

# Residential System Sizing Calculation

## Summary

Project Title:  
Walden Residence

, FL

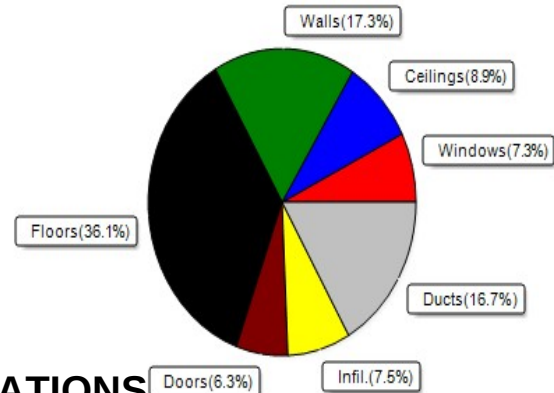
12/13/2022

|                                                                                                       |                   |                                       |                    |
|-------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------|--------------------|
| Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(100 ft.) Temp Range(M) |                   |                                       |                    |
| Humidity data: Interior RH (50%) Outdoor wet bulb (77F) Humidity difference(51gr.)                    |                   |                                       |                    |
| Winter design temperature(TMY3 99%)                                                                   | 30 F              | Summer design temperature(TMY3 99%)   | 94 F               |
| Winter setpoint                                                                                       | 70 F              | Summer setpoint                       | 75 F               |
| Winter temperature difference                                                                         | 40 F              | Summer temperature difference         | 19 F               |
| <b>Total heating load calculation</b>                                                                 | <b>30107 Btuh</b> | <b>Total cooling load calculation</b> | <b>25192 Btuh</b>  |
| Submitted heating capacity                                                                            | % of calc Btuh    | Submitted cooling capacity            | % of calc Btuh     |
| Total (Electric Heat Pump)                                                                            | 119.6 36000       | Sensible (SHR = 0.85)                 | 145.9 30600        |
| Heat Pump + Auxiliary(0.0kW)                                                                          | 119.6 36000       | Latent                                | 128.2 5400         |
|                                                                                                       |                   | <b>Total (Electric Heat Pump)</b>     | <b>142.9 36000</b> |

## WINTER CALCULATIONS

Winter Heating Load (for 2092 sqft)

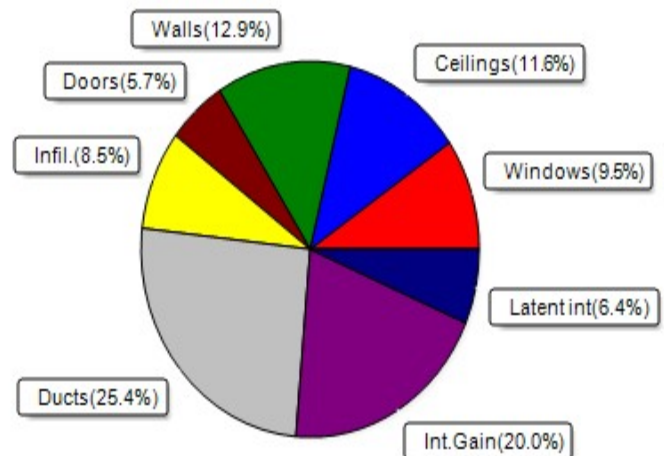
| Load component                  | Load              |
|---------------------------------|-------------------|
| Window total 211 sqft           | 2194 Btuh         |
| Wall total 1469 sqft            | 5215 Btuh         |
| Door total 119 sqft             | 1899 Btuh         |
| Ceiling total 2092 sqft         | 2665 Btuh         |
| Floor total 2092 sqft           | 10856 Btuh        |
| Infiltration 52 cfm             | 2262 Btuh         |
| Duct loss                       | 5016 Btuh         |
| <b>Subtotal</b>                 | <b>30107 Btuh</b> |
| Ventilation Ex:0 cfm; Sup:0 cfm | 0 Btuh            |
| <b>TOTAL HEAT LOSS</b>          | <b>30107 Btuh</b> |



