

# Residential System Sizing Calculation

## Summary

Project Title:  
Bullard Residence

, FL

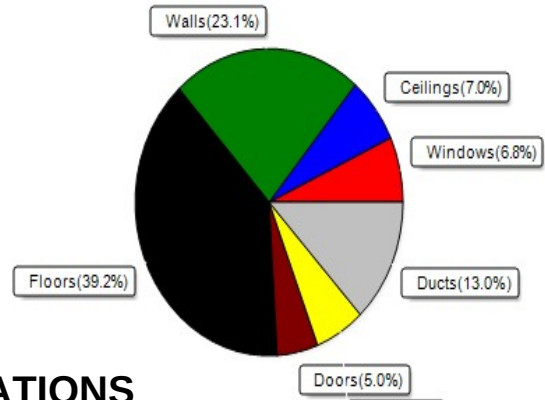
12/13/2022

|                                                                                                       |                   |                                       |                    |
|-------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------|--------------------|
| 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>12768 Btuh</b> | <b>Total cooling load calculation</b> | <b>12009 Btuh</b>  |
| Submitted heating capacity                                                                            | % of calc Btuh    | Submitted cooling capacity            | % of calc Btuh     |
| Total (Electric Heat Pump)                                                                            | 188.0 24000       | Sensible (SHR = 0.85)                 | 197.1 20400        |
| Heat Pump + Auxiliary(0.0kW)                                                                          | 188.0 24000       | Latent                                | 217.1 3600         |
|                                                                                                       |                   | <b>Total (Electric Heat Pump)</b>     | <b>199.9 24000</b> |

## WINTER CALCULATIONS

Winter Heating Load (for 698 sqft)

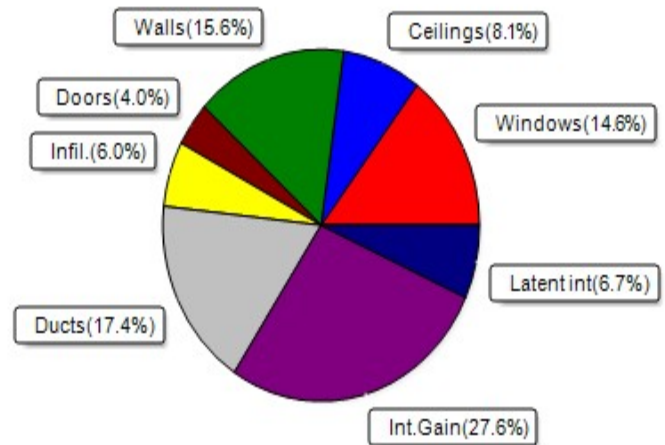
| Load component                  | Load              |
|---------------------------------|-------------------|
| Window total 84 sqft            | 874 Btuh          |
| Wall total 830 sqft             | 2947 Btuh         |
| Door total 40 sqft              | 640 Btuh          |
| Ceiling total 698 sqft          | 889 Btuh          |
| Floor total 698 sqft            | 5003 Btuh         |
| Infiltration 17 cfm             | 755 Btuh          |
| Duct loss                       | 1661 Btuh         |
| <b>Subtotal</b>                 | <b>12768 Btuh</b> |
| Ventilation Ex:0 cfm; Sup:0 cfm | 0 Btuh            |
| <b>TOTAL HEAT LOSS</b>          | <b>12768 Btuh</b> |



## SUMMER CALCULATIONS

Summer Cooling Load (for 698 sqft)

