Prescriptive Energy Code Compliance for All Climate Zones in Washington

Project Information

East House

Contact Information

Chris Luthi

This project will use the requirements of the Prescriptive Path below and incorporate the the minimum values listed. In addition, based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.

Authorized Representative _____ Date _____

All Climate Zones		
	R-Value[a]	U-Factor[a]
Fenestration U-Factor[b]	n/a	0.30
Skylight U-Factor	n/a	0.50
Glazed Fenestration SHGC[b,e]	n/a	n/a
Ceiling[k]	49[j]	0.026
Wood Frame Wall[g,m,n]	21 int	0.056
Mass Wall R-Value[i]	21/21[h]	0.056
Floor	30[g]	0.029
Below Grade Wall[c,m]	10/15/21 int + TB	0.042
Slab[d] R-Value & Depth	10, 2 ft	n/a

*Table R402.1.1 and Table R402.1.3 Footnotes included on Page 2.

Each dwelling unit in a residential building shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits:

☐ **1. Small Dwelling Unit: 1.5 credits**
Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building that are greater than 500 square feet of heated floor area but less than 1500 square feet.

☐ **2. Medium Dwelling Unit: 3.5 credits**
All dwelling units that are not included in #1 or #3. **Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.

☑ **3. Large Dwelling Unit: 4.5 credits**
Dwelling units exceeding 5000 square feet of conditioned floor area.

☐ **4. Additions less than 500 square feet: .5 credits**

Table R406.2 Summary

Option	Description	Credit(s)			
1a	Efficient Building Envelope 1a	0.5	☐		
1b	Efficient Building Envelope 1b	1.0	☐		
1c	Efficient Building Envelope 1c	2.0	☐		
1d	Efficient Building Envelope 1d	0.5	☐		
2a	Air Leakage Control and Efficient Ventilation 2a	0.5	☑		0.5
2b	Air Leakage Control and Efficient Ventilation 2b	1.0	☐		
2c	Air Leakage Control and Efficient Ventilation 2c	1.5	☐		
3a	High Efficiency HVAC 3a	1.0	☐		
3b	High Efficiency HVAC 3b	1.0	☑		1.0
3c	High Efficiency HVAC 3c	1.5	☐		
3d	High Efficiency HVAC 3d	1.0	☐		
4	High Efficiency HVAC Distribution System	1.0	☑		1.0
5a	Efficient Water Heating 5a	0.5	☑		0.5
5b	Efficient Water Heating 5b	1.0	☐		
5c	Efficient Water Heating 5c	1.5	☑		1.5
5d	Efficient Water Heating 5d	0.5	☐		
6	Renewable Electric Energy	0.5		*1200 kwh	0.0
Total Credits					**4.50**

*Please refer to Table R406.2 for complete option descriptions

Table R402.1.1 Footnotes

For SI: 1 foot .= 304.8 mm, ci .= continuous insulation, int .= intermediate framing.

[a] R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which 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. The SHGC column applies to all glazed fenestration.

[c] "10/15/21.+TB" means R-10 continuous insulation on the exterior of the wall, or R-15 on the 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.+TB" 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. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "TB" means thermal break between floor slab and basement wall.

[d] R-10 continuous insulation is required under heated slab on grade floors. See R402.2.9.1.

[e] There are no SHGC requirements in the Marine Zone.

[f] Reserved.

[g] Reserved.

[h] Reserved.

[i] The second R-value applies when more than half the insulation is on the interior of the mass wall.

[j] Reserved.

[k] For single rafter- or joist-vaulted ceilings, the insulation may be reduced to R-38.

[l] Reserved.

[m] Int. (intermediate framing) denotes standard framing 16 inches on center with headers insulated with a minimum of R-10 insulation.

Table R402.1.3 Footnote

[a] Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source or as specified in Section R402.1.3.

