2018 Washington State Energy Code – Residential

Prescriptive Energy Code Compliance for All Climate Zones in Washington

Single Family – New & Additions (effective February 1, 2021) Version 1.2

These requirements apply to all IRC building types, including detached one- and two-family dwellings and multiple single-family dwellings (townhouses).

Project Information	*Contact Information*
Mastad	Chris Luthi

Instructions: This single-family project will use the requirements of the Prescriptive Path below and incorporate the minimum values listed. Based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.

Provide all information from the following tables as building permit drawings: Table R402.1 - Insulation and Fenestration Requirements by Component, Table R406.2 - Fuel Normalization Credits and 406.3 - Energy Credits.

Authorized Representative	Chris Luthi	*Date*	02/03/2023

All Climate Zones (Table R402.1.1)		
	R-Value [a]	**U-Factor** [a]
Fenestration U-Factor [b]	n/a	0.30
Skylight U-Factor [b]	n/a	0.50
Glazed Fenestration SHGC [b,e]	n/a	n/a
Ceiling [e]	49	0.026
Wood Frame Wall [g,h]	21 int	0.056
Floor	30	0.029
Below Grade Wall [c,h]	10/15/21 int + TB	0.042
Slab [d,f] R-Value & Depth	10, 2 ft	n/a

a	*R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity that is less than the label or design thickness of the insulation, the compressed *R*-value of the insulation from Appendix Table A101.4 shall not be less than the *R*-value specified in the table.
b	The fenestration *U*-factor column excludes skylights.
c	"10/15/21 +5TB" means R-10 continuous insulation on the exterior of the wall, or R-15 continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21 +5TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "5TB" means R-5 thermal break between floor slab and basement wall.
d	R-10 continuous insulation is required under heated slab on grade floors. See Section R402.2.9.1.
e	For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38 if the full insulation depth extends over the top plate of the exterior wall.
f	R-7.5 continuous insulation installed over an existing slab is deemed to be equivalent to the required perimeter slab insulation when applied to existing slabs complying with Section R503.1.1. If foam plastic is used, it shall meet the requirements for thermal barriers protecting foam plastics.
g	For log structures developed in compliance with Standard ICC 400, log walls shall meet the requirements for *climate zone* 5 of ICC 400.
h	Int. (intermediate framing) denotes framing and insulation as described in Section A103.2.2 including standard framing 16 inches on center, 78% of the wall cavity insulated and headers insulated with a minimum of R-10 insulation.

Each dwelling unit ***in a residential building*** shall comply with sufficient options from Table R406.2 (fuel normalization credits) and Table 406.3 (energy credits) to achieve the following minimum number of credits. To claim this credit, the building permit drawings shall specify the option selected and the maximum tested building air leakage, and show the qualifying ventilation system and its control sequence of operation.

1. **Small Dwelling Unit:** 3 credits
   Dwelling units less than 1,500 sf in conditioned floor area with less than 300 sf of fenestration area.
   Additions to existing building that are greater than 500 sf of heated floor area but less than 1,500 sf.
2. **Medium Dwelling Unit:** 6 credits
   All dwelling units that are not included in #1 or #3
3. **Large Dwelling Unit:** 7 credits
   Dwelling units exceeding 5,000 sf of conditioned floor area
4. **Additions less than 500 square feet:** 1.5 credits
   All other additions shall meet 1-3 above

Before selecting your credits on this Summary table, review the details in Table 406.3 (Single Family), on page 4.

