

# Residential System Sizing Calculation

## Summary

Mr & Mrs Smith

Project Title  
Smith Residence

LC, FL 32055-

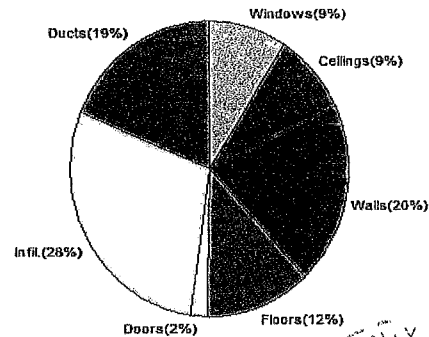
8/26/2013

|                                                                                                      |                   |                                       |                   |
|------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------|-------------------|
| 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(54gr.)                    |                   |                                       |                   |
| 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              |
| <b>Total heating load calculation</b>                                                                | <b>36132 Btuh</b> | <b>Total cooling load calculation</b> | <b>42296 Btuh</b> |
| Submitted heating capacity                                                                           | % of calc Btuh    | Submitted cooling capacity            | % of calc Btuh    |
| Total (Electric Heat Pump)                                                                           | 128.7 46500       | Sensible (SHR = 0.75)                 | 107.8 34875       |
| Heat Pump + Auxiliary(0.0kW)                                                                         | 128.7 46500       | Latent                                | 117.0 11625       |
|                                                                                                      |                   | Total (Electric Heat Pump)            | 109.9 46500       |

## WINTER CALCULATIONS

Winter Heating Load (for 2470 sqft)

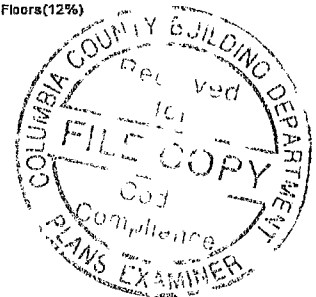
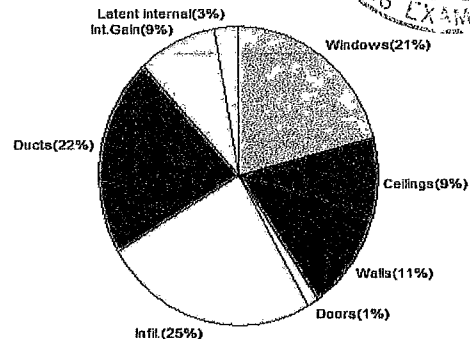
| Load component         |           | Load         |             |
|------------------------|-----------|--------------|-------------|
| Window total           | 305 sqft  | 3384         | Btuh        |
| Wall total             | 2218 sqft | 7286         | Btuh        |
| Door total             | 40 sqft   | 681          | Btuh        |
| Ceiling total          | 2717 sqft | 3202         | Btuh        |
| Floor total            | 2470 sqft | 4481         | Btuh        |
| Infiltration           | 254 cfm   | 10272        | Btuh        |
| Duct loss              |           | 6828         | Btuh        |
| <b>Subtotal</b>        |           | <b>36132</b> | <b>Btuh</b> |
| Ventilation            | 0 cfm     | 0            | Btuh        |
| <b>TOTAL HEAT LOSS</b> |           | <b>36132</b> | <b>Btuh</b> |



## SUMMER CALCULATIONS

Summer Cooling Load (for 2470 sqft)

| Load component                        |           | Load         |             |
|---------------------------------------|-----------|--------------|-------------|
| Window total                          | 305 sqft  | 8835         | Btuh        |
| Wall total                            | 2218 sqft | 4627         | Btuh        |
| Door total                            | 40 sqft   | 515          | Btuh        |
| Ceiling total                         | 2717 sqft | 3634         | Btuh        |
| Floor total                           |           | 0            | Btuh        |
| Infiltration                          | 190 cfm   | 3540         | Btuh        |
| Internal gain                         |           | 3780         | Btuh        |
| Duct gain                             |           | 7427         | Btuh        |
| Sens. Ventilation                     | 0 cfm     | 0            | Btuh        |
| Blower Load                           |           | 0            | Btuh        |
| <b>Total sensible gain</b>            |           | <b>32358</b> | <b>Btuh</b> |
| Latent gain(ducts)                    |           | 1788         | Btuh        |
| Latent gain(infiltration)             |           | 6951         | Btuh        |
| Latent gain(ventilation)              |           | 0            | Btuh        |
| Latent gain(internal/occupants/other) |           | 1200         | Btuh        |
| <b>Total latent gain</b>              |           | <b>9938</b>  | <b>Btuh</b> |
| <b>TOTAL HEAT GAIN</b>                |           | <b>42296</b> | <b>Btuh</b> |



