



Architects & Planners

**Miller Residence
7238 SE 32nd Street
Mercer Island, Wa.**

WASHINGTON
STATE
ENERGY
CODE



2015 IBC
August 2020

Prescriptive Energy Code Compliance for All Climate Zones in Washington

Project Information

Contact Information

Miller Residence
7238 SE 32nd Street
Mercer Island, Wa.

Rick Jones
1400 112th Ave SE
Bellevue, Wa. 98004

This project will use the requirements of the Prescriptive Path below and incorporate 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	4 ^g	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	<input type="checkbox"/>	
1b	Efficient Building Envelope 1b	1.0	<input type="checkbox"/>	
1c	Efficient Building Envelope 1c	2.0	<input type="checkbox"/>	
1d	Efficient Building Envelope 1d	0.5	<input type="checkbox"/>	
2a	Air Leakage Control and Efficient Ventilation 2a	0.5	<input checked="" type="checkbox"/>	0.5
2b	Air Leakage Control and Efficient Ventilation 2b	1.0	<input type="checkbox"/>	
2c	Air Leakage Control and Efficient Ventilation 2c	1.5	<input type="checkbox"/>	
3a	High Efficiency HVAC 3a	1.0	<input checked="" type="checkbox"/>	1.0
3b	High Efficiency HVAC 3b	1.0	<input type="checkbox"/>	
3c	High Efficiency HVAC 3c	1.5	<input type="checkbox"/>	
3d	High Efficiency HVAC 3d	1.0	<input type="checkbox"/>	
4	High Efficiency HVAC Distribution System	1.0	<input type="checkbox"/>	
5a	Efficient Water Heating 5a	0.5	<input checked="" type="checkbox"/>	0.5
5b	Efficient Water Heating 5b	1.0	<input type="checkbox"/>	
5c	Efficient Water Heating 5c	1.5	<input checked="" type="checkbox"/>	1.5
5d	Efficient Water Heating 5d	0.5	<input type="checkbox"/>	
6	Renewable Electric Energy	0.5	<input type="checkbox"/>	
				*1200 kwh

Total Credits **3.50**

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

0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00
0.0	0.00

*Sum of Vertical Fenestration Area and UA
Vertical Fenestration Area Weighted U = UA/Area*

987.8	296.35
	0.30

Overhead Glazing (Skylights)

Component Description	Ref.	U-factor

Qt.	Width		Height	
	Feet	Inch	Feet	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
0.0	0.00

*Sum of Overhead Glazing Area and UA
Overhead Glazing Area Weighted U = UA/Area*

0.0	0.00
	0.00

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

987.8	296.35
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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.

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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)
 $\Delta T = \text{Indoor (70 degrees)} - \text{Outdoor Design Temp}$

45

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

4,077

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

9.5

Conditioned Volume

38,732

Glazing and Doors

[Instructions](#)

U-0.30

U-Factor X Area = UA
0.300 X 988 = 296.34

Skylights

[Instructions](#)

U-Factor X Area = UA
0.50 X [] = ---

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA
0.026 X 2,595 = 67.47

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

R-38 Vented

U-Factor X Area = UA
0.027 X 16 = 0.43

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA
0.056 X 4,250 = 237.97

Floors

[Instructions](#)

R-30

U-Factor X Area = UA
0.029 X 2,450 = 71.05

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor X Area = UA
0.028 X [] = ---

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor X Length = UA
0.303 X [] = ---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor X Length = UA
--- X [] = ---

Location of Ducts

[Instructions](#)

Unconditioned Space

Duct Leakage Coefficient

1.10

Sum of UA 673.27

Envelope Heat Load 30,297 Btu / Hour
Sum of UA X ΔT

Air Leakage Heat Load 18,824 Btu / Hour
Volume X 0.6 X ΔT X .018

Building Design Heat Load 49,120 Btu / Hour
Air Leakage + Envelope Heat Loss

Building and Duct Heat Load 54,033 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 75,646 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

Figure 1.