## SUMMER CALCULATIONS

Summer Cooling Load (for 2092 sqft)

| Load component                        | Load              |
|---------------------------------------|-------------------|
| Window total 211 sqft                 | 2397 Btuh         |
| Wall total 1469 sqft                  | 3255 Btuh         |
| Door total 119 sqft                   | 1424 Btuh         |
| Ceiling total 2092 sqft               | 2931 Btuh         |
| Floor total                           | 0 Btuh            |
| Infiltration 39 cfm                   | 806 Btuh          |
| Internal gain                         | 5040 Btuh         |
| Duct gain                             | 5126 Btuh         |
| Sens.Ventilation Ex:0 cfm; Sup:0 cfm  | 0 Btuh            |
| Blower Load                           | 0 Btuh            |
| <b>Total sensible gain</b>            | <b>20980 Btuh</b> |
| Latent gain(ducts)                    | 1275 Btuh         |
| Latent gain(infiltration)             | 1337 Btuh         |
| Latent gain(ventilation)              | 0 Btuh            |
| Latent gain(internal/occupants/other) | 1600 Btuh         |
| <b>Total latent gain</b>              | <b>4212 Btuh</b>  |
| <b>TOTAL HEAT GAIN</b>                | <b>25192 Btuh</b> |



8th Edition

EnergyGauge® System Sizing

PREPARED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

12-13-22

# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Project Title:  
Walden Residence

, FL

12/13/2022

Reference City: Gainesville, FL (Defaults)  
Humidity difference: 51gr.

Temperature Difference: 19.0F(TMY3 99%)  
Summer Setpoint: 75 °F (Required Manual J default)