Summary of Table R406.2 and 406.3				
Heating Options	**Fuel Normalization Descriptions**	**Credits - select ONE heating option**		**User Notes**
1	Combustion heating minimum NAECA[b]	0.0	☐	
2	Heat pump[c]	1.0	☉	
3	Electric resistance heat only - furnace or zonal	-1.0	☐	
4	DHP with zonal electric resistance per option 3.4	0.5	☐	
5	All other heating systems	-1.0	☐	
Energy Options	**Energy Credit Option Descriptions**	**Credits - select ONE energy option from each category [d]**		
1.1	[illegible]	0.5	☐	
1.2	Efficient Building Envelope	1.0	☐	
1.3	Efficient Building Envelope	0.5	☐	
1.4	Efficient Building Envelope	1.0	☐	
1.5	Efficient Building Envelope	2.0	☐	
1.6	Efficient Building Envelope	3.0	☐	
1.7	Efficient Building Envelope ☐	0.5	☐	
2.1	Air Leakage Control and Efficient Ventilation	0.5	☐	
2.2	Air Leakage Control and Efficient Ventilation	1.0	☉	
2.3	Air Leakage Control and Efficient Ventilation	1.5	☐	
2.4	Air Leakage Control and Efficient Ventilation ☐	2.0	☐	
3.1[a]	High Efficiency HVAC	1.0	☐	
3.2	High Efficiency HVAC	1.0	☐	
3.3[a]	High Efficiency HVAC	1.5	☐	
3.4	High Efficiency HVAC	1.5	☐	
3.5.1	High Efficiency HVAC	1.5	☉	
3.5.2	High Efficiency HVAC	1.5	☐	
3.6[a]	High Efficiency HVAC ☐	2.0	☐	
4.1	High Efficiency HVAC Distribution System	0.5	☉	
4.2	High Efficiency HVAC Distribution System ☐	1.0	☐	

Summary of Table R406.2 (cont.)				
Energy Options	**Energy Credit Option Descriptions (cont.)**	**Credits - select ONE energy option from each category [d]**		**User Notes**
5.1[d]	Efficient Water Heating	0.5	☐	
5.2	Efficient Water Heating	0.5	☐	
5.3	Efficient Water Heating	1.0	☐	
5.4	Efficient Water Heating	1.5	☐	
5.5	Efficient Water Heating	2.0	◉	
5.6	Efficient Water Heating	2.5	☐	
6.1[e]	Renewable Electric Energy (3 credits max)	1.0	☐	
7.1	Appliance Package	0.5	☐	
	Total Credits		6.0	Calculate Total / Clear Form

a. An alternative heating source sized at a maximum of 0.5 W/sf (equivalent) of heated floor area or 500 W, whichever is bigger, may be installed in the dwelling unit.
b. Equipment listed in Table C403.3.2(4) or C403.3.2(5)
c. Equipment listed in Table C403.3.2(1) or C403.3.2(2)
d. You cannot select more than one option from any category EXCEPT in category 5. Option 5.1 may be combined with options 5.2 through 5.6. See Table 406.3.
e. 1.0 credit for each 1,200 kWh of electrical generation provided annually, up to 3 credits max. See the complete Table R406.2 for all requirements and option descriptions.
f. Use the single radiobutton in the upper right of the second column to deselect radiobuttons in that group.

Window, Skylight and Door Schedule

Project Information

Mastan

Contact Information

Component Description	Ref.	U-factor	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
Exempt Swinging Door (24 sq. ft. max.)								0.0	0.00
Exempt Glazed Fenestration (15 sq. ft. max.)								0.0	0.00

Vertical Fenestration (Windows and doors)

Component Description	Ref.	U-factor	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
ENTRY		0.30	1	6	2	8	0	49.3	14.80
STUDY		0.30	1	7	6	5	0	37.5	11.25
STUDY		0.30	1	5	0	5	0	25.0	7.50
KITCHEN		0.30	1	5	0	5	0	25.0	7.50
LR		0.30	2	2	6	2	6	12.5	3.75
LR		0.30	2	2	6	5	0	25.0	7.50
LR		0.30	1	6	6	2	6	16.3	4.88
LR		0.30	1	16	0	8	0	128.0	38.40
LR		0.30	2	8	0	2	6	40.0	12.00
DINING		0.30	1	12	0	8	0	96.0	28.80
LAUNDRY		0.30	1	3	2	8	0	25.3	7.60
HALL		0.30	2	6	2	3	1	38.0	11.41
MBED		0.30	3	3	0	1	6	13.5	4.05
MBED		0.30	2	5	0	6	0	60.0	18.00
MBED		0.30	1	5	0	8	0	40.0	12.00
MBATH		0.30	1	6	6	5	0	32.5	9.75
UP BATH		0.30	1	2	0	2	0	4.0	1.20
2BED		0.30	1	5	0	2	0	10.0	3.00
2BED		0.30	1	5	0	5	0	25.0	7.50
1BED		0.30	1	5	0	2	0	10.0	3.00
1BED		0.30	1	7	6	5	0	37.5	11.25
RECROOM		0.30	2	5	0	2	6	25.0	7.50
GUEST		0.30	1	5	0	4	8	23.3	7.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
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										0.0	0.00
										0.0	0.00
										0.0	0.00
										0.0	0.00
										0.0	0.00

