

## 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](mailto:energycode@energy.wsu.edu) or (360) 956-2042 for assistance.

### Project Information

5047 44th Ave NE (Townhouse Unit 1)  
Seattle, WA 98105  
3039004-LU

### 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](#)

Seattle: Sea-Tac AP

Design Temperature Difference ( $\Delta T$ )

46

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

### Area of Building

#### Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,960

#### Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.3

Conditioned Volume

16,330

### Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA  
0.280 X 505 = 141.44

### Skylights

[Instructions](#)

U-Factor X Area = UA  
0.50 X 8 = 4.00

### 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 721 = 14.42

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

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA  
0.056 X 2,394 = 134.05

#### Floors

[Instructions](#)

R-38

U-Factor X Area = UA  
0.025 X 81 = 2.01

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

[Instructions](#)

R-10 Continuous Exterior

U-Factor X Area = UA  
0.064 X 253 = 16.19

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

[Instructions](#)

R-5 Thermal Break at slab

F-Factor X Length = UA  
0.570 X 90 = 51.30

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

[Instructions](#)

R-10 Fully Insulated

F-Factor X Length = UA  
0.360 X 0 = 0

### Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

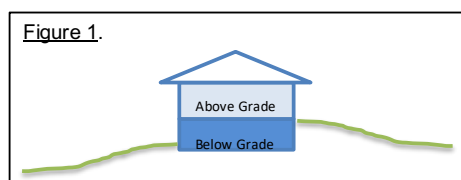


Figure 1.

**Sum of UA** 363.41

**Envelope Heat Load** 16,717 Btu / Hour  
*Sum of UA x  $\Delta T$*

**Air Leakage Heat Load** 8,113 Btu / Hour  
*Volume x 0.6 x  $\Delta T$  x 0.018*

**Building Design Heat Load** 24,830 Btu / Hour  
*Air leakage + envelope heat loss*

**Building and Duct Heat Load** 24,830 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** 31,037 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*