i>				
Mass	U-0.051 U-0.123	R-18 c.i. R-7.6 c.i.	U-0.044 U-0.080	R-21 c.i. R-13.3 c.i.
Metal Building	U-0.064	R-13 + R-7.5 c.i.	U-0.044	R-19 + R-16 c.i.
Steel Framed	U-0.064	R-13 + R-7.5 c.i.	U-0.044	R-19 + R-14 c.i.
Wood Framed and Other	U-0.051	R-13 + R-7.5 c.i., or R-21 + R-2.5 c.i.	U-0.044	R-21 + R-5 c.i.
<i>Wall, Below Grade</i>				
Below Grade Wall		Same as above grade		Same as above grade
<i>Floors</i>				
Mass	U-0.029	R-30 c.i.	U-0.029	R-30 c.i.
Steel Joist	U-0.029	R-38.0 + R-4 c.i.	U-0.029	R-38.0 + R-4 c.i.
Wood Framed and Other	U-0.029	R-30	U-0.029	R-30
<i>Slab-On-Grade Floors</i>				
Unheated	F-0.540	R-10 for 24 in. (with thermal break)	F-0.540	R-10 for 24 in. (with thermal break)
Heated	F-0.360	R-10 c.i. (with thermal break)	F-0.360	R-10 c.i. (with thermal break)
<i>Opaque Doors</i>				
Swinging	U-0.600		U-0.400	
Non-Swinging	U-0.600		U-0.400	
Fenestration 0-40% of Wall				
	Assembly Max. U	Assembly Max. SHGC	Assembly Max. U	Assembly Max. SHGC
<i>Vertical Fenestration</i>		(see 1323.4 & 1323.5)		(see 1323.4 & 1323.5)
Nonmetal framing: all	U-0.32	SHGC-0.40 all, OR SHGC-0.45 all PLUS permanent PF > 0.50 on west, south, and east	U-0.32	
Metal framing: fixed/operable	U-0.40		U-0.40	
Entrance doors	U-0.60		U-0.60	
<i>Skylights</i>				
Without curb (i.e. sloped glazing)	U-0.50	SHGC-0.35 all	U-0.50	SHGC-0.35 all
With curb (i.e individual unit skylights)	U-0.60		U-0.60	

The following definitions apply: c.i. = continuous insulation, Ls = liner system (see definitions)

Section 1515 Egress Lighting. The Council removed this section from the rule. The intended switching mechanisms that will be used in this proposal have not been tested and approved by UL or any other listing agency to meet the more stringent criteria of associated life safety devices.

~~**WAC 51-11-1515 Egress Lighting.** Emergency lighting and means of egress illumination that is normally on during normal building operation shall, during periods that the space served by the means of egress is unoccupied, be shut off and controlled by a combination of listed emergency relay and occupancy sensors.~~

Table 15-1 Lighting Power Allowance. The Council amended Table 15-1 to increase the lighting power allowed based on industry recommendations. The amendment also deleted the proposed space by space lighting density method of compliance.

**TABLE 15-1A
Unit Lighting Power Allowance (LPA)**

Use¹	LPA² (W/ft²)
Automotive facility	0.77 <u>0.85</u>
Convention center	0.99 <u>1.10</u>
Courthouse	0.95 <u>1.10</u>
Cafeterias, fast food establishments ⁵ , restaurants/bars ⁵	1.03 <u>1.20</u>
Dormitory	0.63 <u>0.85</u>
<u>Dwelling units</u>	<u>1.00</u>
Exercise center	0.89 <u>0.95</u>
Gymnasia ⁹ , assembly spaces ⁹	0.86 <u>0.95</u>
Health care clinic	0.84 <u>1.00</u>
Hospital, nursing homes, and other Group I-1 and I-2 Occupancies	1.09 <u>1.20</u>
Hotel/motel	<u>1.00</u>
<u>Hotel banquet/conference/exhibition hall^{3,4}</u>	<u>2.00</u>
Laboratory spaces (all spaces not classified as “laboratory” shall meet office and other appropriate categories)	<u>1.62</u>
Laundries	<u>1.20</u>
Libraries ⁵	1.10 <u>1.20</u>
Manufacturing facility	0.97 <u>1.20</u>
Museum	0.87 <u>1.00</u>
Office buildings, office/administrative areas in facilities of other use types (including but not limited to schools, hospitals, institutions, museums, banks, churches) ^{5,7,11}	0.86 <u>0.91</u>

Parking garages	0.15 0.20
Penitentiary and other Group I-3 Occupancies	0.86 0.90
Police and fire stations ⁸	0.84 0.90
Post office	1.02 1.00
Retail ¹⁰ , retail banking, mall concourses, wholesale stores (pallet rack shelving)	1.33
School buildings (Group E Occupancy only), school classrooms, day care centers	0.97 1.00
Theater, motion picture	0.84 0.97
Theater, performing arts	1.25
Transportation	0.80
Warehouses ¹¹ , storage areas	0.50
Workshop	1.20
Plans Submitted for Common Areas Only⁷	
Main floor building lobbies ³ (except mall concourses)	1.09 1.10
All building common areas, corridors, toilet facilities and washrooms, elevator lobbies, including Group R-1 Occupancies	0.70 0.80

Section 1550 Energy Consuming Systems. The Council removed this section from the rule. No nationally approved standard exists for escalator/walkway automatic control devices as envisioned by the proposed rule. This is a safety issue in a very tightly regulated industry with a great safety track record of existing operating devices.

1550 Energy Consuming Mechanisms

~~1551 General. This section establishes criteria for the control of energy consuming mechanisms, other than those covered elsewhere by this code, that serve commercial buildings.~~

~~1552 Pedestrian Escalators and Moving Pedestrian walkways. Each pedestrian escalator or moving pedestrian walkway shall be equipped with an automatic control device to prevent operation of escalators and moving walkways when the mechanisms are unoccupied.~~