

# Residential System Sizing Calculation

## Summary

Project Title:  
Metcalf Residence

, FL

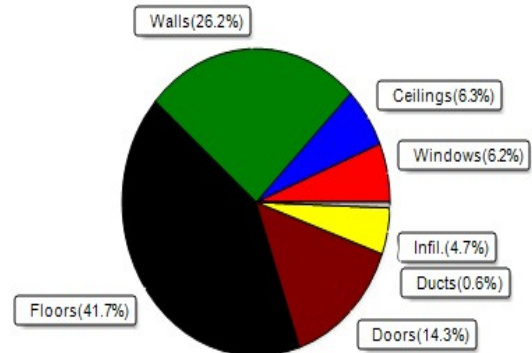
8/9/2023

|                                                                                                       |                   |                                       |                    |
|-------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------|--------------------|
| 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>17177 Btuh</b> | <b>Total cooling load calculation</b> | <b>11526 Btuh</b>  |
| Submitted heating capacity                                                                            | % of calc Btuh    | Submitted cooling capacity            | % of calc Btuh     |
| Total (Electric Heat Pump)                                                                            | 139.7 24000       | Sensible (SHR = 0.85)                 | 193.6 20400        |
| Heat Pump + Auxiliary(0.0kW)                                                                          | 139.7 24000       | Latent                                | 363.3 3600         |
|                                                                                                       |                   | <b>Total (Electric Heat Pump)</b>     | <b>208.2 24000</b> |

## WINTER CALCULATIONS

Winter Heating Load (for 796 sqft)

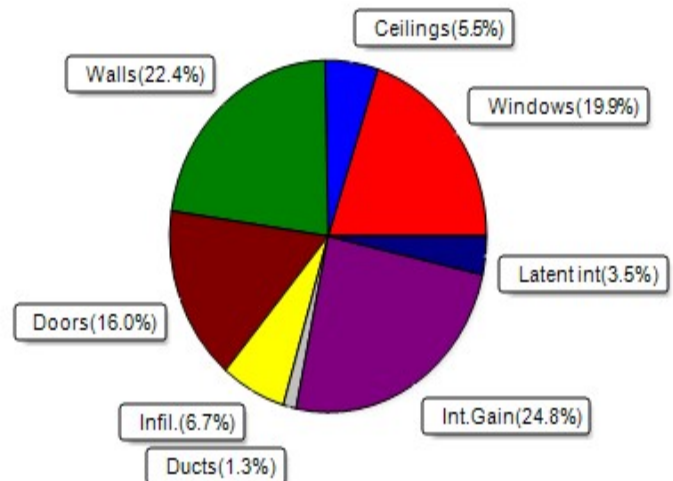
| Load component                  | Load              |
|---------------------------------|-------------------|
| Window total 102 sqft           | 1061 Btuh         |
| Wall total 1110 sqft            | 4507 Btuh         |
| Door total 153 sqft             | 2453 Btuh         |
| Ceiling total 796 sqft          | 1083 Btuh         |
| Floor total 796 sqft            | 7158 Btuh         |
| Infiltration 19 cfm             | 814 Btuh          |
| Duct loss                       | 100 Btuh          |
| <b>Subtotal</b>                 | <b>17177 Btuh</b> |
| Ventilation Ex:0 cfm; Sup:0 cfm | 0 Btuh            |
| <b>TOTAL HEAT LOSS</b>          | <b>17177 Btuh</b> |



## SUMMER CALCULATIONS

Summer Cooling Load (for 796 sqft)

| Load component                        | Load              |
|---------------------------------------|-------------------|
| Window total 102 sqft                 | 2290 Btuh         |
| Wall total 1110 sqft                  | 2582 Btuh         |
| Door total 153 sqft                   | 1840 Btuh         |
| Ceiling total 796 sqft                | 629 Btuh          |
| Floor total                           | 0 Btuh            |
| Infiltration 14 cfm                   | 290 Btuh          |
| Internal gain                         | 2860 Btuh         |
| Duct gain                             | 44 Btuh           |
| Sens.Ventilation Ex:0 cfm; Sup:0 cfm  | 0 Btuh            |
| Blower Load                           | 0 Btuh            |
| <b>Total sensible gain</b>            | <b>10535 Btuh</b> |
| Latent gain(ducts)                    | 110 Btuh          |
| Latent gain(infiltration)             | 481 Btuh          |
| Latent gain(ventilation)              | 0 Btuh            |
| Latent gain(internal/occupants/other) | 400 Btuh          |
| <b>Total latent gain</b>              | <b>991 Btuh</b>   |
| <b>TOTAL HEAT GAIN</b>                | <b>11526 Btuh</b> |



