## 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

Deisgn 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): 8,064

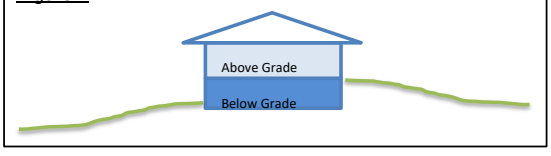
**Average Ceiling Height**
Instructions
Average Ceiling Height (ft): 10.5
Conditioned Volume: 84,672

| | | U-Factor | X | Area | = | UA |
|---|---|---|---|---|---|---|
| **Glazing and Doors** (Instructions) | U-0.25 | 0.250 | | 1,285 | | 321.25 |
| **Skylights** (Instructions) | | 0.50 | | | | 0.00 |
| **Insulation** | | | | | | |
| **Attic** (Instructions) | None | -- | | | | -- |
| **Single Rafter or Joist Vaulted Ceilings** (Instructions) | R-60 | 0.017 | | 3,500 | | 59.50 |
| **Above Grade Walls** *(see Figure 1)* (Instructions) | R-21 INT plus R-5 ci | 0.041 | | 4,933 | | 202.25 |
| **Floors** (Instructions) | R-38 | 0.025 | | 1,209 | | 30.23 |
| **Below Grade Walls and Slabs** *(see Figure 1)* (Instructions) | Wall & Slab: R13 Batt + R5 ci | Wall U-Factor: 0.034 | | Area: 1,800 | | UA: 61.21 |
| | Depth: 7' depth | Slab F-Factor: 0.556 | | Length: 200 | | UA: 111.27 |
| **Slab on Grade** *(see Figure 1)* (Instructions) | R-10 Fully Insulated | F-Factor: 0.360 | | Length: 200 | | UA: 72.00 |

**Location of Ducts**
Instructions: Conditioned Space

**Duct Leakage Coefficient**
1.000

Figure 1.




| | | |
|---|---|---|
| **Sum of UA** | 857.70 | |
| **Envelope Heat Load** | 38,596 | Btu / Hour |
| *Sum of UA x ΔT* | | |
| **Air Leakage Heat Load** | 41,151 | Btu / Hour |
| *Volume x 0.6 x ΔT x 0.018* | | |
| **Building Design Heat Load** | 79,747 | Btu / Hour |
| *Air leakage + envelope heat loss* | | |
| **Building and Duct Heat Load** | 79,747 | 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** | 99,684 | 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* | | |