

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). 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.

This tool is for the permitting purposes only. A Manual J calculation is required to meet the requirement of the 2018 Washington State Energy Code.

Project Information

Rawson Remodel
8413 SE 82nd St
Mercer Island, WA 98040

Contact Information

Brad Sturman - Sturman Architects
9 103rd Ave NE Suite 203
Bellevue, WA 98004

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 25

Design Temperature Difference (ΔT) 45

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

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

926

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

10.3

Conditioned Volume

9,539

Glazing and Doors

[Instructions](#)

U-0.18

U-Factor X Area = UA
0.180 X 271 = 48.78

Skylights

[Instructions](#)

U-Factor X Area = UA
0.50 X 16 = 8.00

Insulation

Attic

[Instructions](#)

Select R-Value

U-Factor X Area = UA
No selection X = --

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

R-49 Advanced

U-Factor X Area = UA
0.020 X 1,443 = 28.86

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA
0.056 X 2,144 = 120.08

Floors

[Instructions](#)

R-38

U-Factor X Area = UA
0.025 X 784 = 19.60

Below Grade Walls and Slabs (see Figure 1)

[Instructions](#)

Wall & Slab R10 Foam Ext
Depth 3.5' depth

Wall U-Factor X Area = UA
0.075 X 531 = 39.83

Slab F-Factor X Length = UA
0.520 X 65 = 33.80

Slab on Grade (see Figure 1)

[Instructions](#)

R-10 Fully Insulated

F-Factor X Length = UA
0.360 X 528 = 190.08

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.000

Sum of UA 489.02

Envelope Heat Load 22,006 Btu / Hour

$\text{Sum of UA} \times \Delta T$

Air Leakage Heat Load 4,636 Btu / Hour

$\text{Volume} \times 0.6 \times \Delta T \times 0.018$

Building Design Heat Load 26,642 Btu / Hour

$\text{Air leakage} + \text{envelope heat loss}$

Building and Duct Heat Load 26,642 Btu / Hour

$\text{Ducts in unconditioned space: sum of building heat loss} \times 1.10$

$\text{Ducts in conditioned space: sum of building heat loss} \times 1$

Maximum Heat Equipment Output 33,302 Btu / Hour

$\text{Building and duct heat loss} \times 1.40 \text{ for forced air furnace}$

$\text{Building and duct heat loss} \times 1.25 \text{ for heat pump}$

Figure 1.