8th Edition

EnergyGauge® System Sizing

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

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

8-9-23

# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Project Title:  
Metcalf Residence

, FL

8/9/2023

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   | S       | 1.5ft       | 2.3ft | 30.0              | 30.0   | 0.0                | 9      | 11       | 274  | Btuh       |      |
| 2             | 2 NFRC                                                                  | 0.20, 0.26 | No | No   | W       | 1.5ft       | 2.3ft | 60.0              | 0.0    | 60.0               | 9      | 24       | 1453 | Btuh       |      |
| 3             | 2 NFRC                                                                  | 0.20, 0.26 | No | No   | W       | 1.5ft       | 2.3ft | 12.0              | 0.0    | 12.0               | 9      | 24       | 291  | Btuh       |      |
|               | Excursion                                                               |            |    |      |         |             |       |                   |        |                    |        |          | 271  | Btuh       |      |
|               | Window Total                                                            |            |    |      |         |             |       | 102 (sqft)        |        |                    |        |          |      | 2290       | Btuh |
| Walls         | Type                                                                    |            |    |      |         | U-Value     |       | R-Value           |        | Area(sqft)         |        | HTM      |      | Load       |      |
|               |                                                                         |            |    |      |         |             |       | Cav/Sheath        |        |                    |        |          |      |            |      |
| 1             | Frame - Steel - Ext                                                     |            |    |      |         | 0.11        |       | 13.0/0.0          |        | 214.0              |        | 2.9      |      | 612 Btuh   |      |
| 2             | Frame - Wood - Adj                                                      |            |    |      |         | 0.09        |       | 13.0/0.0          |        | 505.0              |        | 1.7      |      | 852 Btuh   |      |
| 3             | Frame - Steel - Ext                                                     |            |    |      |         | 0.11        |       | 13.0/0.0          |        | 86.0               |        | 2.9      |      | 246 Btuh   |      |
| 4             | Frame - Steel - Ext                                                     |            |    |      |         | 0.11        |       | 13.0/0.0          |        | 304.7              |        | 2.9      |      | 872 Btuh   |      |
|               | Wall Total                                                              |            |    |      |         |             |       |                   |        | 1110 (sqft)        |        |          |      | 2582 Btuh  |      |
| Doors         | Type                                                                    |            |    |      |         |             |       |                   |        | Area (sqft)        |        | HTM      |      | Load       |      |
|               |                                                                         |            |    |      |         |             |       |                   |        |                    |        |          |      |            |      |
| 1             | Insulated - Exterior                                                    |            |    |      |         |             |       |                   |        | 20.0               |        | 12.0     |      | 240 Btuh   |      |
| 2             | Insulated - Garage                                                      |            |    |      |         |             |       |                   |        | 20.0               |        | 12.0     |      | 240 Btuh   |      |
| 3             | Insulated - Exterior                                                    |            |    |      |         |             |       |                   |        | 40.0               |        | 12.0     |      | 480 Btuh   |      |
| 4             | Insulated - Exterior                                                    |            |    |      |         |             |       |                   |        | 20.0               |        | 12.0     |      | 240 Btuh   |      |
| 5             | Insulated - Exterior                                                    |            |    |      |         |             |       |                   |        | 20.0               |        | 12.0     |      | 240 Btuh   |      |
| 6             | Insulated - Exterior                                                    |            |    |      |         |             |       |                   |        | 33.3               |        | 12.0     |      | 400 Btuh   |      |
|               | Door Total                                                              |            |    |      |         |             |       |                   |        | 153 (sqft)         |        |          |      | 1840 Btuh  |      |
| Ceilings      | Type/Color/Surface                                                      |            |    |      |         | U-Value     |       | R-Value           |        | Area(sqft)         |        | HTM      |      | Load       |      |
|               |                                                                         |            |    |      |         |             |       |                   |        |                    |        |          |      |            |      |
| 1             | SnglAsmb w airsp/Light/Metal                                            |            |    |      |         | 0.034       |       | 30.0/0.0          |        | 796.0              |        | 0.79     |      | 629 Btuh   |      |
|               | Ceiling Total                                                           |            |    |      |         |             |       |                   |        | 796 (sqft)         |        |          |      | 629 Btuh   |      |
| Floors        | Type                                                                    |            |    |      |         |             |       | R-Value           |        | Size               |        | HTM      |      | Load       |      |
|               |                                                                         |            |    |      |         |             |       |                   |        |                    |        |          |      |            |      |
| 1             | Slab On Grade                                                           |            |    |      |         |             |       | 0.0               |        | 796 (ft-perimeter) |        | 0.0      |      | 0 Btuh     |      |
|               | Floor Total                                                             |            |    |      |         |             |       |                   |        | 796.0 (sqft)       |        |          |      | 0 Btuh     |      |
|               | Envelope Subtotal:                                                      |            |    |      |         |             |       |                   |        |                    |        |          |      | 7341 Btuh  |      |
| Infiltration  | Type                                                                    |            |    |      |         | Average ACH |       | Volume(cuft)      |        | Wall Ratio         |        | CFM=     |      | Load       |      |
|               | Natural                                                                 |            |    |      |         | 0.12        |       | 7164              |        | 1                  |        | 13.9     |      | 290 Btuh   |      |
| Internal gain |                                                                         |            |    |      |         | Occupants   |       | Btuh/occupant     |        | Appliance          |        | Load     |      |            |      |
|               |                                                                         |            |    |      |         | 2           |       | X 230             |        | +                  |        | 2400     |      | 2860 Btuh  |      |
|               | Sensible Envelope Load:                                                 |            |    |      |         |             |       |                   |        |                    |        |          |      | 10491 Btuh |      |
| Duct load     | Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Garag) (DGM of 0.004) |            |    |      |         |             |       |                   |        |                    |        |          |      | 44 Btuh    |      |
|               | Sensible Load All Zones                                                 |            |    |      |         |             |       |                   |        |                    |        |          |      | 10535 Btuh |      |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

