

# Residential System Sizing Calculation

## Summary

Project Title:  
Wilkinson Residence

Lake City, FL

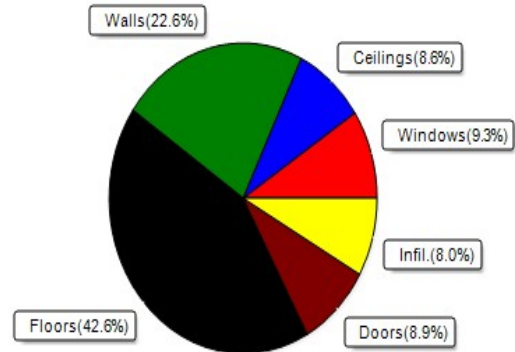
9/23/2020

|                                                                                                       |              |             |                                                  |
|-------------------------------------------------------------------------------------------------------|--------------|-------------|--------------------------------------------------|
| 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               |
| <b>Total heating load calculation</b>                                                                 | <b>31668</b> | <b>Btuh</b> | <b>Total cooling load calculation 22336 Btuh</b> |
| Submitted heating capacity                                                                            | % of calc    | Btuh        | Submitted cooling capacity % of calc Btuh        |
| Total (Electric Heat Pump)                                                                            | 113.7        | 36000       | Sensible (SHR = 0.85) 159.1 30600                |
| Heat Pump + Auxiliary(0.0kW)                                                                          | 113.7        | 36000       | Latent 174.2 5400                                |
|                                                                                                       |              |             | <b>Total (Electric Heat Pump) 161.2 36000</b>    |

## WINTER CALCULATIONS

Winter Heating Load (for 2140 sqft)

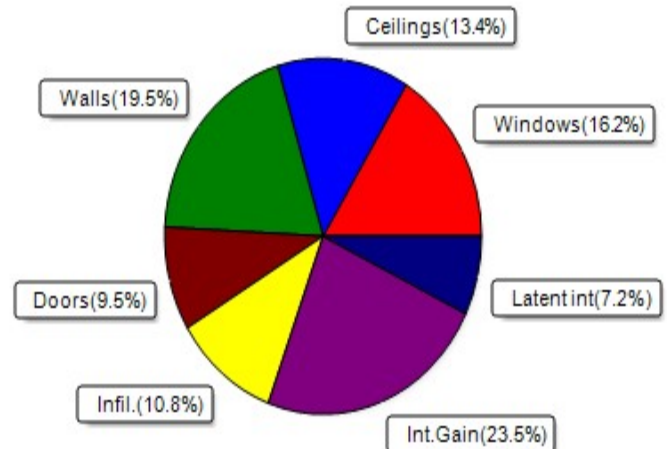
| Load component         |           | Load         |             |
|------------------------|-----------|--------------|-------------|
| Window total           | 223 sqft  | 2944         | Btuh        |
| Wall total             | 2013 sqft | 7147         | Btuh        |
| Door total             | 176 sqft  | 2816         | Btuh        |
| Ceiling total          | 2140 sqft | 2726         | Btuh        |
| Floor total            | 2140 sqft | 13499        | Btuh        |
| Infiltration           | 58 cfm    | 2536         | Btuh        |
| Duct loss              |           | 0            | Btuh        |
| <b>Subtotal</b>        |           | <b>31668</b> | <b>Btuh</b> |
| Ventilation            | 0 cfm     | 0            | Btuh        |
| <b>TOTAL HEAT LOSS</b> |           | <b>31668</b> | <b>Btuh</b> |



## SUMMER CALCULATIONS

Summer Cooling Load (for 2140 sqft)

