

# 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

3925 90th Ave SE  
Mercer Island

## 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 ( $\Delta T$ ) 45

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

### Area of Building

#### Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

517

#### Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

7.5

Conditioned Volume

3,899

### Glazing and Doors

[Instructions](#)

U-0.25

**U-Factor X Area = UA**

0.250 X 111 = 27.75

### Skylights

[Instructions](#)

**U-Factor X Area = UA**

0.50 X 56 = 28.00

### Insulation

#### Attic

[Instructions](#)

R-60

**U-Factor X Area = UA**

0.024 X 1,548 = 37.15

#### Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

Select R-Value

**U-Factor X Area = UA**

No selection --

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

[Instructions](#)

R-21 INT plus R-4 ci

**U-Factor X Area = UA**

0.043 X 1,451 = 62.39

#### Floors

[Instructions](#)

R-30

**U-Factor X Area = UA**

0.029 X 1,383 = 40.11

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

[Instructions](#)

Wall & Slab Select Wall & Slab Insulation

Depth Select nearest slab depth

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

No Selection --

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

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

[Instructions](#)

R-10 Perimeter

**F-Factor X Length = UA**

0.540 X 125 = 67.64

### Location of Ducts

[Instructions](#)

No Ducts

Duct Leakage Coefficient

1.000

**Sum of UA 263.03**

**Envelope Heat Load 11,837 Btu / Hour**

*Sum of UA x  $\Delta T$*

**Air Leakage Heat Load 1,895 Btu / Hour**

*Volume x 0.6 x  $\Delta T$  x 0.018*

**Building Design Heat Load 13,732 Btu / Hour**

*Air leakage + envelope heat loss*

**Building and Duct Heat Load 13,732 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 19,224 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.