Sum of Vertical Fenestration Area and UA	798.8	239.63
Vertical Fenestration Area Weighted U = UA/Area		0.30

Overhead Glazing (Skylights)

Component Description	Ref.	U-factor	Qt.	Width Feet	Width Inch	Height Feet	Height Inch	Area	UA
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00
								0.0	0.00

Sum of Overhead Glazing Area and UA	0.0	0.00
Overhead Glazing Area Weighted U = UA/Area		0.00

Total Sum of Fenestration Area and UA ***(for heating system sizing calculations)***	798.8	239.63

Simple Heating System Size: Washington State

This heating system sizing calculator is based on the Prescriptive Requirements of the 2018 Washington State Energy Code (WSEC) and ACCA Manuals J and S. This tool will calculate heating loads only. ACCA procedures for sizing cooling systems should be used to determine cooling loads.

Please complete the green drop-downs and boxes that are applicable to your project. As you make selections in the drop-downs for each section, some values will be calculated for you. If you do not see the selection you need in the drop-down options, please contact the WSU Energy Program at energycode@energy.wsu.edu or (360) 956-2042 for assistance.

Project Information

Mastan

Contact Information

Heating System Type: ○ All Other Systems ◉ Heat Pump

To see detailed instructions for each section, place your cursor on the word "Instructions"

Design Temperature

Instructions: Mercer Island

Design Temperature Difference (ΔT) 45

ΔT = Indoor (70 degrees) - Outdoor Design Temp

Area of Building

Conditioned Floor Area

Instructions: Conditioned Floor Area (sq ft) 4,232

Average Ceiling Height

Instructions: Average Ceiling Height (ft) 9.0

Conditioned Volume 38,088

Glazing and Doors

Instructions: U-0.30

U-Factor	X	Area	=	UA
0.300		799		239.70

Skylights

Instructions

U-Factor	X	Area	=	UA
0.50				---

Insulation

Attic

Instructions: R-49

U-Factor	X	Area	=	UA
0.026		1,719		44.69

Single Rafter or Joist Vaulted Ceilings

Instructions: R-38 Vented

U-Factor	X	Area	UA
0.027			

Above Grade Walls *(see Figure 1)*

Instructions: Select R-Value

U-Factor	X	Area	UA
No selection		3,030	

Floors

Instructions: No Floors above unconditioned spaces.

U-Factor	X	Area	UA
---		538	

Below Grade Walls *(see Figure 1)*

Instructions: R-21 Interior

U-Factor	X	Area	UA
0.042		1,160	48.72

Slab Below Grade *(see Figure 1)*

Instructions: R-5 Thermal Break at slab edge

F-Factor	X	Length	UA
0.570		145	82.65

Slab on Grade *(see Figure 1)*

Instructions: R-10 Fully Insulated

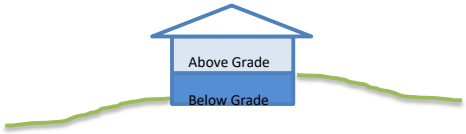
F-Factor	X	Length	UA
0.360		58	20.88

Location of Ducts

Instructions: Conditioned Space

Duct Leakage Coefficient
1.00

Figure 1.



Sum of UA	436.64	
Envelope Heat Load	19,649	Btu / Hour
Sum of UA x ΔT		
Air Leakage Heat Load	18,511	Btu / Hour
Volume x 0.6 x ΔT x 0.018		
Building Design Heat Load	38,160	Btu / Hour
Air leakage + envelope heat loss		
Building and Duct Heat Load	38,160	Btu / Hour
Ducts in unconditioned space: sum of building heat loss x 1.10		
Ducts in conditioned space: sum of building heat loss x 1		
Maximum Heat Equipment Output	47,700	Btu / Hour
Building and duct heat loss x 1.40 for forced air furnace		
Building and duct heat loss x 1.25 for heat pump		