# Residential System Sizing Calculation

## Summary

Thomas

Lake City, FL

Project Title:
Norris Thomas Residence

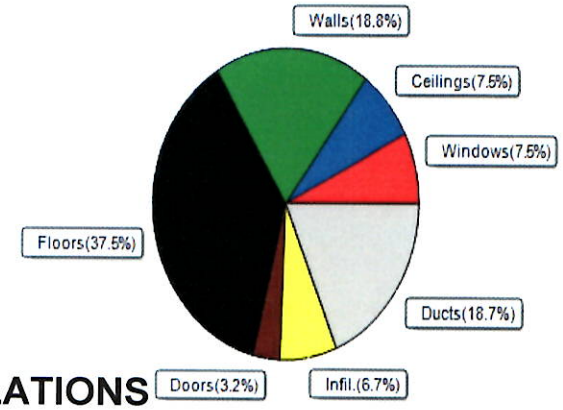
8/8/2022

| Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(152 ft.) Temp Range(M) Humidity data: Interior RH (50%) Outdoor wet bulb (76F) Humidity difference(47gr.) | | | | | |
|---|---|---|---|---|---|
| Winter design temperature(MJ8 99%) | 33 | F | Summer design temperature(MJ8 99%) | 92 | F |
| Winter setpoint | 70 | F | Summer setpoint | 75 | F |
| Winter temperature difference | 37 | F | Summer temperature difference | 17 | F |
| **Total heating load calculation** | **17504** | **Btuh** | **Total cooling load calculation** | **13675** | **Btuh** |
| Submitted heating capacity | % of calc | Btuh | Submitted cooling capacity | % of calc | Btuh |
| Total (Electric Heat Pump) | 205.7 | 36000 | Sensible (SHR = 0.75) | 255.6 | 27000 |
| Heat Pump + Auxiliary(0.0kW) | 205.7 | 36000 | Latent | 289.3 | 9000 |
| | | | Total (Electric Heat Pump) | 263.3 | 36000 |

## WINTER CALCULATIONS

Winter Heating Load (for 1391 sqft)

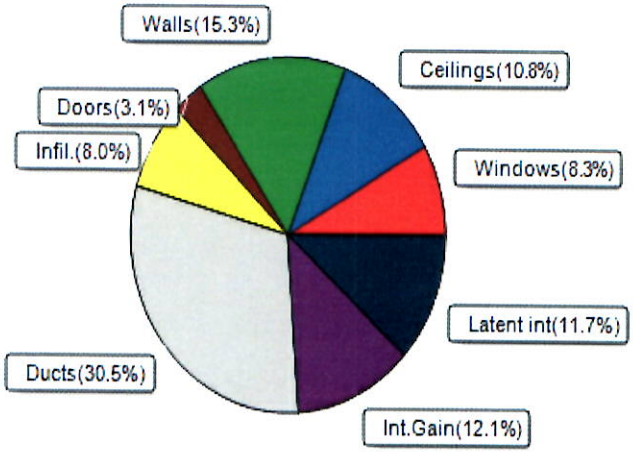
| Load component | | | Load | |
|---|---|---|---|---|
| Window total | 107 | sqft | 1306 | Btuh |
| Wall total | 1049 | sqft | 3293 | Btuh |
| Door total | 33 | sqft | 567 | Btuh |
| Ceiling total | 1391 | sqft | 1306 | Btuh |
| Floor total | 1391 | sqft | 6571 | Btuh |
| Infiltration | 29 | cfm | 1178 | Btuh |
| Duct loss | | | 3282 | Btuh |
| **Subtotal** | | | **17504** | **Btuh** |
| Ventilation | Ex:0 cfm; Sup:0 cfm | | 0 | Btuh |
| **TOTAL HEAT LOSS** | | | **17504** | **Btuh** |




## SUMMER CALCULATIONS

Summer Cooling Load (for 1391 sqft)

| Load component | | | Load | |
|---|---|---|---|---|
| Window total | 107 | sqft | 1140 | Btuh |
| Wall total | 1049 | sqft | 2092 | Btuh |
| Door total | 33 | sqft | 429 | Btuh |
| Ceiling total | 1391 | sqft | 1483 | Btuh |
| Floor total | | | 0 | Btuh |
| Infiltration | 22 | cfm | 406 | Btuh |
| Internal gain | | | 1660 | Btuh |
| Duct gain | | | 3354 | Btuh |
| Sens.Ventilation | Ex:0 cfm; Sup:0 cfm | | 0 | Btuh |
| Blower Load | | | 0 | Btuh |
| **Total sensible gain** | | | **10564** | **Btuh** |
| Latent gain(ducts) | | | 817 | Btuh |
| Latent gain(infiltration) | | | 694 | Btuh |
| Latent gain(ventilation) | | | 0 | Btuh |
| Latent gain(internal/occupants/other) | | | 1600 | Btuh |
| **Total latent gain** | | | **3111** | **Btuh** |
| **TOTAL HEAT GAIN** | | | **13675** | **Btuh** |

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EnergyGauge® System Sizing
PREPARED BY: Robert Davis
DATE: 8/8/22