### Component Loads for Whole House

| Window   | Type*                    |             |      |                     |            | Overhang   |               | Window Area(sqft) |           |           | HTM        |          | Load      |
|----------|--------------------------|-------------|------|---------------------|------------|------------|---------------|-------------------|-----------|-----------|------------|----------|-----------|
|          | Panes                    | SHGC        | U    | InSh                | IS Ornt    | Len        | Hgt           | Gross             | Shaded    | Unshaded  | Shaded     | Unshaded |           |
| 1        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | N          | 9.5ft      | 2.3ft         | 15.0              | 0.0       | 15.0      | 9          | 9        | 137 Btuh  |
| 2        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | N          | 9.5ft      | 2.3ft         | 30.0              | 0.0       | 30.0      | 9          | 9        | 274 Btuh  |
| 3        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | N          | 9.5ft      | 2.3ft         | 18.0              | 0.0       | 18.0      | 9          | 9        | 165 Btuh  |
| 4        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | N          | 1.5ft      | 2.3ft         | 30.0              | 0.0       | 30.0      | 9          | 9        | 274 Btuh  |
| 5        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | E          | 1.5ft      | 2.3ft         | 16.0              | 0.0       | 16.0      | 9          | 24       | 388 Btuh  |
| 6        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | S          | 1.5ft      | 2.3ft         | 15.0              | 15.0      | 0.0       | 9          | 11       | 137 Btuh  |
| 7        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | S          | 7.5ft      | 2.3ft         | 72.0              | 72.0      | 0.0       | 9          | 11       | 659 Btuh  |
| 8        | 2 NFRC                   | 0.20, 0.26  | No   | No                  | W          | 1.5ft      | 2.3ft         | 15.0              | 0.0       | 15.0      | 9          | 24       | 363 Btuh  |
|          | Window Total             |             |      |                     |            |            |               | 211 (sqft)        |           |           |            |          | 2397 Btuh |
| Walls    | Type                     | U-Value     |      | R-Value             |            | Area(sqft) |               | HTM               |           | Load      |            |          |           |
|          |                          |             |      |                     | Cav/Sheath |            |               |                   |           |           |            |          |           |
| 1        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 211.5         |                   | 2.3       |           | 479 Btuh   |          |           |
| 2        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 166.5         |                   | 2.3       |           | 377 Btuh   |          |           |
| 3        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 143.0         |                   | 2.3       |           | 324 Btuh   |          |           |
| 4        | Frame - Wood - Adj       |             | 0.09 |                     | 13.0/0.0   |            | 119.8         |                   | 1.7       |           | 202 Btuh   |          |           |
| 5        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 108.0         |                   | 2.3       |           | 244 Btuh   |          |           |
| 6        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 54.0          |                   | 2.3       |           | 122 Btuh   |          |           |
| 7        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 9.0           |                   | 2.3       |           | 20 Btuh    |          |           |
| 8        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 225.0         |                   | 2.3       |           | 509 Btuh   |          |           |
| 9        | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 82.5          |                   | 2.3       |           | 187 Btuh   |          |           |
| 10       | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 54.0          |                   | 2.3       |           | 122 Btuh   |          |           |
| 11       | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 111.0         |                   | 2.3       |           | 251 Btuh   |          |           |
| 12       | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 54.0          |                   | 2.3       |           | 122 Btuh   |          |           |
| 13       | Frame - Wood - Ext       |             | 0.09 |                     | 13.0/0.0   |            | 130.5         |                   | 2.3       |           | 295 Btuh   |          |           |
|          | Wall Total               |             |      |                     |            |            | 1469 (sqft)   |                   |           | 3255 Btuh |            |          |           |
| Doors    | Type                     | Area (sqft) |      | HTM                 |            | Load       |               |                   |           |           |            |          |           |
| 1        | Insulated - Exterior     | 24.0        |      | 12.0                |            | 288 Btuh   |               |                   |           |           |            |          |           |
| 2        | Insulated - Garage       | 20.0        |      | 12.0                |            | 240 Btuh   |               |                   |           |           |            |          |           |
| 3        | Insulated - Garage       | 26.7        |      | 12.0                |            | 320 Btuh   |               |                   |           |           |            |          |           |
| 4        | Insulated - Exterior     | 48.0        |      | 12.0                |            | 576 Btuh   |               |                   |           |           |            |          |           |
|          | Door Total               |             |      |                     |            |            | 119 (sqft)    |                   | 1424 Btuh |           |            |          |           |
| Ceilings | Type/Color/Surface       | U-Value     |      | R-Value             |            | Area(sqft) |               | HTM               |           | Load      |            |          |           |
| 1        | Vented Attic/Med/Shingle | 0.032       |      | 30.0/0.0            |            | 2092.0     |               | 1.40              |           | 2931 Btuh |            |          |           |
|          | Ceiling Total            |             |      |                     |            |            | 2092 (sqft)   |                   |           | 2931 Btuh |            |          |           |
| Floors   | Type                     | R-Value     |      | Size                |            | HTM        |               | Load              |           |           |            |          |           |
| 1        | Slab On Grade            | 0.0         |      | 2092 (ft-perimeter) |            | 0.0        |               | 0 Btuh            |           |           |            |          |           |
|          | Floor Total              |             |      |                     |            |            | 2092.0 (sqft) |                   |           | 0 Btuh    |            |          |           |
|          | Envelope Subtotal:       |             |      |                     |            |            |               |                   |           |           | 10008 Btuh |          |           |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Project Title: Climate:FL\_GAINESVILLE\_REGIONAL\_A  
Walden Residence

, FL

12/13/2022

|                      |                                                                       |                     |                        |                 |              |                   |
|----------------------|-----------------------------------------------------------------------|---------------------|------------------------|-----------------|--------------|-------------------|
| <b>Infiltration</b>  | Type<br>Natural                                                       | Average ACH<br>0.12 | Volume(cuft)<br>18828  | Wall Ratio<br>1 | CFM=<br>38.7 | Load<br>806 Btuh  |
| <b>Internal gain</b> |                                                                       | Occupants<br>8      | Btuh/occupant<br>X 230 | Appliance<br>+  | 3200         | Load<br>5040 Btuh |
|                      | Sensible Envelope Load:                                               |                     |                        |                 |              | 15854 Btuh        |
| <b>Duct load</b>     | Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.323) |                     |                        |                 |              | 5126 Btuh         |
|                      | <b>Sensible Load All Zones</b>                                        |                     |                        |                 |              | <b>20980 Btuh</b> |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Project Title: Climate:FL\_GAINESVILLE\_REGIONAL\_A  
Walden Residence

