## Simple Heating System Size: Washington State

This heating system sizing calculator is based on the Prescriptive Requirements of the 2015 Washington State Energy Code (WSEC) and ACCA Manuals J and S. This calculator will calculate heating loads only. ACCA procedures for sizing cooling systems should be used to determine cooling loads.

The glazing (window) and door portion of this calculator assumes the installed glazing and door products have an area weighted average U-factor of 0.30. The incorporated insulation requirements are the minimum prescriptive amounts specified by the 2015 WSEC.

Please fill out all of 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 call the WSU Energy Extension Program at (360) 956-2042 for assistance.

| *Project Information* | *Contact Information* |
|---|---|
| CHAN ADU | STEPHANIE WASCHA, AIA |
| 7036 81ST AVE SE MERCER ISLAND 98040 | 206.818.2139 |
| | SW@WASCHASTUDIOS.COM |

**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 Difference (ΔT) 45

*ΔT = Indoor (70 degrees) - Outdoor Design Temp*

### Area of Building

**Conditioned Floor Area**

Instructions: Conditioned Floor Area (sq ft) 900

**Average Ceiling Height**

Instructions: Average Ceiling Height (ft) 10.6

Conditioned Volume 9,540

### Glazing and Doors

Instructions

| U-Factor | X | Area | = | UA |
|---|---|---|---|---|
| 0.30 | | 167 | | 50.19 |

### Skylights

Instructions

| U-Factor | X | Area | = | UA |
|---|---|---|---|---|
| 0.50 | | 21 | | 10.50 |

### Insulation

**Attic**

Instructions: R-49

| U-Factor | X | Area | = | UA |
|---|---|---|---|---|
| 0.026 | | 134 | | 3.48 |

**Single Rafter or Joist Vaulted Ceilings**

Instructions: R-38 Vented

| U-Factor | X | Area | UA |
|---|---|---|---|
| 0.027 | | 766 | 20.68 |

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

Instructions: R-21 Intermediate

| U-Factor | X | Area | UA |
|---|---|---|---|
| 0.056 | | 1,114 | 62.38 |

**Floors**

Instructions: Select R-Value

| U-Factor | X | Area | UA |
|---|---|---|---|
| No selection | | | --- |

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

Instructions: Select R-value

| U-Factor | X | Area | UA |
|---|---|---|---|
| No selection | | | --- |

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

Instructions: Select conditioning

| F-Factor | X | Length | UA |
|---|---|---|---|
| No selection | | | --- |

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

Instructions: R-10 Fully Insulated

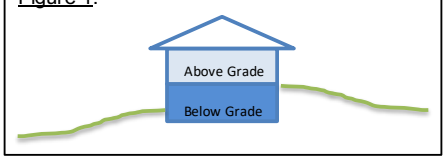
| F-Factor | X | Length | UA |
|---|---|---|---|
| 0.360 | | 139 | 50.04 |

### Location of Ducts

Instructions: Unconditioned Space

**Duct Leakage Coefficient** 1.10

Figure 1.




| | | |
|---|---|---|
| **Sum of UA** | 197.28 | |
| **Envelope Heat Load** *Sum of UA X ΔT* | 8,877 | Btu / Hour |
| **Air Leakage Heat Load** *Volume X 0.6 X ΔT X .018* | 4,636 | Btu / Hour |
| **Building Design Heat Load** *Air Leakage + Envelope Heat Loss* | 13,514 | Btu / Hour |
| **Building and Duct Heat Load** *Ducts in unconditioned space: Sum of Building Heat Loss X 1.10* *Ducts in conditioned space: Sum of Building Heat Loss X 1* | 14,865 | Btu / Hour |
| **Maximum Heat Equipment Output** *Building and Duct Heat Loss X 1.40 for Forced Air Furnace* *Building and Duct Heat Loss X 1.25 for Heat Pump* | 18,582 | Btu / Hour |