# System Sizing Calculations - Winter

## Residential Load - Whole House Component Details

Thomas

Lake City, FL

Project Title:
Norris Thomas Residence
Building Type: User

8/8/2022

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 37.0 °F (MJ8 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 0.21 | Metal | 0.33 | N | 9.0 | 12.2 | 110 Btuh |
| 2 | 2, NFRC 0.21 | Metal | 0.33 | N | 4.5 | 12.2 | 55 Btuh |
| 3 | 2, NFRC 0.21 | Metal | 0.33 | E | 6.0 | 12.2 | 73 Btuh |
| 4 | 2, NFRC 0.21 | Metal | 0.33 | E | 7.5 | 12.2 | 92 Btuh |
| 5 | 2, NFRC 0.21 | Metal | 0.33 | S | 25.0 | 12.2 | 305 Btuh |
| 6 | 2, NFRC 0.21 | Metal | 0.33 | S | 15.0 | 12.2 | 183 Btuh |
| 7 | 2, NFRC 0.21 | Metal | 0.33 | S | 25.0 | 12.2 | 305 Btuh |
| 8 | 2, NFRC 0.21 | Metal | 0.33 | W | 15.0 | 12.2 | 183 Btuh |
| | Window Total | | | | 107.0(sqft) | | 1306 Btuh |

| Walls | Type | Ornt. | Ueff. | R-Value (Cav/Sh) | Area X | HTM= | Load |
|---|---|---|---|---|---|---|---|
| 1 | Frame - Wood | - Ext | (0.085) | 13.0/1.0 | 328 | 3.14 | 1028 Btuh |
| 2 | Frame - Wood | - Ext | (0.085) | 13.0/1.0 | 235 | 3.14 | 736 Btuh |
| 3 | Frame - Wood | - Ext | (0.085) | 13.0/1.0 | 152 | 3.14 | 478 Btuh |
| 4 | Frame - Wood | - Ext | (0.085) | 13.0/1.0 | 102 | 3.14 | 320 Btuh |
| 5 | Frame - Wood | - Ext | (0.085) | 13.0/1.0 | 233 | 3.14 | 731 Btuh |
| | Wall Total | | | | 1049(sqft) | | 3293 Btuh |

| Doors | Type | Storm | Ueff. | Area X | HTM= | Load |
|---|---|---|---|---|---|---|
| 1 | Insulated - Exterior, | n | (0.460) | 13 | 17.0 | 227 Btuh |
| 2 | Insulated - Exterior, | n | (0.460) | 20 | 17.0 | 340 Btuh |
| | Door Total | | | 33(sqft) | | 567Btuh |

| Ceilings | Type/Color/Surface | Ueff. | R-Value | Area X | HTM= | Load |
|---|---|---|---|---|---|---|
| 1 | Flat ceil/M/Shing | (0.025) | 38.0/0.0 | 1391 | 0.94 | 1306 Btuh |
| | Ceiling Total | | | 1391(sqft) | | 1306Btuh |

| Floors | Type | Ueff. | R-Value | Size X | HTM= | Load |
|---|---|---|---|---|---|---|
| 1 | Slab On Grade | (1.180) | 0.0 | 150.5 ft(perim.) | 43.7 | 6571 Btuh |
| | Floor Total | | | 1391 sqft | | 6571 Btuh |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Envelope Subtotal: | | 13044 Btuh |

| Infiltration | Type | Wholehouse | ACH | Volume(cuft) | Wall Ratio | CFM= | |
|---|---|---|---|---|---|---|---|
| | Natural | | 0.16 | 11128 | 1.00 | 29.1 | 1178 Btuh |

| Duct load | Average sealed, R6.0, Supply(Att), Return(Att) | (DLM of 0.231) | 3282 Btuh |
|---|---|---|---|

| All Zones | | **Sensible Subtotal All Zones** | **17504 Btuh** |
|---|---|---|---|

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

Thomas

Lake City, FL

Project Title:
Norris Thomas Residence
Building Type: User

8/8/2022

### WHOLE HOUSE TOTALS

| | | |
|---|---|---|
| **Totals for Heating** | Subtotal Sensible Heat Loss<br>Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm)<br>Total Heat Loss | 17504 Btuh<br>0 Btuh<br>17504 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)

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# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Thomas

Project Title:
Norris Thomas Residence

Lake City, FL

8/8/2022

Reference City: Gainesville, FL (Defaults)
Humidity difference: 47gr.