| Load component                        | Load              |
|---------------------------------------|-------------------|
| Window total 84 sqft                  | 1748 Btuh         |
| Wall total 830 sqft                   | 1879 Btuh         |
| Door total 40 sqft                    | 480 Btuh          |
| Ceiling total 698 sqft                | 978 Btuh          |
| Floor total                           | 0 Btuh            |
| Infiltration 13 cfm                   | 269 Btuh          |
| Internal gain                         | 3320 Btuh         |
| Duct gain                             | 1677 Btuh         |
| Sens.Ventilation Ex:0 cfm; Sup:0 cfm  | 0 Btuh            |
| Blower Load                           | 0 Btuh            |
| <b>Total sensible gain</b>            | <b>10350 Btuh</b> |
| Latent gain(ducts)                    | 412 Btuh          |
| Latent gain(infiltration)             | 446 Btuh          |
| Latent gain(ventilation)              | 0 Btuh            |
| Latent gain(internal/occupants/other) | 800 Btuh          |
| <b>Total latent gain</b>              | <b>1658 Btuh</b>  |
| <b>TOTAL HEAT GAIN</b>                | <b>12009 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:  
Bullard 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       | 1.5ft       | 2.3ft      | 10.0               | 0.0    | 10.0       | 9              | 9        | 91 Btuh    |
| 2             | 2 NFRC                                                 | 0.20, 0.26               | No | No   | E       | 1.5ft       | 2.3ft      | 25.0               | 0.0    | 25.0       | 9              | 24       | 606 Btuh   |
| 3             | 2 NFRC                                                 | 0.20, 0.26               | No | No   | E       | 1.5ft       | 2.3ft      | 12.0               | 0.0    | 12.0       | 9              | 24       | 291 Btuh   |
| 4             | 2 NFRC                                                 | 0.20, 0.26               | No | No   | S       | 1.5ft       | 2.3ft      | 9.0                | 9.0    | 0.0        | 9              | 11       | 82 Btuh    |
| 5             | 2 NFRC                                                 | 0.20, 0.26               | No | No   | W       | 1.5ft       | 2.3ft      | 25.0               | 0.0    | 25.0       | 9              | 24       | 606 Btuh   |
| 6             | 2 NFRC                                                 | 0.20, 0.26               | No | No   | W       | 1.5ft       | 2.3ft      | 3.0                | 0.0    | 3.0        | 9              | 24       | 73 Btuh    |
|               | Window Total                                           |                          |    |      |         |             |            | 84 (sqft)          |        |            |                |          | 1748 Btuh  |
| Walls         | Type                                                   |                          |    |      |         | U-Value     | R-Value    | Area(sqft)         |        |            | HTM            |          | Load       |
|               |                                                        |                          |    |      |         |             | Cav/Sheath |                    |        |            |                |          |            |
|               | 1                                                      | Frame - Wood - Ext       |    |      |         | 0.09        | 13.0/0.0   | 189.0              |        |            | 2.3            |          | 428 Btuh   |
|               | 2                                                      | Frame - Wood - Ext       |    |      |         | 0.09        | 13.0/0.0   | 201.0              |        |            | 2.3            |          | 455 Btuh   |
|               | 3                                                      | Frame - Wood - Ext       |    |      |         | 0.09        | 13.0/0.0   | 210.0              |        |            | 2.3            |          | 475 Btuh   |
|               | 4                                                      | Frame - Wood - Ext       |    |      |         | 0.09        | 13.0/0.0   | 230.0              |        |            | 2.3            |          | 521 Btuh   |
|               | Wall Total                                             |                          |    |      |         |             |            | 830 (sqft)         |        |            |                |          | 1879 Btuh  |
| Doors         | Type                                                   |                          |    |      |         |             |            | Area (sqft)        |        |            | HTM            |          | Load       |
|               | 1                                                      | Insulated - Exterior     |    |      |         |             |            | 20.0               |        |            | 12.0           |          | 240 Btuh   |
|               | 2                                                      | Insulated - Exterior     |    |      |         |             |            | 20.0               |        |            | 12.0           |          | 240 Btuh   |
|               | Door Total                                             |                          |    |      |         |             |            | 40 (sqft)          |        |            |                |          | 480 Btuh   |
| Ceilings      | Type/Color/Surface                                     |                          |    |      |         | U-Value     | R-Value    | Area(sqft)         |        |            | HTM            |          | Load       |
|               | 1                                                      | Vented Attic/Med/Shingle |    |      |         | 0.032       | 30.0/0.0   | 698.0              |        |            | 1.40           |          | 978 Btuh   |
|               | Ceiling Total                                          |                          |    |      |         |             |            | 698 (sqft)         |        |            |                |          | 978 Btuh   |
| Floors        | Type                                                   |                          |    |      |         |             | R-Value    | Size               |        |            | HTM            |          | Load       |
|               | 1                                                      | Slab On Grade            |    |      |         |             | 0.0        | 698 (ft-perimeter) |        |            | 0.0            |          | 0 Btuh     |
|               | Floor Total                                            |                          |    |      |         |             |            | 698.0 (sqft)       |        |            |                |          | 0 Btuh     |
|               | Envelope Subtotal:                                     |                          |    |      |         |             |            |                    |        |            |                |          | 5085 Btuh  |
| Infiltration  | Type                                                   |                          |    |      |         | Average ACH |            | Volume(cuft)       |        | Wall Ratio |                | CFM=     | Load       |
|               | Natural                                                |                          |    |      |         | 0.12        |            | 6282               |        | 1          |                | 12.9     | 269 Btuh   |
| Internal gain |                                                        |                          |    |      |         | Occupants   |            | Btuh/occupant      |        |            | Appliance      |          | Load       |
|               |                                                        |                          |    |      |         | 4           |            | X 230              |        |            | +              |          | 3320 Btuh  |
|               | Sensible Envelope Load:                                |                          |    |      |         |             |            |                    |        |            |                |          | 8674 Btuh  |
| Duct load     | Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) |                          |    |      |         |             |            |                    |        |            | (DGM of 0.193) |          | 1677 Btuh  |
|               | Sensible Load All Zones                                |                          |    |      |         |             |            |                    |        |            |                |          | 10350 Btuh |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

