### 3835 Roland Ave., Baltimore, MD 21211 HVAC Load Calculations

for

Josh Hartl 3835 Roland Ave Baltimore, MD 21211



Manual J, N, D, & S Report Services!

Licensed & Certified 3rd Party



"PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed HVAC Master under the laws of the State of Maryland & Delaware."

Glan In Goethinger







Prepared By:

GMG Correct Air Engineering 100 Waibel Road Port Deposit, MD 21904 443-465-9218 Sunday, October 15, 2023

Rhvac is an ACCA approved Manual J, D and S computer program.

Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.

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Project Report

**General Project Information** 

Project Title: 3835 Roland Ave., Baltimore, MD 21211

Project Date: Saturday, October 14, 2023

**Project Comment:** All data to perform load calculations provided by drawings and data provided. Note:

> block loads provide overall building required btu's for heating and cooling only and do not provide actual cfm and btu's required for each room. Btu's and cfm's for each room can vary due to exterior exposures of N, S, E, and W, by as much as 2.83 tons in

some residential cases.

Client Name: Josh Hartl

Client Address: 3835 Roland Ave Client City: Baltimore, MD 21211 Client Phone: 212-767-9553 Client E-Mail Address: mr\_hartl@yahoo.com

Client Comment: All data to perform load calculations provided by drawings and data provided.

Company Name: Correct Air Engineering

Company Representative: GMG

Company Address: 100 Waibel Road Company City: Port Deposit, MD 21904

Company Phone: 443-465-9218

Company E-Mail Address: correctairmd@gmail.com Company Website: www.CorrectAirMd.com

Company Comment: This report and calculations are intended only for the project specified on this report,

address changes will alter load calculations. This report is not to be reproduced or used by others without written permission by Correct Air Engineering. Unauthorized

use or copying of this report is prohibited.

Design Data

Reference City: Balitimore CO, Maryland **Building Orientation:** Front door faces West

Daily Temperature Range: Medium Latitude: 39 Degrees Elevation: 24 ft. Altitude Factor: 0.999

|         | Outdoor         | Outdoor  | Outdoor | Indoor  | Indoor   | Grains            |
|---------|-----------------|----------|---------|---------|----------|-------------------|
|         | <u>Dry Bulb</u> | Wet Bulb | Rel.Hum | Rel.Hum | Dry Bulb | <b>Difference</b> |
| Winter: | 17              | 15.7     | 80%     | 30%     | 70       | 22.17             |
| Summer: | 89              | 76       | 56%     | 50%     | 75       | 50                |

| Check Figures               |        |                               |       |
|-----------------------------|--------|-------------------------------|-------|
| Total Building Supply CFM:  | 1,229  | CFM Per Square ft.:           | 0.800 |
| Square ft. of Room Area:    | 1,537  | Square ft. Per Ton:           | 503   |
| Volume (ft3) (Above Grade): | 10,980 | Air Turnover Rate (per hour): | 5.9   |

Volume (ft<sup>3</sup>) (Total): 12.521

**Building Loads** 

Total Heating Required Including Ventilation Air: 30,006 Btuh 30.006 MBH Total Sensible Gain: 27.491 Btuh 82 % 18 % Total Latent Gain: 5,853 Btuh

Total Cooling Required Including Ventilation Air: 33,344 Btuh 2.78 Tons (Based On Sensible +

Latent)