| Load component                        |           | Load         |             |
|---------------------------------------|-----------|--------------|-------------|
| Window total                          | 223 sqft  | 3623         | Btuh        |
| Wall total                            | 2013 sqft | 4360         | Btuh        |
| Door total                            | 176 sqft  | 2112         | Btuh        |
| Ceiling total                         | 2140 sqft | 2999         | Btuh        |
| Floor total                           |           | 0            | Btuh        |
| Infiltration                          | 43 cfm    | 904          | Btuh        |
| Internal gain                         |           | 5240         | Btuh        |
| Duct gain                             |           | 0            | Btuh        |
| Sens. Ventilation                     | 0 cfm     | 0            | Btuh        |
| Blower Load                           |           | 0            | Btuh        |
| <b>Total sensible gain</b>            |           | <b>19237</b> | <b>Btuh</b> |
| Latent gain(ducts)                    |           | 0            | Btuh        |
| Latent gain(infiltration)             |           | 1499         | Btuh        |
| Latent gain(ventilation)              |           | 0            | Btuh        |
| Latent gain(internal/occupants/other) |           | 1600         | Btuh        |
| <b>Total latent gain</b>              |           | <b>3099</b>  | <b>Btuh</b> |
| <b>TOTAL HEAT GAIN</b>                |           | <b>22336</b> | <b>Btuh</b> |



8th Edition

EnergyGauge® System Sizing

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

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

9-21-20

# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Project Title:  
Wilkinson Residence

Lake City, FL

9/23/2020

Reference City: Gainesville, FL

Temperature Difference: 19.0F(TMY3 99%)

Humidity difference: 51gr.