Temperature Difference: 17.0F(MJ8 99%)
Summer Setpoint: 75 °F (Required Manual J default)

**Component Loads for Whole House**

| Window | Type* Panes | SHGC | U | InSh | IS | Ornt | Overhang Len | Hgt | Window Area(sqft) Gross | Shaded | Unshaded | HTM Shaded | Unshaded | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 NFRC | 0.21, 0.33 | B-L | No | N | | 1.5ft | 2.0ft | 9.0 | 0.0 | 9.0 | 8 | 8 | 69 Btuh |
| 2 | 2 NFRC | 0.21, 0.33 | B-L | No | N | | 1.5ft | 2.0ft | 4.5 | 0.0 | 4.5 | 8 | 8 | 35 Btuh |
| 3 | 2 NFRC | 0.21, 0.33 | B-L | No | E | | 1.5ft | 2.0ft | 6.0 | 0.0 | 6.0 | 8 | 19 | 113 Btuh |
| 4 | 2 NFRC | 0.21, 0.33 | B-L | No | E | | 1.5ft | 2.0ft | 7.5 | 0.0 | 7.5 | 8 | 19 | 141 Btuh |
| 5 | 2 NFRC | 0.21, 0.33 | B-L | No | S | | 1.5ft | 2.0ft | 25.0 | 25.0 | 0.0 | 8 | 9 | 192 Btuh |
| 6 | 2 NFRC | 0.21, 0.33 | B-L | No | S | | 1.5ft | 2.0ft | 15.0 | 15.0 | 0.0 | 8 | 9 | 115 Btuh |
| 7 | 2 NFRC | 0.21, 0.33 | B-L | No | S | | 1.5ft | 2.0ft | 25.0 | 25.0 | 0.0 | 8 | 9 | 192 Btuh |
| 8 | 2 NFRC | 0.21, 0.33 | B-L | No | W | | 1.5ft | 2.0ft | 15.0 | 0.0 | 15.0 | 8 | 19 | 282 Btuh |
| | Window Total | | | | | | | | 107 (sqft) | | | | | 1140 Btuh |

| Walls | Type | U-Value | R-Value Cav/Sheath | Area(sqft) | HTM | Load |
|---|---|---|---|---|---|---|
| 1 | Frame - Wood - Ext | 0.08 | 13.0/1.0 | 327.5 | 2.0 | 653 Btuh |
| 2 | Frame - Wood - Ext | 0.08 | 13.0/1.0 | 234.5 | 2.0 | 468 Btuh |
| 3 | Frame - Wood - Ext | 0.08 | 13.0/1.0 | 152.2 | 2.0 | 303 Btuh |
| 4 | Frame - Wood - Ext | 0.08 | 13.0/1.0 | 101.9 | 2.0 | 203 Btuh |
| 5 | Frame - Wood - Ext | 0.08 | 13.0/1.0 | 233.0 | 2.0 | 465 Btuh |
| | Wall Total | | | 1049 (sqft) | | 2092 Btuh |

| Doors | Type | Area (sqft) | HTM | Load |
|---|---|---|---|---|
| 1 | Insulated - Exterior | 13.3 | 12.9 | 172 Btuh |
| 2 | Insulated - Exterior | 20.0 | 12.9 | 258 Btuh |
| | Door Total | 33 (sqft) | | 429 Btuh |

| Ceilings | Type/Color/Surface | U-Value | R-Value | Area(sqft) | HTM | Load |
|---|---|---|---|---|---|---|
| 1 | Vented Attic/Med/Shingle | 0.025 | 38.0/0.0 | 1391.0 | 1.07 | 1483 Btuh |
| | Ceiling Total | | | 1391 (sqft) | | 1483 Btuh |

| Floors | Type | R-Value | Size | HTM | Load |
|---|---|---|---|---|---|
| 1 | Slab On Grade | 0.0 | 1391 (ft-perimeter) | 0.0 | 0 Btuh |
| | Floor Total | | 1391.0 (sqft) | | 0 Btuh |
| | | | Envelope Subtotal: | | 5143 Btuh |

| Infiltration | Type | Average ACH | Volume(cuft) | Wall Ratio | CFM= | Load |
|---|---|---|---|---|---|---|
| | Natural | 0.12 | 11128 | 1 | 21.8 | 406 Btuh |
| **Internal gain** | | Occupants | Btuh/occupant | | Appliance | Load |
| | | 2 | X 230 | + | 1200 | 1660 Btuh |
| | | | | Sensible Envelope Load: | | 7209 Btuh |
| **Duct load** | Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) | | | (DGM of 0.465) | | 3354 Btuh |
| | | | | **Sensible Load All Zones** | | **10564 Btuh** |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Thomas

Project Title: Norris Thomas Residence

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

8/8/2022

### WHOLE HOUSE TOTALS

| | | |
|---|---|---|
| **Whole House Totals for Cooling** | **Sensible Envelope Load All Zones** | **7209 Btuh** |
| | Sensible Duct Load | 3354 Btuh |
| | **Total Sensible Zone Loads** | **10564 Btuh** |
| | Sensible ventilation (Ex:0 cfm; Sup:0 cfm) | 0 Btuh |
| | Blower | 0 Btuh |
| | **Total sensible gain** | **10564 Btuh** |
| | Latent infiltration gain (for 47 gr. humidity difference) | 694 Btuh |
| | Latent ventilation gain | 0 Btuh |
| | Latent duct gain | 817 Btuh |
| | Latent occupant gain (2.0 people @ 200 Btuh per person) | 400 Btuh |
| | Latent other gain | 1200 Btuh |
| | **Latent total gain** | **3111 Btuh** |
| | **TOTAL GAIN** | **13675 Btuh** |

### EQUIPMENT

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

*Key: Window types (Panes - 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)

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