

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.

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

2854 Fairview Ave E
TH1
Seattle, WA 98102

Contact Information

Emily Morgan
Cone Architecture
morgan@cone-arch.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](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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

46

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,070

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.8

Conditioned Volume

9,363

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA

0.280 X 353 = 98.84

U-Factor X Area = UA

0.50 X --- = ---

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA

0.026 X 348 = 9.05

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor X Area = UA

--- X --- = ---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA

0.056 X 1,501 = 84.06

Floors

[Instructions](#)

R-38

U-Factor X Area = UA

0.025 X 368 = 9.20

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor X Area = UA

0.028 X 0 = ---

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor X Length = UA

0.303 X --- = ---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor X Length = UA

--- X --- = ---

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA

201.14

Envelope Heat Load

9,253 Btu / Hour

Sum of UA X ΔT

Air Leakage Heat Load

4,651 Btu / Hour

Volume X 0.6 X ΔT X 0.018

Building Design Heat Load

13,904 Btu / Hour

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load

13,904 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

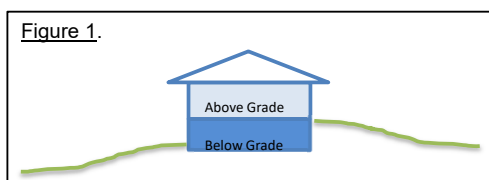
Maximum Heat Equipment Output

17,380 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.



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Project Information

2854 Fairview Ave E
TH2
Seattle, WA 98102

Contact Information

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morgan@cone-arch.com

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☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,070

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.8

Conditioned Volume

9,363

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA

0.280 X 353 = 98.84

U-Factor X Area = UA

0.50 X --- = ---

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA

0.026 X 348 = 9.05

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor X Area = UA

--- X --- = ---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA

0.056 X 1,501 = 84.06

Floors

[Instructions](#)

R-38

U-Factor X Area = UA

0.025 X 368 = 9.20

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor X Area = UA

0.028 X 0 = ---

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor X Length = UA

0.303 X --- = ---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor X Length = UA

--- X --- = ---

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA

201.14

Envelope Heat Load

9,253 Btu / Hour

Sum of UA X ΔT

Air Leakage Heat Load

4,651 Btu / Hour

Volume X 0.6 X ΔT X 0.018

Building Design Heat Load

13,904 Btu / Hour

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load

13,904 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

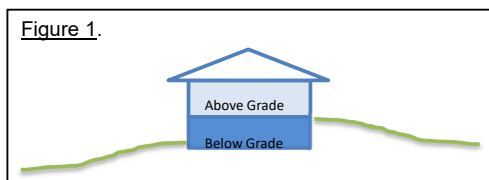
Maximum Heat Equipment Output

17,380 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.



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Project Information

2854 Fairview Ave E
TH3
Seattle, WA 98102

Contact Information

Emily Morgan
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Heating System Type:

☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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

46

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,070

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.8

Conditioned Volume

9,363

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor	X	Area	=	UA
0.280		353		98.84

U-Factor	X	Area	=	UA
0.50				---

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor	X	Area	=	UA
0.026		348		9.05

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor	X	Area	=	UA
---				---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor	X	Area	=	UA
0.056		1,501		84.06

Floors

[Instructions](#)

R-38

U-Factor	X	Area	=	UA
0.025		368		9.20

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor	X	Area	=	UA
0.028		0		---

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor	X	Length	=	UA
0.303				---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor	X	Length	=	UA
---				---

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA

201.14

Envelope Heat Load

9,253 Btu / Hour

$\text{Sum of UA} \times \Delta T$

Air Leakage Heat Load

4,651 Btu / Hour

$\text{Volume} \times 0.6 \times \Delta T \times 0.018$

Building Design Heat Load

13,904 Btu / Hour

$\text{Air Leakage} + \text{Envelope Heat Loss}$

Building and Duct Heat Load

13,904 Btu / Hour

$\text{Ducts in unconditioned space: Sum of Building Heat Loss} \times 1.10$

$\text{Ducts in conditioned space: Sum of Building Heat Loss} \times 1$

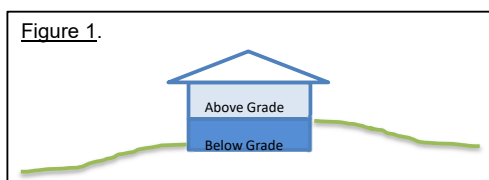
Maximum Heat Equipment Output

17,380 Btu / Hour

$\text{Building and Duct Heat Loss} \times 1.40 \text{ for Forced Air Furnace}$

$\text{Building and Duct Heat Loss} \times 1.25 \text{ for Heat Pump}$

Figure 1.



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Contact Information

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Heating System Type:

☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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

46

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,070

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

8.8

Conditioned Volume

9,363

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA

0.280 X 353 = 98.84

U-Factor X Area = UA

0.50 X --- = ---

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA

0.026 X 348 = 9.05

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor X Area = UA

--- X --- = ---

Above Grade Walls (see Figure 1)

[Instructions](#)

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U-Factor X Area = UA

0.056 X 1,501 = 84.06

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[Instructions](#)

R-38

U-Factor X Area = UA

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Below Grade Walls (see Figure 1)

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0.028 X 0 = ---

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor X Length = UA

0.303 X --- = ---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor X Length = UA

--- X --- = ---

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA

201.14

Envelope Heat Load

9,253 Btu / Hour

Sum of UA X ΔT

Air Leakage Heat Load

4,651 Btu / Hour

Volume X 0.6 X ΔT X 0.018

Building Design Heat Load

13,904 Btu / Hour

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load

13,904 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

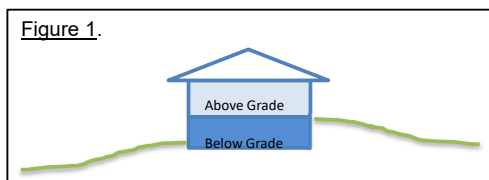
Maximum Heat Equipment Output

17,380 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

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Project Information

2854 Fairview Ave E
TH5
Seattle, WA 98102

Contact Information

Emily Morgan
Cone Architecture
morgan@cone-arch.com

Heating System Type:

☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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

46

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,412

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

9.0

Conditioned Volume

12,736

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA
0.280 X 457 = 127.96

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

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA
0.026 X 346 = 9.00

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor X Area = UA
--- X --- = ---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA
0.056 X 2,239 = 125.38

Floors

[Instructions](#)

R-38

U-Factor X Area = UA
0.025 X 346 = 8.65

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor X Area = UA
0.028 X 390 = 10.92

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

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

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

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

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA 281.91

Envelope Heat Load 12,968 Btu / Hour

Sum of UA X ΔT

Air Leakage Heat Load 6,327 Btu / Hour

Volume X 0.6 X ΔT X 0.018

Building Design Heat Load 19,295 Btu / Hour

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load 19,295 Btu / Hour

Ducts in unconditioned space: Sum of Building Heat Loss X 1.10

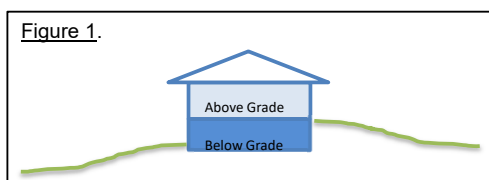
Ducts in conditioned space: Sum of Building Heat Loss X 1

Maximum Heat Equipment Output 24,119 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.



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Project Information

2854 Fairview Ave E
TH6
Seattle, WA 98102

Contact Information

Emily Morgan
Cone Architecture
morgan@cone-arch.com

Heating System Type:

☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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

46

Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,398

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

9.0

Conditioned Volume

12,582

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor	X	Area	=	UA
0.280		378		105.84

U-Factor	X	Area	=	UA
0.50				---

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor	X	Area	=	UA
0.026		350		9.10

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor	X	Area	=	UA
---				---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor	X	Area	=	UA
0.056		1,550		86.80

Floors

[Instructions](#)

R-38

U-Factor	X	Area	=	UA
0.025		350		8.75

Below Grade Walls (see Figure 1)

[Instructions](#)

No Below Grade Walls in this project.

U-Factor	X	Area	=	UA
0.028		192		5.38

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

F-Factor	X	Length	=	UA
0.303				---

Slab on Grade (see Figure 1)

[Instructions](#)

No Slab on Grade in this project.

F-Factor	X	Length	=	UA
---				---

Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

1.00

Sum of UA

215.87

Envelope Heat Load

9,930 Btu / Hour

$\text{Sum of UA} \times \Delta T$

Air Leakage Heat Load

6,251 Btu / Hour

$\text{Volume} \times 0.6 \times \Delta T \times 0.018$

Building Design Heat Load

16,181 Btu / Hour

$\text{Air Leakage} + \text{Envelope Heat Loss}$

Building and Duct Heat Load

16,181 Btu / Hour

$\text{Ducts in unconditioned space: Sum of Building Heat Loss} \times 1.10$

$\text{Ducts in conditioned space: Sum of Building Heat Loss} \times 1$

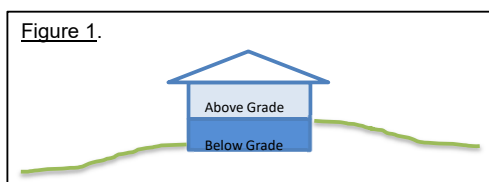
Maximum Heat Equipment Output

20,226 Btu / Hour

$\text{Building and Duct Heat Loss} \times 1.40 \text{ for Forced Air Furnace}$

$\text{Building and Duct Heat Loss} \times 1.25 \text{ for Heat Pump}$

Figure 1.



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TH7
Seattle, WA 98102

Contact Information

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Heating System Type:

☐ All Other Systems

☒ Heat Pump

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Design Temperature

[Instructions](#)

Seattle: Sea-Tac AP

Design Temperature Difference (ΔT)

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Area of Building

Conditioned Floor Area

[Instructions](#)

Conditioned Floor Area (sq ft)

1,412

Average Ceiling Height

[Instructions](#)

Average Ceiling Height (ft)

9.0

Conditioned Volume

12,736

Glazing and Doors

[Instructions](#)

U-0.28

U-Factor X Area = UA
0.280 X 457 = 127.96

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

Skylights

[Instructions](#)

Insulation

Attic

[Instructions](#)

R-49

U-Factor X Area = UA
0.026 X 346 = 9.00

Single Rafter or Joist Vaulted Ceilings

[Instructions](#)

No Vaulted Ceilings in this project.

U-Factor X Area = UA
--- X --- = ---

Above Grade Walls (see Figure 1)

[Instructions](#)

R-21 Intermediate

U-Factor X Area = UA
0.056 X 2,239 = 125.38

Floors

[Instructions](#)

R-38

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0.025 X 346 = 8.65

Below Grade Walls (see Figure 1)

[Instructions](#)

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U-Factor X Area = UA
0.028 X 390 = 10.92

Slab Below Grade (see Figure 1)

[Instructions](#)

No Slab Below Grade in this project.

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

Slab on Grade (see Figure 1)

[Instructions](#)

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Location of Ducts

[Instructions](#)

Conditioned Space

Duct Leakage Coefficient

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Sum of UA 281.91

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Sum of UA X ΔT

Air Leakage Heat Load 6,327 Btu / Hour

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Building Design Heat Load 19,295 Btu / Hour

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load 19,295 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 24,119 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.