### 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                     | 0.22, 0.33 | No | No   | N  |         | 1.5ft      | 1.3ft | 30.0                | 0.0    | 30.0     | 11     | 11       | 327        | Btuh |
| 2        | 2 NFRC                     | 0.22, 0.33 | No | No   | N  |         | 10.5f      | 1.3ft | 16.0                | 0.0    | 16.0     | 11     | 11       | 174        | Btuh |
| 3        | 2 NFRC                     | 0.22, 0.33 | No | No   | W  |         | 1.5ft      | 1.3ft | 15.0                | 0.0    | 15.0     | 11     | 27       | 412        | Btuh |
| 4        | 2 NFRC                     | 0.22, 0.33 | No | No   | N  |         | 1.5ft      | 1.3ft | 30.0                | 0.0    | 30.0     | 11     | 11       | 327        | Btuh |
| 5        | 2 NFRC                     | 0.22, 0.33 | No | No   | E  |         | 1.5ft      | 1.3ft | 20.0                | 0.0    | 20.0     | 11     | 27       | 550        | Btuh |
| 6        | 2 NFRC                     | 0.22, 0.33 | No | No   | E  |         | 1.5ft      | 1.3ft | 8.0                 | 0.0    | 8.0      | 11     | 27       | 220        | Btuh |
| 7        | 2 NFRC                     | 0.22, 0.33 | No | No   | E  |         | 1.5ft      | 1.3ft | 6.0                 | 0.0    | 6.0      | 11     | 27       | 165        | Btuh |
| 8        | 2 NFRC                     | 0.22, 0.33 | No | No   | S  |         | 1.5ft      | 1.3ft | 8.0                 | 8.0    | 0.0      | 11     | 13       | 87         | Btuh |
| 9        | 2 NFRC                     | 0.22, 0.33 | No | No   | S  |         | 9.5ft      | 1.3ft | 72.0                | 72.0   | 0.0      | 11     | 13       | 785        | Btuh |
| 10       | 2 NFRC                     | 0.22, 0.33 | No | No   | W  |         | 1.5ft      | 1.3ft | 15.0                | 0.0    | 15.0     | 11     | 27       | 412        | Btuh |
| 11       | 2 NFRC                     | 0.22, 0.33 | No | No   | W  |         | 1.5ft      | 1.3ft | 3.0                 | 0.0    | 3.0      | 11     | 27       | 82         | Btuh |
|          | Excursion                  |            |    |      |    |         |            |       |                     |        |          |        |          | 81         | Btuh |
|          | Window Total               |            |    |      |    |         |            |       | 223 (sqft)          |        |          |        |          | 3623 Btuh  |      |
| Walls    | Type                       |            |    |      |    | U-Value | R-Value    |       | Area(sqft)          |        |          | HTM    |          | Load       |      |
|          |                            |            |    |      |    |         | Cav/Sheath |       |                     |        |          |        |          |            |      |
| 1        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 58.5                |        |          | 2.3    |          | 132 Btuh   |      |
| 2        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 54.0                |        |          | 2.3    |          | 122 Btuh   |      |
| 3        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 91.5                |        |          | 2.3    |          | 207 Btuh   |      |
| 4        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 100.5               |        |          | 2.3    |          | 227 Btuh   |      |
| 5        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 177.3               |        |          | 2.3    |          | 401 Btuh   |      |
| 6        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 138.0               |        |          | 2.3    |          | 312 Btuh   |      |
| 7        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 165.0               |        |          | 2.3    |          | 373 Btuh   |      |
| 8        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 201.5               |        |          | 2.3    |          | 456 Btuh   |      |
| 9        | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 65.5                |        |          | 2.3    |          | 148 Btuh   |      |
| 10       | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 48.0                |        |          | 2.3    |          | 109 Btuh   |      |
| 11       | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 206.7               |        |          | 2.3    |          | 468 Btuh   |      |
| 12       | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 73.5                |        |          | 2.3    |          | 166 Btuh   |      |
| 13       | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 58.5                |        |          | 2.3    |          | 132 Btuh   |      |
| 14       | Frame - Wood - Ext         |            |    |      |    | 0.09    | 13.0/0.0   |       | 234.0               |        |          | 2.3    |          | 530 Btuh   |      |
| 15       | Frame - Wood - Adj         |            |    |      |    | 0.09    | 13.0/0.0   |       | 340.5               |        |          | 1.7    |          | 574 Btuh   |      |
|          | Wall Total                 |            |    |      |    |         |            |       | 2013 (sqft)         |        |          |        |          | 4360 Btuh  |      |
| Doors    | Type                       |            |    |      |    |         |            |       | Area (sqft)         |        |          | HTM    |          | Load       |      |
|          |                            |            |    |      |    |         |            |       |                     |        |          |        |          |            |      |
| 1        | Insulated - Exterior       |            |    |      |    |         |            |       | 40.0                |        |          | 12.0   |          | 480 Btuh   |      |
| 2        | Insulated - Exterior       |            |    |      |    |         |            |       | 40.0                |        |          | 12.0   |          | 480 Btuh   |      |
| 3        | Insulated - Exterior       |            |    |      |    |         |            |       | 24.0                |        |          | 12.0   |          | 288 Btuh   |      |
| 4        | Insulated - Exterior       |            |    |      |    |         |            |       | 48.0                |        |          | 12.0   |          | 576 Btuh   |      |
| 5        | Insulated - Garage         |            |    |      |    |         |            |       | 24.0                |        |          | 12.0   |          | 288 Btuh   |      |
|          | Door Total                 |            |    |      |    |         |            |       | 176 (sqft)          |        |          |        |          | 2112 Btuh  |      |
| Ceilings | Type/Color/Surface         |            |    |      |    | U-Value | R-Value    |       | Area(sqft)          |        |          | HTM    |          | Load       |      |
|          |                            |            |    |      |    |         |            |       |                     |        |          |        |          |            |      |
| 1        | Vented Attic/Light/Shingle |            |    |      |    | 0.032   | 30.0/0.0   |       | 2140.0              |        |          | 1.40   |          | 2999 Btuh  |      |
|          | Ceiling Total              |            |    |      |    |         |            |       | 2140 (sqft)         |        |          |        |          | 2999 Btuh  |      |
| Floors   | Type                       |            |    |      |    |         | R-Value    |       | Size                |        |          | HTM    |          | Load       |      |
|          |                            |            |    |      |    |         |            |       |                     |        |          |        |          |            |      |
| 1        | Slab On Grade              |            |    |      |    |         | 0.0        |       | 2140 (ft-perimeter) |        |          | 0.0    |          | 0 Btuh     |      |
|          | Floor Total                |            |    |      |    |         |            |       | 2140.0 (sqft)       |        |          |        |          | 0 Btuh     |      |
|          | Envelope Subtotal:         |            |    |      |    |         |            |       |                     |        |          |        |          | 13093 Btuh |      |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

