# Residential System Sizing Calculation

## Summary

Dale & Karla Nickelson

Lake City, FL 32024

Project Title:
Nickelson Res

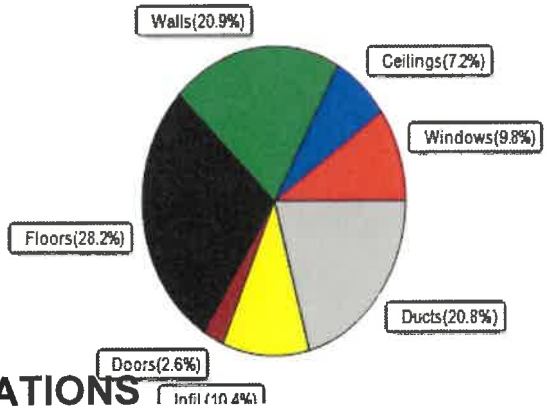
2/9/2021

| Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(152 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 |
| **Total heating load calculation** | **51241** | **Btuh** | **Total cooling load calculation** | **39987** | **Btuh** |
| Submitted heating capacity | % of calc | Btuh | Submitted cooling capacity | % of calc | Btuh |
| Total (Electric Heat Pump) | 60.6 | 31044 | Sensible (SHR = 0.70) | 48.4 | 15600 |
| Heat Pump + Auxiliary(0.0kW) | 60.6 | 31044 | Latent | 86.2 | 6686 |
| | | | Total (Electric Heat Pump) | 55.7 | 22286 |

## WINTER CALCULATIONS

Winter Heating Load (for 3477 sqft)

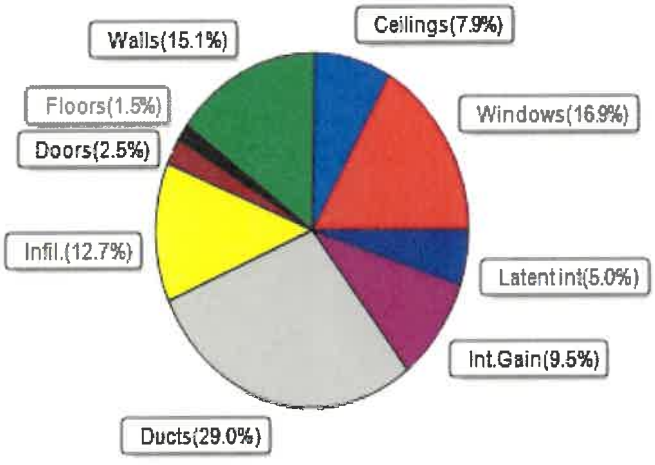
| Load component | | | Load | |
|---|---|---|---|---|
| Window total | 349 | sqft | 5026 | Btuh |
| Wall total | 3316 | sqft | 10715 | Btuh |
| Door total | 72 | sqft | 1325 | Btuh |
| Ceiling total | 3651 | sqft | 3706 | Btuh |
| Floor total | See detail report | | 14453 | Btuh |
| Infiltration | 122 | cfm | 5349 | Btuh |
| Duct loss | | | 10668 | Btuh |
| **Subtotal** | | | **51241** | **Btuh** |
| Ventilation | 0 | cfm | 0 | Btuh |
| **TOTAL HEAT LOSS** | | | **51241** | **Btuh** |




## SUMMER CALCULATIONS

Summer Cooling Load (for 3477 sqft)

| Load component | | | Load | |
|---|---|---|---|---|
| Window total | 349 | sqft | 6746 | Btuh |
| Wall total | 3316 | sqft | 6034 | Btuh |
| Door total | 72 | sqft | 994 | Btuh |
| Ceiling total | 3651 | sqft | 3150 | Btuh |
| Floor total | | | 598 | Btuh |
| Infiltration | 92 | cfm | 1906 | Btuh |
| Internal gain | | | 3800 | Btuh |
| Duct gain | | | 9007 | Btuh |
| Sens. Ventilation | 0 | cfm | 0 | Btuh |
| Blower Load | | | 0 | Btuh |
| **Total sensible gain** | | | **32235** | **Btuh** |
| Latent gain(ducts) | | | 2590 | Btuh |
| Latent gain(infiltration) | | | 3162 | Btuh |
| Latent gain(ventilation) | | | 0 | Btuh |
| Latent gain(internal/occupants/other) | | | 2000 | Btuh |
| **Total latent gain** | | | **7752** | **Btuh** |
| **TOTAL HEAT GAIN** | | | **39987** | **Btuh** |




8th Edition

EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 2/9/2021

# System Sizing Calculations - Winter

## Residential Load - Whole House Component Details

Dale & Karla Nickelson
Lake City, FL 32024

Project Title:
Nickelson Res
Building Type: User

2/9/2021

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)