8th Edition

EnergyGauge® System Sizing

PREPARED BY

DATE

8/26/13

# System Sizing Calculations - Winter

## Residential Load - Whole House Component Details

Mr & Mrs Smith

LC, FL 32055-

Project Title:  
Smith Residence  
Building Type: User

8/26/2013

Reference City Gainesville, FL (Defaults) Winter Temperature Difference: 37.0 F (MJ8 99%)

### Component Loads for Whole House

| Window             | Panes/Type                                                    | Frame      | U       | Orientation         | Area(sqft)  | X          | HTM=  | Load       |
|--------------------|---------------------------------------------------------------|------------|---------|---------------------|-------------|------------|-------|------------|
| 1                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | E                   | 30.0        |            | 11.1  | 333 Btuh   |
| 2                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | E                   | 60.0        |            | 11.1  | 666 Btuh   |
| 3                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | E                   | 13.3        |            | 11.1  | 148 Btuh   |
| 4                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | E                   | 6.0         |            | 11.1  | 67 Btuh    |
| 5                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | N                   | 30.0        |            | 11.1  | 333 Btuh   |
| 6                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | W                   | 30.0        |            | 11.1  | 333 Btuh   |
| 7                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | W                   | 45.0        |            | 11.1  | 500 Btuh   |
| 8                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | W                   | 80.0        |            | 11.1  | 888 Btuh   |
| 9                  | 2, NFRC 0.50                                                  | Metal      | 0.30    | S                   | 4.5         |            | 11.1  | 50 Btuh    |
| 10                 | 2, NFRC 0.50                                                  | Metal      | 0.30    | S                   | 6.0         |            | 11.1  | 67 Btuh    |
| Window Total       |                                                               |            |         |                     | 304.8(sqft) |            |       | 3384 Btuh  |
| Walls              | Type                                                          | Ornt       | Ueff.   | R-Value<br>(Cav/Sh) | Area        | X          | HTM=  | Load       |
| 1                  | Frame - Wood                                                  | - Ext      | (0.089) | 13.0/0.0            | 674         |            | 3.28  | 2213 Btuh  |
| 2                  | Frame - Wood                                                  | - Ext      | (0.089) | 13.0/0.0            | 447         |            | 3.28  | 1467 Btuh  |
| 3                  | Frame - Wood                                                  | - Ext      | (0.089) | 13.0/0.0            | 648         |            | 3.28  | 2129 Btuh  |
| 4                  | Frame - Wood                                                  | - Ext      | (0.089) | 13.0/0.0            | 450         |            | 3.28  | 1476 Btuh  |
| Wall Total         |                                                               |            |         |                     | 2219(sqft)  |            |       | 7286 Btuh  |
| Doors              | Type                                                          | Storm      | Ueff    |                     | Area        | X          | HTM=  | Load       |
| 1                  | Insulated - Exterior, n                                       |            | (0.460) |                     | 20          |            | 17.0  | 340 Btuh   |
| 2                  | Insulated - Exterior, n                                       |            | (0.460) |                     | 20          |            | 17.0  | 340 Btuh   |
| Door Total         |                                                               |            |         |                     | 40(sqft)    |            |       | 681Btuh    |
| Ceilings           | Type/Color/Surface                                            |            | Ueff    | R-Value             | Area        | X          | HTM=  | Load       |
| 1                  | Vented Attic/L/Shing                                          |            | (0.032) | 30.0/0.0            | 2717        |            | 1.2   | 3202 Btuh  |
| Ceiling Total      |                                                               |            |         |                     | 2717(sqft)  |            |       | 3202Btuh   |
| Floors             | Type                                                          |            | Ueff.   | R-Value             | Size        | X          | HTM=  | Load       |
| 1                  | Slab On Grade                                                 |            | (0.442) | 5.0                 | 274.0       | ft(perim ) | 16.4  | 4481 Btuh  |
| Floor Total        |                                                               |            |         |                     | 2470        | sqft       |       | 4481 Btuh  |
| Envelope Subtotal: |                                                               |            |         |                     |             |            |       | 19033 Btuh |
| Infiltration       | Type                                                          | Wholehouse | ACH     | Volume(cuft)        | Wall Ratio  |            | CFM=  | Load       |
|                    | Natural                                                       |            | 0.62    | 24700               | 1.00        |            | 253.6 | 10272 Btuh |
| Duct load          | Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.233) |            |         |                     |             |            |       | 6828 Btuh  |
| All Zones          | Sensible Subtotal All Zones                                   |            |         |                     |             |            |       | 36132 Btuh |