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

Lake City, FL

9/23/2020

|                      |                                                                         |                     |                        |                 |              |                   |
|----------------------|-------------------------------------------------------------------------|---------------------|------------------------|-----------------|--------------|-------------------|
| <b>Infiltration</b>  | Type<br>Natural                                                         | Average ACH<br>0.14 | Volume(cuft)<br>19260  | Wall Ratio<br>1 | CFM=<br>43.4 | Load<br>904 Btuh  |
| <b>Internal gain</b> |                                                                         | Occupants<br>8      | Btuh/occupant<br>X 230 | Appliance<br>+  | 3400         | Load<br>5240 Btuh |
|                      | Sensible Envelope Load:                                                 |                     |                        |                 |              | 19237 Btuh        |
| <b>Duct load</b>     | Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Condi) (DGM of 0.000) |                     |                        |                 |              | 0 Btuh            |
|                      | <b>Sensible Load All Zones</b>                                          |                     |                        |                 |              | <b>19237 Btuh</b> |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

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

Lake City, FL

9/23/2020

### WHOLE HOUSE TOTALS

|                                           |                                                           |                   |
|-------------------------------------------|-----------------------------------------------------------|-------------------|
| <b>Whole House<br/>Totals for Cooling</b> | <b>Sensible Envelope Load All Zones</b>                   | <b>19237 Btuh</b> |
|                                           | Sensible Duct Load                                        | 0 Btuh            |
|                                           | <b>Total Sensible Zone Loads</b>                          | <b>19237 Btuh</b> |
|                                           | Sensible ventilation                                      | 0 Btuh            |
|                                           | Blower                                                    | 0 Btuh            |
|                                           | <b>Total sensible gain</b>                                | <b>19237 Btuh</b> |
|                                           | Latent infiltration gain (for 51 gr. humidity difference) | 1499 Btuh         |
|                                           | Latent ventilation gain                                   | 0 Btuh            |
|                                           | Latent duct gain                                          | 0 Btuh            |
|                                           | Latent occupant gain (8.0 people @ 200 Btuh per person)   | 1600 Btuh         |
|                                           | Latent other gain                                         | 0 Btuh            |
|                                           | <b>Latent total gain</b>                                  | <b>3099 Btuh</b>  |
|                                           | <b>TOTAL GAIN</b>                                         | <b>22336 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