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

, FL

12/13/2022

### WHOLE HOUSE TOTALS

|                                   |                                                           |                   |
|-----------------------------------|-----------------------------------------------------------|-------------------|
| Whole House<br>Totals for Cooling | <b>Sensible Envelope Load All Zones</b>                   | <b>8674 Btuh</b>  |
|                                   | Sensible Duct Load                                        | 1677 Btuh         |
|                                   | <b>Total Sensible Zone Loads</b>                          | <b>10350 Btuh</b> |
|                                   | Sensible ventilation (Ex:0 cfm; Sup:0 cfm)                | 0 Btuh            |
|                                   | Blower                                                    | 0 Btuh            |
|                                   | <b>Total sensible gain</b>                                | <b>10350 Btuh</b> |
|                                   | Latent infiltration gain (for 51 gr. humidity difference) | 446 Btuh          |
|                                   | Latent ventilation gain                                   | 0 Btuh            |
|                                   | Latent duct gain                                          | 412 Btuh          |
|                                   | Latent occupant gain (4.0 people @ 200 Btuh per person)   | 800 Btuh          |
|                                   | Latent other gain                                         | 0 Btuh            |
|                                   | <b>Latent total gain</b>                                  | <b>1658 Btuh</b>  |
|                                   | <b>TOTAL GAIN</b>                                         | <b>12009 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:  
Bullard Residence  
Building Type: User

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                   | 10.0             |      | 10.4           | 104 Btuh   |
| 2                               | 2, NFRC 0.20                                   | Vinyl      | 0.26    | E                   | 25.0             |      | 10.4           | 260 Btuh   |
| 3                               | 2, NFRC 0.20                                   | Vinyl      | 0.26    | E                   | 12.0             |      | 10.4           | 125 Btuh   |
| 4                               | 2, NFRC 0.20                                   | Vinyl      | 0.26    | S                   | 9.0              |      | 10.4           | 94 Btuh    |
| 5                               | 2, NFRC 0.20                                   | Vinyl      | 0.26    | W                   | 25.0             |      | 10.4           | 260 Btuh   |
| 6                               | 2, NFRC 0.20                                   | Vinyl      | 0.26    | W                   | 3.0              |      | 10.4           | 31 Btuh    |
|                                 | Window Total                                   |            |         |                     | 84.0(sqft)       |      |                | 874 Btuh   |
| Walls                           | Type                                           | Ornt.      | Ueff.   | R-Value<br>(Cav/Sh) | Area             | X    | HTM=           | Load       |
| 1                               | Frame - Wood                                   | - Ext      | (0.089) | 13.0/0.0            | 189              |      | 3.55           | 671 Btuh   |
| 2                               | Frame - Wood                                   | - Ext      | (0.089) | 13.0/0.0            | 201              |      | 3.55           | 714 Btuh   |
| 3                               | Frame - Wood                                   | - Ext      | (0.089) | 13.0/0.0            | 210              |      | 3.55           | 746 Btuh   |
| 4                               | Frame - Wood                                   | - Ext      | (0.089) | 13.0/0.0            | 230              |      | 3.55           | 817 Btuh   |
|                                 | Wall Total                                     |            |         |                     | 830(sqft)        |      |                | 2947 Btuh  |
| Doors                           | Type                                           | Storm      | Ueff.   |                     | Area             | X    | HTM=           | Load       |
| 1                               | Insulated - Exterior, n                        |            | (0.400) |                     | 20               |      | 16.0           | 320 Btuh   |
| 2                               | Insulated - Exterior, n                        |            | (0.400) |                     | 20               |      | 16.0           | 320 Btuh   |
|                                 | Door Total                                     |            |         |                     | 40(sqft)         |      |                | 640Btuh    |
| Ceilings                        | Type/Color/Surface                             |            | Ueff.   | R-Value             | Area             | X    | HTM=           | Load       |
| 1                               | Flat ceil/M/Shing                              |            | (0.032) | 30.0/0.0            | 698              |      | 1.3            | 889 Btuh   |
|                                 | Ceiling Total                                  |            |         |                     | 698(sqft)        |      |                | 889Btuh    |
| Floors                          | Type                                           |            | Ueff.   | R-Value             | Size             | X    | HTM=           | Load       |
| 1                               | Slab On Grade                                  |            | (1.180) | 0.0                 | 106.0 ft(perim.) |      | 47.2           | 5003 Btuh  |
|                                 | Floor Total                                    |            |         |                     | 698 sqft         |      |                | 5003 Btuh  |
|                                 | Envelope Subtotal:                             |            |         |                     |                  |      |                | 10353 Btuh |
| Infiltration                    | Type                                           | Wholehouse | ACH     | Volume(cuft)        | Wall Ratio       | CFM= |                |            |
|                                 | Natural                                        |            | 0.16    | 6282                | 1.00             | 17.2 |                | 755 Btuh   |
| Duct load                       | Average sealed, R6.0, Supply(Att), Return(Att) |            |         |                     |                  |      | (DLM of 0.150) | 1661 Btuh  |
| All Zones                       | Sensible Subtotal All Zones                    |            |         |                     |                  |      |                | 12768 Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

, FL

Project Title:  
Bullard Residence  
Building Type: User

12/13/2022

### WHOLE HOUSE TOTALS

|                           |                                                   |            |
|---------------------------|---------------------------------------------------|------------|
| <b>Totals for Heating</b> | Subtotal Sensible Heat Loss                       | 12768 Btuh |
|                           | Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm) | 0 Btuh     |
|                           | Total Heat Loss                                   | 12768 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