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

Mr & Mrs Smith

LC, FL 32055-

Project Title:  
Smith Residence  
Building Type. User

8/26/2013

### WHOLE HOUSE TOTALS

|                           |                                |                   |
|---------------------------|--------------------------------|-------------------|
| <b>Totals for Heating</b> | Subtotal Sensible Heat Loss    | 36132 Btuh        |
|                           | Ventilation Sensible Heat Loss | 0 Btuh            |
|                           | <b>Total Heat Loss</b>         | <b>36132 Btuh</b> |

### EQUIPMENT

|                      |   |            |
|----------------------|---|------------|
| 1 Electric Heat Pump | # | 46500 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

Mr & Mrs Smith

Project Title:  
Smith Residence

LC, FL 32055-

8/26/2013

Reference City: Gainesville, FL

Temperature Difference: 17.0F(MJ8 99%)

Humidity difference: 54gr.

### 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                                                               | 0.50 | 0.30 | No   | No        | E           | 1.5ft                                                                            | 1.5ft.              | 30.0              | 0.0        | 30.0     | 16     | 53        | 1599 Btuh  |
| 2             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | E           | 10.0ft                                                                           | 1.5ft.              | 60.0              | 60.0       | 0.0      | 16     | 53        | 937 Btuh   |
| 3             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | E           | 10.0ft                                                                           | 3.0ft.              | 13.3              | 10.6       | 2.7      | 16     | 53        | 311 Btuh   |
| 4             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | E           | 1.5ft.                                                                           | 1.5ft               | 6.0               | 0.0        | 6.0      | 16     | 53        | 320 Btuh   |
| 5             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | N           | 1.0ft.                                                                           | 8.0ft               | 30.0              | 0.0        | 30.0     | 16     | 16        | 469 Btuh   |
| 6             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | W           | 1.5ft.                                                                           | 1.5ft               | 30.0              | 0.0        | 30.0     | 16     | 53        | 1599 Btuh  |
| 7             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | W           | 9.0ft                                                                            | 1.5ft               | 45.0              | 45.0       | 0.0      | 16     | 53        | 703 Btuh   |
| 8             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | W           | 9.0ft.                                                                           | 1.5ft.              | 80.0              | 71.6       | 8.4      | 16     | 53        | 1564 Btuh  |
| 9             | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | S           | 1.0ft.                                                                           | 8.0ft.              | 4.5               | 0.0        | 4.5      | 16     | 20        | 88 Btuh    |
| 10            | 2 NFRC                                                               | 0.50 | 0.30 | No   | No        | S           | 1.0ft                                                                            | 8.0ft.              | 6.0               | 0.0        | 6.0      | 16     | 20        | 117 Btuh   |
|               | Excursion                                                            |      |      |      |           |             |                                                                                  |                     |                   |            |          |        |           | 1127 Btuh  |
|               | Window Total                                                         |      |      |      |           |             |                                                                                  |                     | 305 (sqft)        |            |          |        |           | 8835 Btuh  |
| Walls         | Type                                                                 |      |      |      |           | U-Value     | R-Value                                                                          | Area(sqft)          |                   |            | HTM      |        | Load      |            |
|               |                                                                      |      |      |      |           |             | Cav/Sheath                                                                       |                     |                   |            |          |        |           |            |
| 1             | Frame - Wood - Ext                                                   |      |      |      |           | 0.09        | 13.0/0.0                                                                         | 674.0               |                   |            | 2.1      |        | 1406 Btuh |            |
| 2             | Frame - Wood - Ext                                                   |      |      |      |           | 0.09        | 13.0/0.0                                                                         | 446.7               |                   |            | 2.1      |        | 932 Btuh  |            |
| 3             | Frame - Wood - Ext                                                   |      |      |      |           | 0.09        | 13.0/0.0                                                                         | 648.3               |                   |            | 2.1      |        | 1352 Btuh |            |
| 4             | Frame - Wood - Ext                                                   |      |      |      |           | 0.09        | 13.0/0.0                                                                         | 449.5               |                   |            | 2.1      |        | 938 Btuh  |            |
|               | Wall Total                                                           |      |      |      |           |             |                                                                                  |                     | 2218 (sqft)       |            |          |        |           | 4627 Btuh  |
| Doors         | Type                                                                 |      |      |      |           |             |                                                                                  | Area (sqft)         |                   |            | HTM      |        | Load      |            |
| 1             | Insulated - Exterior                                                 |      |      |      |           |             |                                                                                  | 20.0                |                   |            | 12.9     |        | 258 Btuh  |            |
| 2             | Insulated - Exterior                                                 |      |      |      |           |             |                                                                                  | 20.0                |                   |            | 12.9     |        | 258 Btuh  |            |
|               | Door Total                                                           |      |      |      |           |             |                                                                                  |                     | 40 (sqft)         |            |          |        |           | 515 Btuh   |
| Ceilings      | Type/Color/Surface                                                   |      |      |      |           | U-Value     | R-Value                                                                          | Area(sqft)          |                   |            | HTM      |        | Load      |            |
| 1             | Vented AtticLight/Shingle                                            |      |      |      |           | 0.032       | 30.0/0.0                                                                         | 2717.0              |                   |            | 1.34     |        | 3634 Btuh |            |
|               | Ceiling Total                                                        |      |      |      |           |             |                                                                                  |                     | 2717 (sqft)       |            |          |        |           | 3634 Btuh  |
| Floors        | Type                                                                 |      |      |      |           |             | R-Value                                                                          | Size                |                   |            | HTM      |        | Load      |            |
| 1             | Slab On Grade                                                        |      |      |      |           |             | 5.0                                                                              | 2470 (ft-perimeter) |                   |            | 0.0      |        | 0 Btuh    |            |
|               | Floor Total                                                          |      |      |      |           |             |                                                                                  |                     | 2470.0 (sqft)     |            |          |        |           | 0 Btuh     |
|               | Envelope Subtotal:                                                   |      |      |      |           |             |                                                                                  |                     |                   |            |          |        |           | 17611 Btuh |
| Infiltration  | Type                                                                 |      |      |      |           | Average ACH |                                                                                  | Volume(cuft)        |                   | Wall Ratio |          | CFM=   |           | Load       |
|               | Natural                                                              |      |      |      |           | 0.46        |                                                                                  | 24700               |                   | 1          |          | 190.2  |           | 3540 Btuh  |
| Internal gain |                                                                      |      |      |      | Occupants |             | Btuh/occupant <td colspan="2">Appliance</td> <td colspan="2"></td> <td>Load</td> |                     | Appliance         |            |          |        | Load      |            |
|               |                                                                      |      |      |      | 6         |             | X 230                                                                            |                     | +                 |            | 2400     |        | 3780 Btuh |            |
|               | Sensible Envelope Load:                                              |      |      |      |           |             |                                                                                  |                     |                   |            |          |        |           | 24931 Btuh |
| Duct load     | Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.298) |      |      |      |           |             |                                                                                  |                     |                   |            |          |        |           | 7427 Btuh  |
|               | Sensible Load All Zones                                              |      |      |      |           |             |                                                                                  |                     |                   |            |          |        |           | 32358 Btuh |

