## 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*

Forest Ave Lot 1
5222 Forest Ave SE
Mercer Island, WA 98040

*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

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): 4,326

**Average Ceiling Height**

Instructions — Average Ceiling Height (ft): 9.5

Conditioned Volume: 41,097

| | | U-Factor | X | Area | = | UA |
|---|---|---|---|---|---|---|
| **Glazing and Doors** (Instructions) | U-0.28 | 0.280 | | 1,041 | | 291.42 |
| **Skylights** (Instructions) | | 0.50 | | 9 | | 4.40 |
| **Insulation** | | | | | | |
| **Attic** (Instructions) | None | -- | | | | -- |
| **Single Rafter or Joist Vaulted Ceilings** (Instructions) | R-38 | 0.026 | | 2,524 | | 65.62 |
| **Above Grade Walls** *(see Figure 1)* (Instructions) | R-21 INT plus R-5 ci | 0.041 | | 3,178 | | 130.30 |
| **Floors** (Instructions) | R-38 | 0.025 | | 2,518 | | 62.95 |

| | | Wall U-Factor | X | Area | UA |
|---|---|---|---|---|---|
| **Below Grade Walls and Slabs** *(see Figure 1)* (Instructions) | | | | | |
| **Wall & Slab** | None | -- | | | -- |
| **Depth** | Select nearest slab depth | Slab F-Factor | X | Length | UA |
| | | -- | | | -- |

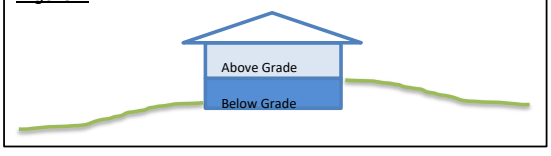
| | | F-Factor | X | Length | UA |
|---|---|---|---|---|---|
| **Slab on Grade** *(see Figure 1)* (Instructions) | None | -- | | | -- |

**Location of Ducts**

Instructions: Conditioned Space

**Duct Leakage Coefficient**
1.000

Figure 1.




| | | |
|---|---|---|
| **Sum of UA** | 554.70 | |
| **Envelope Heat Load** | 24,961 | Btu / Hour |
| *Sum of UA x ΔT* | | |
| **Air Leakage Heat Load** | 19,973 | Btu / Hour |
| *Volume x 0.6 x ΔT x 0.018* | | |
| **Building Design Heat Load** | 44,934 | Btu / Hour |
| *Air leakage + envelope heat loss* | | |
| **Building and Duct Heat Load** | 44,934 | 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** | 56,168 | 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* | | |