Lake City, FL

Project Title:  
Wilkinson Residence  
Building Type: User

9/23/2020

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 0.22          | Vinyl | 0.33    | N                   | 30.0             |             | 13.2 | 396 Btuh   |            |
| 2                               | 2, NFRC 0.22          | Vinyl | 0.33    | N                   | 16.0             |             | 13.2 | 211 Btuh   |            |
| 3                               | 2, NFRC 0.22          | Vinyl | 0.33    | W                   | 15.0             |             | 13.2 | 198 Btuh   |            |
| 4                               | 2, NFRC 0.22          | Vinyl | 0.33    | N                   | 30.0             |             | 13.2 | 396 Btuh   |            |
| 5                               | 2, NFRC 0.22          | Vinyl | 0.33    | E                   | 20.0             |             | 13.2 | 264 Btuh   |            |
| 6                               | 2, NFRC 0.22          | Vinyl | 0.33    | E                   | 8.0              |             | 13.2 | 106 Btuh   |            |
| 7                               | 2, NFRC 0.22          | Vinyl | 0.33    | E                   | 6.0              |             | 13.2 | 79 Btuh    |            |
| 8                               | 2, NFRC 0.22          | Vinyl | 0.33    | S                   | 8.0              |             | 13.2 | 106 Btuh   |            |
| 9                               | 2, NFRC 0.22          | Vinyl | 0.33    | S                   | 72.0             |             | 13.2 | 950 Btuh   |            |
| 10                              | 2, NFRC 0.22          | Vinyl | 0.33    | W                   | 15.0             |             | 13.2 | 198 Btuh   |            |
| 11                              | 2, NFRC 0.22          | Vinyl | 0.33    | W                   | 3.0              |             | 13.2 | 40 Btuh    |            |
|                                 | Window Total          |       |         |                     |                  | 223.0(sqft) |      |            | 2944 Btuh  |
| Walls                           | Type                  | Ornt. | Ueff.   | R-Value<br>(Cav/Sh) | Area             | X           | HTM= | Load       |            |
| 1                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 59               |             | 3.55 | 208 Btuh   |            |
| 2                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 54               |             | 3.55 | 192 Btuh   |            |
| 3                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 92               |             | 3.55 | 325 Btuh   |            |
| 4                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 101              |             | 3.55 | 357 Btuh   |            |
| 5                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 177              |             | 3.55 | 630 Btuh   |            |
| 6                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 138              |             | 3.55 | 490 Btuh   |            |
| 7                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 165              |             | 3.55 | 586 Btuh   |            |
| 8                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 202              |             | 3.55 | 715 Btuh   |            |
| 9                               | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 66               |             | 3.55 | 233 Btuh   |            |
| 10                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 48               |             | 3.55 | 170 Btuh   |            |
| 11                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 207              |             | 3.55 | 734 Btuh   |            |
| 12                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 74               |             | 3.55 | 261 Btuh   |            |
| 13                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 59               |             | 3.55 | 208 Btuh   |            |
| 14                              | Frame - Wood          | - Ext | (0.089) | 13.0/0.0            | 234              |             | 3.55 | 831 Btuh   |            |
| 15                              | Frame - Wood          | - Adj | (0.089) | 13.0/0.0            | 341              |             | 3.55 | 1209 Btuh  |            |
|                                 | Wall Total            |       |         |                     |                  | 2013(sqft)  |      |            | 7147 Btuh  |
| Doors                           | Type                  | Storm | Ueff.   |                     | Area             | X           | HTM= | Load       |            |
| 1                               | Insulated - Exterior, | n     | (0.400) |                     | 40               |             | 16.0 | 640 Btuh   |            |
| 2                               | Insulated - Exterior, | n     | (0.400) |                     | 40               |             | 16.0 | 640 Btuh   |            |
| 3                               | Insulated - Exterior, | n     | (0.400) |                     | 24               |             | 16.0 | 384 Btuh   |            |
| 4                               | Insulated - Exterior, | n     | (0.400) |                     | 48               |             | 16.0 | 768 Btuh   |            |
| 5                               | Insulated - Garage,   | n     | (0.400) |                     | 24               |             | 16.0 | 384 Btuh   |            |
|                                 | Door Total            |       |         |                     |                  | 176(sqft)   |      |            | 2816Btuh   |
| Ceilings                        | Type/Color/Surface    |       | Ueff.   | R-Value             | Area             | X           | HTM= | Load       |            |
| 1                               | Vented Attic/L/Shing  |       | (0.032) | 30.0/0.0            | 2140             |             | 1.3  | 2726 Btuh  |            |
|                                 | Ceiling Total         |       |         |                     |                  | 2140(sqft)  |      |            | 2726Btuh   |
| Floors                          | Type                  |       | Ueff.   | R-Value             | Size             | X           | HTM= | Load       |            |
| 1                               | Slab On Grade         |       | (1.180) | 0.0                 | 286.0 ft(perim.) |             | 47.2 | 13499 Btuh |            |
|                                 | Floor Total           |       |         |                     |                  | 2140 sqft   |      |            | 13499 Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

Lake City, FL

Project Title:  
Wilkinson Residence  
Building Type: User

9/23/2020

|                     |                                                                 |            |      |              |            |      |                   |
|---------------------|-----------------------------------------------------------------|------------|------|--------------|------------|------|-------------------|
|                     | Envelope Subtotal:                                              |            |      |              |            |      | 29132 Btuh        |
| <b>Infiltration</b> | Type                                                            | Wholehouse | ACH  | Volume(cuft) | Wall Ratio | CFM= |                   |
|                     | Natural                                                         |            | 0.18 | 19260        | 1.00       | 57.9 | 2536 Btuh         |
| <b>Duct load</b>    | Extremely sealed, R6.0, Supply(Con), Return(Con) (DLM of 0.000) |            |      |              |            |      | 0 Btuh            |
| <b>All Zones</b>    | <b>Sensible Subtotal All Zones</b>                              |            |      |              |            |      | <b>31668 Btuh</b> |

### WHOLE HOUSE TOTALS

|                           |                                |            |
|---------------------------|--------------------------------|------------|
| <b>Totals for Heating</b> | Subtotal Sensible Heat Loss    | 31668 Btuh |
|                           | Ventilation Sensible Heat Loss | 0 Btuh     |
|                           | Total Heat Loss                | 31668 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