**Component Loads for Whole House**

| **Window** | Panes/Type | Frame | U | Orientation | Area(sqft) X | HTM= | Load |
|---|---|---|---|---|---|---|---|
| 1 | 2, NFRC 0.25 | Vinyl | 0.36 | S | 72.0 | 14.4 | 1037 Btuh |
| 2 | 2, NFRC 0.25 | Vinyl | 0.36 | S | 12.0 | 14.4 | 173 Btuh |
| 3 | 2, NFRC 0.25 | Vinyl | 0.36 | E | 12.0 | 14.4 | 173 Btuh |
| 4 | 2, NFRC 0.25 | Vinyl | 0.36 | E | 16.0 | 14.4 | 230 Btuh |
| 5 | 2, NFRC 0.25 | Vinyl | 0.36 | N | 18.0 | 14.4 | 259 Btuh |
| 6 | 2, NFRC 0.25 | Vinyl | 0.36 | W | 18.0 | 14.4 | 259 Btuh |
| 7 | 2, NFRC 0.25 | TIM | 0.36 | W | 24.0 | 14.4 | 346 Btuh |
| 8 | 2, NFRC 0.25 | Vinyl | 0.36 | N | 14.0 | 14.4 | 202 Btuh |
| 9 | 2, NFRC 0.25 | TIM | 0.36 | N | 96.0 | 14.4 | 1382 Btuh |
| 10 | 2, NFRC 0.25 | Vinyl | 0.36 | W | 18.0 | 14.4 | 259 Btuh |
| 11 | 2, NFRC 0.25 | Vinyl | 0.36 | W | 4.0 | 14.4 | 58 Btuh |
| 12 | 2, NFRC 0.25 | Vinyl | 0.36 | S | 15.0 | 14.4 | 216 Btuh |
| 13 | 2, NFRC 0.25 | Vinyl | 0.36 | E | 30.0 | 14.4 | 432 Btuh |
| | Window Total | | | | 349.0(sqft) | | 5026 Btuh |

| **Walls** | Type | Ornt. | Ueff. | R-Value (Cav/Sh) | Area X | HTM= | Load |
|---|---|---|---|---|---|---|---|
| 1 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 377 | 3.09 | 1164 Btuh |
| 2 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 40 | 3.09 | 124 Btuh |
| 3 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 118 | 3.09 | 365 Btuh |
| 4 | Frame - Wood | - Adj | (0.077) | 19.0/0.0 | 219 | 3.09 | 678 Btuh |
| 5 | Frame - Wood | - Adj | (0.077) | 19.0/0.0 | 145 | 3.09 | 448 Btuh |
| 6 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 204 | 3.09 | 630 Btuh |
| 7 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 269 | 3.09 | 830 Btuh |
| 8 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 168 | 3.09 | 519 Btuh |
| 9 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 230 | 3.09 | 711 Btuh |
| 10 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 60 | 3.09 | 185 Btuh |
| 11 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 150 | 3.09 | 464 Btuh |
| 12 | Frame - Wood | - Ext | (0.077) | 19.0/0.0 | 321 | 3.09 | 993 Btuh |
| 13 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 117 | 3.55 | 415 Btuh |
| 14 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 249 | 3.55 | 883 Btuh |
| 15 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 167 | 3.55 | 594 Btuh |
| 16 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 53 | 3.55 | 187 Btuh |
| 17 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 109 | 3.55 | 388 Btuh |
| 18 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 160 | 3.55 | 568 Btuh |
| 19 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 112 | 3.55 | 398 Btuh |
| 20 | Frame - Wood | - Ext | (0.089) | 13.0/0.0 | 48 | 3.55 | 170 Btuh |
| | Wall Total | | | | 3316(sqft) | | 10715 Btuh |

| **Doors** | Type | Storm | Ueff. | Area X | HTM= | Load |
|---|---|---|---|---|---|---|
| 1 | Insulated - Garage, | n | (0.460) | 24 | 18.4 | 442 Btuh |
| 2 | Insulated - Exterior, | n | (0.460) | 48 | 18.4 | 883 Btuh |
| | Door Total | | | 72(sqft) | | 1325Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