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Mr & Mrs Smith

Project Title:  
Smith Residence

Climate: FL\_GAINESVILLE\_REGIONAL\_A

LC, FL 32055-

8/26/2013

### WHOLE HOUSE TOTALS

|                                           |                                                           |                   |
|-------------------------------------------|-----------------------------------------------------------|-------------------|
| <b>Whole House<br/>Totals for Cooling</b> | <b>Sensible Envelope Load All Zones</b>                   | <b>24931 Btuh</b> |
|                                           | Sensible Duct Load                                        | 7427 Btuh         |
|                                           | <b>Total Sensible Zone Loads</b>                          | <b>32358 Btuh</b> |
|                                           | Sensible ventilation                                      | 0 Btuh            |
|                                           | Blower                                                    | 0 Btuh            |
|                                           | <b>Total sensible gain</b>                                | <b>32358 Btuh</b> |
|                                           | Latent infiltration gain (for 54 gr. humidity difference) | 6951 Btuh         |
|                                           | Latent ventilation gain                                   | 0 Btuh            |
|                                           | Latent duct gain                                          | 1788 Btuh         |
|                                           | Latent occupant gain (6.0 people @ 200 Btuh per person)   | 1200 Btuh         |
|                                           | Latent other gain                                         | 0 Btuh            |
|                                           | <b>Latent total gain</b>                                  | <b>9938 Btuh</b>  |
|                                           | <b>TOTAL GAIN</b>                                         | <b>42296 Btuh</b> |

### EQUIPMENT

|                 |   |            |
|-----------------|---|------------|
| 1. Central Unit | # | 46500 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