

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

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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)

4,241

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

10.0

Conditioned Volume

42,410

Glazing and Doors

[Instructions](#)

U-0.30

U-Factor X Area = UA
 0.300 X 1,503 = 450.96

Skylights

[Instructions](#)

0.50

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

Insulation

Attic

[Instructions](#)

R-60

U-Factor X Area = UA
 0.024 X 2,928 = 70.27

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

R-60

U-Factor X Area = UA
 0.017 X 0 = 0.00

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA
 0.056 X 3,400 = 190.40

Floors

[Instructions](#)

R-38

U-Factor X Area = UA
 0.025 X 2,928 = 73.20

Below Grade Walls and Slabs (see Figure 1)

[Instructions](#)

Wall & Slab R21 Batt w/TB
 Depth 7' depth

Wall U-Factor X Area = UA
 0.035 X 0 = 0.00

Slab F-Factor X Length = UA
 0.500 X 0 = 0.00

Slab on Grade (see Figure 1)

[Instructions](#)

R-10 Fully Insulated

F-Factor X Length = UA
 0.360 X 0 = 0.00

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.000

Sum of UA 784.83
Envelope Heat Load 35,317 Btu / Hour
Sum of UA x ΔT
Air Leakage Heat Load 20,611 Btu / Hour
Volume x 0.6 x ΔT x 0.018
Building Design Heat Load 55,929 Btu / Hour
Air leakage + envelope heat loss
Building and Duct Heat Load 55,929 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 69,911 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.