Window, Skylight and Door Schedule

Project Information

East House 4270 E. Mercer ShortPlat

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	4	0	8	0	32.0	9.60
Dining		0.30	1	14	1.5	7	6	105.9	31.78
Dining		0.30	2	2	3.5	7	6	34.4	10.31
Living		0.30	2	16	0	8	0	256.0	76.80
Living		0.30	1	3	0	6	0	18.0	5.40
Kitchen		0.30	1	6	0	5	0	30.0	9.00
Stairs		0.30	1	6	0	11	0	66.0	19.80
Stairs		0.30	1	6	0	3	0	18.0	5.40
Bath1		0.30	1	2	0	5	0	10.0	3.00
Bed1		0.30	2	3	0	4	6	27.0	8.10
Bed1		0.30	1	12	0	5	6	66.0	19.80
Study		0.30	1	6	0	5	6	33.0	9.90
UpperFoyer		0.30	1	6	0	5	6	33.0	9.90
Bed2		0.30	2	2	3.5	5	6	25.2	7.56
Bed2		0.30	1	14	1.5	5	6	77.7	23.31
Beds 3+4		0.30	2	6	0	5	6	66.0	19.80
UpperBath		0.30	1	6	0	2	0	12.0	3.60
Media		0.30	1	9	0	5	6	49.5	14.85
Laundry		0.30	1	6	0	4	6	27.0	8.10
Mbed		0.30	2	3	0	4	6	27.0	8.10
Mbed		0.30	1	12	0	5	6	66.0	19.80
Mbath		0.30	1	6	0	5	6	33.0	9.90
RecRoom		0.30	1	16	0	8	0	128.0	38.40
Office		0.30	1	6	0	2	0	12.0	3.60
								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

Sum of Vertical Fenestration Area and UA	1252.7	375.81
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)***	1252.7	375.81

Simple Heating System Size: Washington State

This heating system sizing calculator is based on the Prescriptive Requirements of the 2015 Washington State Energy Code (WSEC) and ACCA Manuals J and S. This calculator will calculate heating loads only. ACCA procedures for sizing cooling systems should be used to determine cooling loads.

Please fill out all of 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 call the WSU Energy Extension Program at (360) 956-2042 for assistance.

Project Information

4270 ShortPlat East House

Contact Information

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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): 6,605

Average Ceiling Height

Instructions — Average Ceiling Height (ft): 9.4

Conditioned Volume: 62,091

Glazing and Doors

Instructions — U-0.30

U-Factor	X	Area	=	UA
0.300		1,253		375.90

Skylights

Instructions

U-Factor	X	Area	=	UA
0.50				---

Insulation

Attic

Instructions — R-49

U-Factor	X	Area	=	UA
0.026		2,298		59.75

Single Rafter or Joist Vaulted Ceilings

Instructions — Select R-Value

U-Factor	X	Area	UA
No selection			---

Above Grade Walls *(see Figure 1)*

Instructions — R-21 Intermediate

U-Factor	X	Area	UA
0.056		5,221	292.38

Floors

Instructions — R-38

U-Factor	X	Area	UA
0.025		797	19.93

Below Grade Walls *(see Figure 1)*

Instructions — R-21 Interior

U-Factor	X	Area	UA
0.042		1,056	44.35

Slab Below Grade *(see Figure 1)*

Instructions — R-10 Fully insulated

F-Factor	X	Length	UA
0.303		1,409	427.05

Slab on Grade *(see Figure 1)*

Instructions — Select R-Value

F-Factor	X	Length	UA
No selection			---

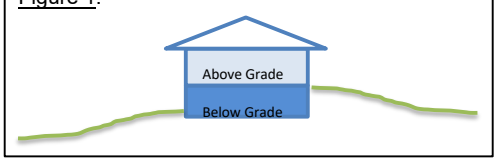
Location of Ducts

Instructions — Conditioned Space

Duct Leakage Coefficient

1.00

Figure 1.



Sum of UA	1219.35	
Envelope Heat Load *Sum of UA X ΔT*	54,871	Btu / Hour
Air Leakage Heat Load *Volume X 0.6 X ΔT X .018*	30,176	Btu / Hour
Building Design Heat Load *Air Leakage + Envelope Heat Loss*	85,047	Btu / Hour
Building and Duct Heat Load *Ducts in unconditioned space: Sum of Building Heat Loss X 1.10* *Ducts in conditioned space: Sum of Building Heat Loss X 1*	85,047	Btu / Hour
Maximum Heat Equipment Output *Building and Duct Heat Loss X 1.40 for Forced Air Furnace* *Building and Duct Heat Loss X 1.25 for Heat Pump*	106,309	Btu / Hour