Dale & Karla Nickelson
Lake City, FL 32024

Project Title:
Nickelson Res
Building Type: User

2/9/2021

| | | | | | | |
|---|---|---|---|---|---|---|
| **Ceilings** | Type/Color/Surface | Ueff. | R-Value | Area X | HTM= | Load |
| 1 | Vented Attic/L/Shing | (0.025) | 38.0/0.0 | 2756 | 1.0 | 2798 Btuh |
| 2 | Vented Attic/L/Shing | (0.025) | 38.0/0.0 | 895 | 1.0 | 908 Btuh |
| | Ceiling Total | | | 3651(sqft) | | 3706Btuh |
| **Floors** | Type | Ueff. | R-Value | Size X | HTM= | Load |
| 1 | Slab On Grade | (1.180) | 0.0 | 270.0 ft(perim.) | 47.2 | 12744 Btuh |
| 2 | Raised Wood - Adj | (0.050) | 19.0 | 852.0 sqft | 2.0 | 1709 Btuh |
| | Floor Total | | | 3477 sqft | | 14453 Btuh |
| | | | | Envelope Subtotal: | | 35224 Btuh |
| **Infiltration** | Type | Wholehouse ACH | Volume(cuft) | Wall Ratio | CFM= | |
| | Natural | 0.22 | 33066 | 1.00 | 122.2 | 5349 Btuh |
| **Duct load** | Average sealed, R6.0, Supply(Att), Return(Att) | | | | (DLM of 0.263) | 10668 Btuh |
| **All Zones** | | | **Sensible Subtotal All Zones** | | | **51241 Btuh** |

## WHOLE HOUSE TOTALS

| | | |
|---|---|---|
| **Totals for Heating** | Subtotal Sensible Heat Loss | 51241 Btuh |
| | Ventilation Sensible Heat Loss | 0 Btuh |
| | Total Heat Loss | 51241 Btuh |

## EQUIPMENT

| | | |
|---|---|---|
| 1. Electric Heat Pump | # | 31044 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

# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Dale & Karla Nickelson

Lake City, FL 32024

Project Title:
Nickelson Res

2/9/2021

Reference City: Gainesville, FL  Temperature Difference: 19.0F(TMY3 99%)  Humidity difference: 51gr.

**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 | 0.25, 0.36 | No | No | S | 9.5ft. | 1.0ft. | 72.0 | 72.0 | 0.0 | 12 | 14 | 871 | Btuh |
| 2 | 2 NFRC | 0.25, 0.36 | No | No | S | 5.5ft. | 1.0ft. | 12.0 | 12.0 | 0.0 | 12 | 14 | 145 | Btuh |
| 3 | 2 NFRC | 0.25, 0.36 | No | No | E | 1.5ft. | 1.0ft. | 12.0 | 1.5 | 10.5 | 12 | 31 | 344 | Btuh |
| 4 | 2 NFRC | 0.25, 0.36 | No | No | E | 1.5ft. | 1.0ft. | 16.0 | 1.0 | 15.0 | 12 | 31 | 477 | Btuh |
| 5 | 2 NFRC | 0.25, 0.36 | No | No | N | 1.5ft. | 1.0ft. | 18.0 | 0.0 | 18.0 | 12 | 12 | 218 | Btuh |
| 6 | 2 NFRC | 0.25, 0.36 | No | No | W | 1.5ft. | 1.0ft. | 18.0 | 0.7 | 17.3 | 12 | 31 | 543 | Btuh |
| 7 | 2 NFRC | 0.25, 0.36 | No | No | W | 1.5ft. | 1.0ft. | 24.0 | 0.7 | 23.3 | 12 | 31 | 729 | Btuh |
| 8 | 2 NFRC | 0.25, 0.36 | No | No | N | 13.5f | 1.0ft. | 14.0 | 0.0 | 14.0 | 12 | 12 | 169 | Btuh |
| 9 | 2 NFRC | 0.25, 0.36 | No | No | N | 13.5f | 1.0ft. | 96.0 | 0.0 | 96.0 | 12 | 12 | 1161 | Btuh |
| 10 | 2 NFRC | 0.25, 0.36 | No | No | W | 1.5ft. | 1.0ft. | 18.0 | 0.7 | 17.3 | 12 | 31 | 543 | Btuh |
| 11 | 2 NFRC | 0.25, 0.36 | No | No | W | 1.5ft. | 1.0ft. | 4.0 | 1.0 | 3.0 | 12 | 31 | 105 | Btuh |
| 12 | 2 NFRC | 0.25, 0.36 | No | No | S | 1.0ft. | 1.0ft. | 15.0 | 14.0 | 1.0 | 12 | 14 | 183 | Btuh |
| 13 | 2 NFRC | 0.25, 0.36 | No | No | E | 1.5ft. | 1.0ft. | 30.0 | 1.5 | 28.5 | 12 | 31 | 901 | Btuh |
| | Excursion | | | | | | | | | | | | 357 | Btuh |
| | Window Total | | | | | | | 349 (sqft) | | | | | 6746 | Btuh |