3.05 Tons (Based On 75% Sensible Capacity)

Notes

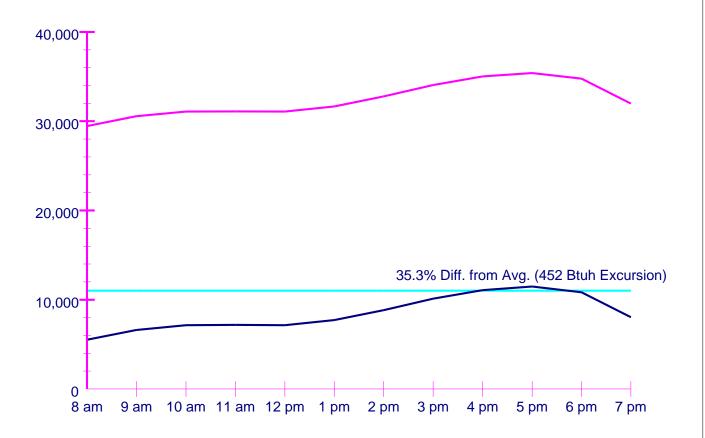
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| Rhvac - Residential & Light Commercial HVAC Loads Correct Air Engineering 100 Waibel Road, Port Deposit, MD 21904                                   | Elite Software Development, Inc.<br>3835 Roland Ave., Baltimore, MD 21211<br>Page 3 |
|---|---|
| Project Report (cont'd)   |   |
| Notes   |   |
| All computed results are estimates as building use and wear Be sure to select a unit that meets both sensible and latent at your design conditions. | Ither may vary. loads according to the manufacturer's performance data              |
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| Ninter:   17   | Rhvac - Residential & Light Com<br>Correct Air Engineering<br>100 Waibel Road, Port Deposit, MI                                   |                                       | C Loads                                   |                                  |  |   |                            | Software Deve<br>nd Ave., Baltimo |                |
|--|---|---------------------------------------|---|----------------------------------|--|---|----------------------------|-----------------------------------|----------------|
| Note  | Miscellaneous Repo  | ort                                   |   |                                  |  |   |                            |                                   |                |
| Dry Bulb   Wet Bulb   Rel. Hum   Rel. Hum   Dry Bulb   Difference  |   |                                       |   | Outdoor                          | Outdoor                                  | Outdoor                                     | Indoor                     | Indoor                            | Grains         |
| Summer:   89   76   56%   50%   75   49  | Input Data  |                                       |   |                                  |  |   |                            |                                   | Difference     |
| Main Trunk   |   |                                       |   |                                  |  |   |                            |                                   | 22.17<br>49.90 |
| Main Trunk   |   |                                       |   | 09                               | 70                                       | 30 /6                                       | 30 /6                      | 75                                | 49.90          |
| Calculate:         Yes         Yes           Use Schedule:         Yes         Yes           Roughness Factor:         0.00300         0.01000           Pressure Drop:         0.1000 in.wg./100 ft.         0.1000 in.wg./100 ft.           Minimum Velocity:         650 ft./min         450 ft./min           Maximum Velocity:         900 ft./min         750 ft./min           Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data         Winter         0 in.           Infiltration Specified:         0.770 AC/hr         0.400 AC/hr           Infiltration Actual:         0.752 AC/hr         0.400 AC/hr           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           X 0.0167         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1         Infiltration & Ventilation Latent Gain Multiplier:         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 53.0  |   | ain Trunk                             |   |                                  | Runouts                                  |   |                            |                                   |                |
| Roughness Factor:         0.00300         0.01000           Pressure Drop:         0.1000 in.wg./100 ft.         0.1000 in.wg./100 ft.           Minimum Velocity:         650 ft./min         450 ft./min           Maximum Velocity:         900 ft./min         750 ft./min           Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data           Winter         Summer           Infiltration Specified:         0.770 AC/hr         0.400 AC/hr           141 CFM         73 CFM           Infiltration Actual:         0.752 AC/hr         0.364 AC/hr           Above Grade Volume:         X 10,980 Cu.ft.         X 10,980 Cu.ft.           X 0.0167         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1           Infiltration & Ventilation Latent Gain Multiplier:         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)   |   |                                       |   |                                  |  |   |                            |                                   |                |
| Pressure Drop:         0.1000 in.wg./100 ft.         0.1000 in.wg./100 ft.           Minimum Velocity:         650 ft./min         450 ft./min           Maximum Velocity:         900 ft./min         750 ft./min           Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data           Infiltration Specified:         0.770 AC/hr         0.400 AC/hr           141 CFM         73 CFM           Infiltration Actual:         0.752 AC/hr         0.364 AC/hr           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           X 0.0167         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Latent Gain Multiplier:         15.39 = (0.68 X 0.999 X 49.90 Grains Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  | Use Schedule:   | Yes                                   |   |                                  | Yes                                      |   |                            |                                   |                |
