

# Simple Heating System Size: Washington State

This heating system sizing calculator is based on the Prescriptive Requirements of the 2018 and 2021 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 Washington State Energy Code.

### Project Information

5331 Forest Ave SE, Mercer Island WA 98040

### 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 25  
Design Temperature Difference (ΔT) 45  
*ΔT = Indoor (70 degrees) - Outdoor Design Temp*

### Area of Building

#### Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

895

#### Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

9.8

Conditioned Volume  
8,771

### Glazing and Doors

[Instructions](#)

U-0.25

**U-Factor X Area = UA**  
0.250 X 268 = 67.05

### Skylights

[Instructions](#)

U-0.50

**U-Factor X Area = UA**  
0.50 X 4 = 2.00

### Insulation

#### Attic

[Instructions](#)

R-60

**U-Factor X Area = UA**  
0.024 X 494 = 11.86

#### Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

None

**U-Factor X Area = UA**  
-- X -- = --

#### Above Grade Walls (see Figure 1)

[Instructions](#)

R-20 STD +R-5 ci

**U-Factor X Area = UA**  
0.045 X 701 = 31.55

#### Floors

[Instructions](#)

R-38

**U-Factor X Area = UA**  
0.025 X 26 = 0.65

#### Below Grade Walls and Slabs (see Figure 1)

[Instructions](#)

Wall & Slab R21 Batt w/TB

Depth 3.5' depth

**Wall U-Factor X Area = UA**  
0.040 X 611 = 24.44

**Slab F-Factor X Length = UA**  
0.560 X 410 = 229.60

#### Slab on Grade (see Figure 1)

[Instructions](#)

R-10 Fully Insulated

**F-Factor X Length = UA**  
0.360 X 410 = 147.60

### Location of Ducts

[Instructions](#)

No Ducts

**Duct Leakage Coefficient**  
1.000

**Sum of UA** 514.74  
**Envelope Heat Load** 23,163 Btu / Hour  
*Sum of UA x ΔT*  
**Air Leakage Heat Load** 4,263 Btu / Hour  
*Volume x 0.6 x ΔT x 0.018*  
**Building Design Heat Load** 27,426 Btu / Hour  
*Air leakage + envelope heat loss*  
**Building and Duct Heat Load** 27,426 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** 34,282 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.

