

## 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) and ACCA Manuals J and S. 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.

### Project Information

Wagner Residence  
8828 SE 72nd Place  
Mercer Island, WA 98040

### Contact Information

Kati Eitzman - Sturman Architects  
9- 103rd Ave NE Ste. 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 Difference ( $\Delta T$ )  
 $\Delta T = \text{Indoor (70 degrees)} - \text{Outdoor Design Temp}$

45

### Area of Building

#### Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

686

#### Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.3

Conditioned Volume  
5,716

### Glazing and Doors

[Instructions](#)

U-0.28

**U-Factor X Area = UA**  
0.280 X 155 = 43.43

### Skylights

[Instructions](#)

**U-Factor X Area = UA**  
0.50 X 5 = 2.65

### Insulation

#### Attic

[Instructions](#)

R-49

**U-Factor X Area = UA**  
0.026 X 804 = 20.90

#### Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

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

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

[Instructions](#)

R-21 Intermediate

**U-Factor X Area = UA**  
0.056 X 988 = 55.33

#### Floors

[Instructions](#)

R-38

**U-Factor X Area = UA**  
0.025 X 520 = 13.00

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

[Instructions](#)

No Below Grade Walls in this project.

**U-Factor X Area = UA**  
0.028 = ---

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

[Instructions](#)

No Slab Below Grade in this project.

**F-Factor X Length = UA**  
0.303 = ---

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

[Instructions](#)

R-10 Fully Insulated

**F-Factor X Length = UA**  
0.360 X 200 = 72.00

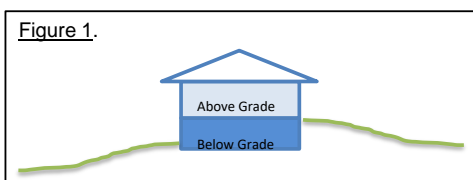
### Location of Ducts

[Instructions](#)

No Ducts

Duct Leakage Coefficient  
1.00

Figure 1.



|   |                   |
|---|-------------------|
| <b>Sum of UA</b>  | 207.31            |
| <b>Envelope Heat Load</b>   | 9,329 Btu / Hour  |
| <i>Sum of UA x <math>\Delta T</math></i>                              |                   |
| <b>Air Leakage Heat Load</b>  | 2,778 Btu / Hour  |
| <i>Volume x 0.6 x <math>\Delta T</math> x 0.018</i>                   |                   |
| <b>Building Design Heat Load</b>                                      | 12,107 Btu / Hour |
| <i>Air leakage + envelope heat loss</i>                               |                   |
| <b>Building and Duct Heat Load</b>                                    | 12,107 Btu / Hour |
| <i>Ducts in unconditioned space: sum of building heat loss x 1.10</i> |                   |
| <i>Ducts in conditioned space: sum of building heat loss x 1</i>      |                   |
| <b>Maximum Heat Equipment Output</b>                                  | 15,134 Btu / Hour |
| <i>Building and duct heat loss x 1.40 for forced air furnace</i>      |                   |
| <i>Building and duct heat loss x 1.25 for heat pump</i>               |                   |