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

, FL

8/9/2023

### WHOLE HOUSE TOTALS

|                                   |                                                           |                   |
|-----------------------------------|-----------------------------------------------------------|-------------------|
| Whole House<br>Totals for Cooling | <b>Sensible Envelope Load All Zones</b>                   | <b>10491 Btuh</b> |
|                                   | Sensible Duct Load                                        | 44 Btuh           |
|                                   | <b>Total Sensible Zone Loads</b>                          | <b>10535 Btuh</b> |
|                                   | Sensible ventilation (Ex:0 cfm; Sup:0 cfm)                | 0 Btuh            |
|                                   | Blower                                                    | 0 Btuh            |
|                                   | <b>Total sensible gain</b>                                | <b>10535 Btuh</b> |
|                                   | Latent infiltration gain (for 51 gr. humidity difference) | 481 Btuh          |
|                                   | Latent ventilation gain                                   | 0 Btuh            |
|                                   | Latent duct gain                                          | 110 Btuh          |
|                                   | Latent occupant gain (2.0 people @ 200 Btuh per person)   | 400 Btuh          |
|                                   | Latent other gain                                         | 0 Btuh            |
|                                   | <b>Latent total gain</b>                                  | <b>991 Btuh</b>   |
|                                   | <b>TOTAL GAIN</b>                                         | <b>11526 Btuh</b> |

### EQUIPMENT

|                 |   |            |
|-----------------|---|------------|
| 1. Central Unit | # | 24000 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