| Walls | Type | U-Value | R-Value Cav/Sheath | Area(sqft) | HTM | Load |
|---|---|---|---|---|---|---|
| 1 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 376.7 | 1.7 | 623 Btuh |
| 2 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 40.0 | 1.7 | 66 Btuh |
| 3 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 118.0 | 1.7 | 195 Btuh |
| 4 | Frame - Wood - Adj | 0.08 | 19.0/0.0 | 219.3 | 1.5 | 322 Btuh |
| 5 | Frame - Wood - Adj | 0.08 | 19.0/0.0 | 145.0 | 1.5 | 213 Btuh |
| 6 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 203.7 | 1.7 | 337 Btuh |
| 7 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 268.7 | 1.7 | 444 Btuh |
| 8 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 168.0 | 1.7 | 278 Btuh |
| 9 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 230.0 | 1.7 | 380 Btuh |
| 10 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 60.0 | 1.7 | 99 Btuh |
| 11 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 150.0 | 1.7 | 248 Btuh |
| 12 | Frame - Wood - Ext | 0.08 | 19.0/0.0 | 321.3 | 1.7 | 531 Btuh |
| 13 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 117.0 | 2.3 | 265 Btuh |
| 14 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 248.7 | 2.3 | 563 Btuh |
| 15 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 167.3 | 2.3 | 379 Btuh |
| 16 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 52.7 | 2.3 | 119 Btuh |
| 17 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 109.3 | 2.3 | 247 Btuh |
| 18 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 160.0 | 2.3 | 362 Btuh |
| 19 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 112.0 | 2.3 | 253 Btuh |
| 20 | Frame - Wood - Ext | 0.09 | 13.0/0.0 | 48.0 | 2.3 | 109 Btuh |
| | Wall Total | | | 3316 (sqft) | | 6034 Btuh |

| Doors | Type | Area (sqft) | HTM | Load |
|---|---|---|---|---|
| 1 | Insulated - Garage | 24.0 | 13.8 | 331 Btuh |
| 2 | Insulated - Exterior | 48.0 | 13.8 | 662 Btuh |
| | Door Total | 72 (sqft) | | 994 Btuh |

| Ceilings | Type/Color/Surface | U-Value | R-Value | Area(sqft) | HTM | Load |
|---|---|---|---|---|---|---|
| 1 | Vented Attic/Light/Shingle/RB | 0.025 | 38.0/0.0 | 2756.0 | 0.86 | 2378 Btuh |
| 2 | Vented Attic/Light/Shingle/RB | 0.025 | 38.0/0.0 | 894.6 | 0.86 | 772 Btuh |
| | Ceiling Total | | | 3651 (sqft) | | 3150 Btuh |

| Floors | Type | R-Value | Size | HTM | Load |
|---|---|---|---|---|---|
| 1 | Slab On Grade | 0.0 | 2625 (ft-perimeter) | 0.0 | 0 Btuh |
| 2 | Raised Wood - Adj | 19.0 | 852 (sqft) | 0.7 | 598 Btuh |
| | Floor Total | | 3477.0 (sqft) | | 598 Btuh |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Dale & Karla Nickelson
Lake City, FL 32024

Project Title: Nickelson Res

Climate:FL_GAINESVILLE_REGIONAL_A

2/9/2021

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Envelope Subtotal: | | 17522 | Btuh |
| **Infiltration** | Type | Average ACH | Volume(cuft) | Wall Ratio | | CFM= | Load | |
| | Natural | 0.17 | 33066 | 1 | | 91.6 | 1906 | Btuh |
| **Internal gain** | | Occupants | Btuh/occupant | | | Appliance | Load | |
| | | 10 | X 230 | + | | 1500 | 3800 | Btuh |
| | | | | | Sensible Envelope Load: | | 23228 | Btuh |
| **Duct load** | Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic) | | | | (DGM of 0.388) | | 9007 | Btuh |
| | | | | | **Sensible Load All Zones** | | **32235** | **Btuh** |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Dale & Karla Nickelson
Lake City, FL 32024

Project Title: Nickelson Res

Climate:FL_GAINESVILLE_REGIONAL_A

2/9/2021

### WHOLE HOUSE TOTALS

| | | | |
|---|---|---|---|
| **Whole House Totals for Cooling** | **Sensible Envelope Load All Zones** | **23228** | **Btuh** |
| | Sensible Duct Load | 9007 | Btuh |
| | **Total Sensible Zone Loads** | **32235** | **Btuh** |
| | Sensible ventilation | 0 | Btuh |
| | Blower | 0 | Btuh |
| | **Total sensible gain** | **32235** | **Btuh** |
| | Latent infiltration gain (for 51 gr. humidity difference) | 3162 | Btuh |
| | Latent ventilation gain | 0 | Btuh |
| | Latent duct gain | 2590 | Btuh |
| | Latent occupant gain (10.0 people @ 200 Btuh per person) | 2000 | Btuh |
| | Latent other gain | 0 | Btuh |
| | **Latent total gain** | **7752** | **Btuh** |
| | **TOTAL GAIN** | **39987** | **Btuh** |

### EQUIPMENT

| | | |
|---|---|---|
| 1. Central Unit | # | 22286 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)

Version 8