

# 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](mailto: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

Biggs Residence  
 2411 60th Ave SE  
 Mercer Island, WA 98040

### Contact Information

Brad Sturman - Sturman Architects  
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 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  
 ΔT = Indoor (70 degrees) - Outdoor Design Temp

### Area of Building

#### Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

5,263

#### Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.5

Conditioned Volume  
 44,731

### Glazing and Doors

[Instructions](#)

U-0.30

**U-Factor X Area = UA**  
 0.300 X 1,358 = 407.37

### Skylights

[Instructions](#)

0

**U-Factor X Area = UA**  
 0.50 X 0 = 0.00

### Insulation

#### Attic

[Instructions](#)

None

**U-Factor X Area = UA**  
 -- X 0 = --

#### Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

R-38

**U-Factor X Area = UA**  
 0.026 X 2,960 = 76.96

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

[Instructions](#)

R-21 INT plus R-12 ci

**U-Factor X Area = UA**  
 0.032 X 3,210 = 102.71

#### Floors

[Instructions](#)

R-30

**U-Factor X Area = UA**  
 0.029 X 326 = 9.47

#### 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 4,580 = 183.20

**Slab F-Factor X Length = UA**  
 0.560 X 258 = 144.48

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

[Instructions](#)

R-10 Perimeter

**F-Factor X Length = UA**  
 0.540 X 7 = 3.78

### Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient  
 1.000

**Sum of UA** 927.97  
**Envelope Heat Load** 41,759 Btu / Hour  
*Sum of UA x ΔT*  
**Air Leakage Heat Load** 21,739 Btu / Hour  
*Volume x 0.6 x ΔT x 0.018*  
**Building Design Heat Load** 63,498 Btu / Hour  
*Air leakage + envelope heat loss*  
**Building and Duct Heat Load** 63,498 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** 79,373 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.