, FL

Project Title:  
Metcalf Residence  
Building Type: User

8/9/2023

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    | S                   | 30.0             |      | 10.4 | 312 Btuh   |
| 2                               | 2, NFRC 0.20                                                    | Vinyl      | 0.26    | W                   | 60.0             |      | 10.4 | 624 Btuh   |
| 3                               | 2, NFRC 0.20                                                    | Vinyl      | 0.26    | W                   | 12.0             |      | 10.4 | 125 Btuh   |
|                                 | Window Total                                                    |            |         |                     | 102.0(sqft)      |      |      | 1061 Btuh  |
| Walls                           | Type                                                            | Ornt.      | Ueff.   | R-Value<br>(Cav/Sh) | Area             | X    | HTM= | Load       |
| 1                               | Frame - Steel                                                   | - Ext      | (0.112) | 13.0/0.0            | 214              |      | 4.49 | 961 Btuh   |
| 2                               | Frame - Wood                                                    | - Adj      | (0.089) | 13.0/0.0            | 505              |      | 3.55 | 1793 Btuh  |
| 3                               | Frame - Steel                                                   | - Ext      | (0.112) | 13.0/0.0            | 86               |      | 4.49 | 386 Btuh   |
| 4                               | Frame - Steel                                                   | - Ext      | (0.112) | 13.0/0.0            | 305              |      | 4.49 | 1368 Btuh  |
|                                 | Wall Total                                                      |            |         |                     | 1110(sqft)       |      |      | 4507 Btuh  |
| Doors                           | Type                                                            | Storm      | Ueff.   |                     | Area             | X    | HTM= | Load       |
| 1                               | Insulated - Exterior,                                           | n          | (0.400) |                     | 20               |      | 16.0 | 320 Btuh   |
| 2                               | Insulated - Garage,                                             | n          | (0.400) |                     | 20               |      | 16.0 | 320 Btuh   |
| 3                               | Insulated - Exterior,                                           | n          | (0.400) |                     | 40               |      | 16.0 | 640 Btuh   |
| 4                               | Insulated - Exterior,                                           | n          | (0.400) |                     | 20               |      | 16.0 | 320 Btuh   |
| 5                               | Insulated - Exterior,                                           | n          | (0.400) |                     | 20               |      | 16.0 | 320 Btuh   |
| 6                               | Insulated - Exterior,                                           | n          | (0.400) |                     | 33               |      | 16.0 | 533 Btuh   |
|                                 | Door Total                                                      |            |         |                     | 153(sqft)        |      |      | 2453Btuh   |
| Ceilings                        | Type/Color/Surface                                              |            | Ueff.   | R-Value             | Area             | X    | HTM= | Load       |
| 1                               | Single as/L/Metal                                               |            | (0.034) | 30.0/0.0            | 796              |      | 1.4  | 1083 Btuh  |
|                                 | Ceiling Total                                                   |            |         |                     | 796(sqft)        |      |      | 1083Btuh   |
| Floors                          | Type                                                            |            | Ueff.   | R-Value             | Size             | X    | HTM= | Load       |
| 1                               | Slab On Grade                                                   |            | (1.180) | 0.0                 | 151.7 ft(perim.) |      | 47.2 | 7158 Btuh  |
|                                 | Floor Total                                                     |            |         |                     | 796 sqft         |      |      | 7158 Btuh  |
|                                 | Envelope Subtotal:                                              |            |         |                     |                  |      |      | 16263 Btuh |
| Infiltration                    | Type                                                            | Wholehouse | ACH     | Volume(cuft)        | Wall Ratio       | CFM= |      |            |
|                                 | Natural                                                         |            | 0.16    | 7164                | 1.00             | 18.6 |      | 814 Btuh   |
| Duct load                       | Extremely sealed, R6.0, Supply(Con), Return(Gar) (DLM of 0.006) |            |         |                     |                  |      |      | 100 Btuh   |
| All Zones                       | Sensible Subtotal All Zones                                     |            |         |                     |                  |      |      | 17177 Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

, FL

Project Title:  
Metcalf Residence  
Building Type: User

8/9/2023

### WHOLE HOUSE TOTALS

|                           |                                                   |            |
|---------------------------|---------------------------------------------------|------------|
| <b>Totals for Heating</b> | Subtotal Sensible Heat Loss                       | 17177 Btuh |
|                           | Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm) | 0 Btuh     |
|                           | Total Heat Loss                                   | 17177 Btuh |

### EQUIPMENT

|                       |   |            |
|-----------------------|---|------------|
| 1. Electric Heat Pump | # | 24000 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