, FL

12/13/2022

### WHOLE HOUSE TOTALS

|                                   |                                                           |                   |
|-----------------------------------|-----------------------------------------------------------|-------------------|
| Whole House<br>Totals for Cooling | <b>Sensible Envelope Load All Zones</b>                   | <b>15854 Btuh</b> |
|                                   | Sensible Duct Load                                        | 5126 Btuh         |
|                                   | <b>Total Sensible Zone Loads</b>                          | <b>20980 Btuh</b> |
|                                   | Sensible ventilation (Ex:0 cfm; Sup:0 cfm)                | 0 Btuh            |
|                                   | Blower                                                    | 0 Btuh            |
|                                   | <b>Total sensible gain</b>                                | <b>20980 Btuh</b> |
|                                   | Latent infiltration gain (for 51 gr. humidity difference) | 1337 Btuh         |
|                                   | Latent ventilation gain                                   | 0 Btuh            |
|                                   | Latent duct gain                                          | 1275 Btuh         |
|                                   | Latent occupant gain (8.0 people @ 200 Btuh per person)   | 1600 Btuh         |
|                                   | Latent other gain                                         | 0 Btuh            |
|                                   | <b>Latent total gain</b>                                  | <b>4212 Btuh</b>  |
|                                   | <b>TOTAL GAIN</b>                                         | <b>25192 Btuh</b> |

### EQUIPMENT

|                 |   |            |
|-----------------|---|------------|
| 1. Central Unit | # | 36000 Btuh |
|-----------------|---|------------|

\*Key: Window types (Panels - Number and type of panes of glass)  
(SHGC - Shading coefficient of glass as SHGC numerical value)  
(U - Window U-Factor)  
(InSh - Interior shading device: none(No), Blinds(B), Draperies(D) or Roller Shades(R))  
- For Blinds: Assume medium color, half closed  
For Draperies: Assume medium weave, half closed  
For Roller shades: Assume translucent, half closed  
(IS - Insect screen: none(N), Full(F) or Half(½))  
(Ornt - compass orientation)



Version 8

# System Sizing Calculations - Winter

## Residential Load - Whole House Component Details

Project Title:  
Walden Residence  
Building Type: User

, FL

12/13/2022

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 °F (TMY3 99%)  
Winter Setpoint: 70 °F (Required Manual J default)

| Component Loads for Whole House |                       |       |         |                     |                  |   |      |            |
|---------------------------------|-----------------------|-------|---------|---------------------|------------------|---|------|------------|
| Window                          | Panes/Type            | Frame | U       | Orientation         | Area(sqft)       | X | HTM= | Load       |
| 1                               | 2, NFRC 0.20          | Vinyl | 0.26    | N                   | 15.0             |   | 10.4 | 156 Btuh   |
| 2                               | 2, NFRC 0.20          | Vinyl | 0.26    | N                   | 30.0             |   | 10.4 | 312 Btuh   |
| 3                               | 2, NFRC 0.20          | Vinyl | 0.26    | N                   | 18.0             |   | 10.4 | 187 Btuh   |
| 4                               | 2, NFRC 0.20          | Vinyl | 0.26    | N                   | 30.0             |   | 10.4 | 312 Btuh   |
| 5                               | 2, NFRC 0.20          | Vinyl | 0.26    | E                   | 16.0             |   | 10.4 | 166 Btuh   |
| 6                               | 2, NFRC 0.20          | Vinyl | 0.26    | S                   | 15.0             |   | 10.4 | 156 Btuh   |
| 7                               | 2, NFRC 0.20          | Vinyl | 0.26    | S                   | 72.0             |   | 10.4 | 749 Btuh   |
| 8                               | 2, NFRC 0.20          | Vinyl | 0.26    | W                   | 15.0             |   | 10.4 | 156 Btuh   |
|                                 | Window Total          |       |         |                     | 211.0(sqft)      |   |      | 2194 Btuh  |
| Walls                           | Type                  | Ornt. | Ueff.   | R-Value<br>(Cav/Sh) | Area             | X | HTM= | Load       |
| 1                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 212              |   | 3.55 | 751 Btuh   |
| 2                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 167              |   | 3.55 | 591 Btuh   |
| 3                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 143              |   | 3.55 | 508 Btuh   |
| 4                               | Frame - Wood          | - Adj | (0.089) | 13.0/0.0            | 120              |   | 3.55 | 425 Btuh   |
| 5                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 108              |   | 3.55 | 383 Btuh   |
| 6                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 54               |   | 3.55 | 192 Btuh   |
| 7                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 9                |   | 3.55 | 32 Btuh    |
| 8                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 225              |   | 3.55 | 799 Btuh   |
| 9                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 83               |   | 3.55 | 293 Btuh   |
| 10                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 54               |   | 3.55 | 192 Btuh   |
| 11                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 111              |   | 3.55 | 394 Btuh   |
| 12                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 54               |   | 3.55 | 192 Btuh   |
| 13                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 131              |   | 3.55 | 463 Btuh   |
|                                 | Wall Total            |       |         |                     | 1469(sqft)       |   |      | 5215 Btuh  |
| Doors                           | Type                  | Storm | Ueff.   |                     | Area             | X | HTM= | Load       |
| 1                               | Insulated - Exterior, | n     | (0.400) |                     | 24               |   | 16.0 | 384 Btuh   |
| 2                               | Insulated - Garage,   | n     | (0.400) |                     | 20               |   | 16.0 | 320 Btuh   |
| 3                               | Insulated - Garage,   | n     | (0.400) |                     | 27               |   | 16.0 | 427 Btuh   |
| 4                               | Insulated - Exterior, | n     | (0.400) |                     | 48               |   | 16.0 | 768 Btuh   |
|                                 | Door Total            |       |         |                     | 119(sqft)        |   |      | 1899Btuh   |
| Ceilings                        | Type/Color/Surface    |       | Ueff.   | R-Value             | Area             | X | HTM= | Load       |
| 1                               | Flat ceil/M/Shing     |       | (0.032) | 30.0/0.0            | 2092             |   | 1.3  | 2665 Btuh  |
|                                 | Ceiling Total         |       |         |                     | 2092(sqft)       |   |      | 2665Btuh   |
| Floors                          | Type                  |       | Ueff.   | R-Value             | Size             | X | HTM= | Load       |
| 1                               | Slab On Grade         |       | (1.180) | 0.0                 | 230.0 ft(perim.) |   | 47.2 | 10856 Btuh |
|                                 | Floor Total           |       |         |                     | 2092 sqft        |   |      | 10856 Btuh |
|                                 | Envelope Subtotal:    |       |         |                     |                  |   |      | 22829 Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

, FL

Project Title:  
Walden Residence  
Building Type: User

12/13/2022

|                     |                                                               |                        |                       |                    |              |                   |
|---------------------|---------------------------------------------------------------|------------------------|-----------------------|--------------------|--------------|-------------------|
| <b>Infiltration</b> | Type<br>Natural                                               | Wholehouse ACH<br>0.16 | Volume(cuft)<br>18828 | Wall Ratio<br>1.00 | CFM=<br>51.6 | 2262 Btuh         |
| <b>Duct load</b>    | Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.200) |                        |                       |                    |              | 5016 Btuh         |
| <b>All Zones</b>    | <b>Sensible Subtotal All Zones</b>                            |                        |                       |                    |              | <b>30107 Btuh</b> |

### WHOLE HOUSE TOTALS

|                           |                                                   |            |
|---------------------------|---------------------------------------------------|------------|
| <b>Totals for Heating</b> | Subtotal Sensible Heat Loss                       | 30107 Btuh |
|                           | Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm) | 0 Btuh     |
|                           | Total Heat Loss                                   | 30107 Btuh |

### EQUIPMENT

|                       |   |            |
|-----------------------|---|------------|
| 1. Electric Heat Pump | # | 36000 Btuh |
|-----------------------|---|------------|

Key: Window types - NFRC (Requires U-Factor and Shading coefficient(SHGC) of glass as numerical values)  
or - Glass as 'Clear' or 'Tint' (Uses U-Factor and SHGC defaults)  
U - (Window U-Factor)  
HTM - (ManualJ Heat Transfer Multiplier)



Version 8