| Minimum Velocity:         650 ft./min         450 ft./min           Maximum Velocity:         900 ft./min         750 ft./min           Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data           Winter         Summer           Infiltration Specified:         0.770 AC/hr         0.400 AC/hr           141 CFM         73 CFM           Infiltration Actual:         0.752 AC/hr         0.364 AC/hr           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           X 2.0167         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1           Infiltration & Ventilation Sensible Gain Multiplier:         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  |   |                                       |   |                                  |  |   |                            |                                   |                |
| Maximum Velocity:         900 ft./min         750 ft./min           Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data           Winter         Summer           Infiltration Specified:         0.770 AC/hr         0.400 AC/hr           141 CFM         73 CFM           Infiltration Actual:         0.752 AC/hr         0.364 AC/hr           Above Grade Volume:         X 10.980 Cu.ft.         X 10.980 Cu.ft.           Above Grade Volume:         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1         Infiltration & Ventilation Sensible Gain Multiplier:         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 49.90 Grains Difference)   |   |                                       |   | 00 ft.                           |  |   |                            |                                   |                |
| Minimum Height:         0 in.         0 in.           Maximum Height:         0 in.         0 in.           Outside Air Data           Infiltration Specified:         Winter 0.770 AC/hr 0.400 AC/hr 73 CFM           Infiltration Actual:         0.752 AC/hr 0.364 AC/hr 0  |   |                                       |   |                                  |  |   |                            |                                   |                |
| Maximum Height:         0 in.         0 in.           Outside Air Data           Infiltration Specified:         Winter 0.770 AC/hr 141 CFM         Summer 0.400 AC/hr 73 CFM           Infiltration Actual:         0.752 AC/hr 0.364 A   |   |                                       |   |                                  |  | · -   |                            |                                   |                |
| Outside Air Data           Infiltration Specified:         Winter 0.770 AC/hr 141 CFM         Summer 0.400 AC/hr 0.400 AC/hr 73 CFM           Infiltration Actual:         0.752 AC/hr 0.364 AC/hr 0.364 AC/hr 0.364 AC/hr 0.364 AC/hr 0.364 AC/hr 0.366 Cu.ft.           Above Grade Volume:         X 10.980 Cu.ft. X 10.980 Cu.ft. X 10.980 Cu.ft. X 0.0167 Total Building Infiltration:         X 0.0167 Total Building Ventilation:         X 0.0167 Total Building Ventilation:         30 CFM Total Building Ventilation:   |   | _                                     |   |                                  |  |   |                            |                                   |                |
| Infiltration Specified:  | <del>-</del>  | 0                                     | in.                                       |                                  | 0 ir                                     | ì.<br>                                      |                            |                                   |                |
| Infiltration Specified:    0.770   AC/hr   141   CFM   73   CFM    System 1  | Outside Air Data  |                                       | \A/' (                                    |                                  | 0  |   |                            |                                   |                |
| 141 CFM         73 CFM           Infiltration Actual:         0.752 AC/hr         0.364 AC/hr           Above Grade Volume:         X 10,980 Cu.ft.         X 10,980 Cu.ft.           X 0.0167         X 0.0167         X 0.0167           Total Building Infiltration:         138 CFM         67 CFM           Total Building Ventilation:         30 CFM         30 CFM          System 1           Infiltration & Ventilation Sensible Gain Multiplier:         15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)           Infiltration & Ventilation Sensible Loss Multiplier:         58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)   | Indituation Consideration   |                                       |   | Λ C /h »                         |  |   |                            |                                   |                |
| Infiltration Actual: 0.752 AC/hr 0.364 AC/hr Above Grade Volume: $X = 10,980$ Cu.ft.   | inilitration Specified:   |                                       |   |                                  | 0.4                                      |   |                            |                                   |                |
| Above Grade Volume: $\frac{X}{8,256}$ Cu.ft. $\frac{X}{0.0167}$ Cu.ft. $\frac{X}{0.0167}$ Cu.ft. $\frac{X}{0.0167}$ Cu.ft./hr $\frac{X}{0.0167}$ CFM Grade Volume: $\frac{X}{0.0167}$ Total Building Infiltration: $\frac{138}{30}$ CFM $\frac{67}{30}$ CFM $\frac{67}{30}$ CFM $\frac{1}{30}$ | Infiltration Actual:  |                                       |   |                                  | 0.3                                      |   |                            |                                   |                |
| 8,256 Cu.ft./hr X 0.0167  Total Building Infiltration: 138 CFM Total Building Ventilation: 30 CFM System 1 Infiltration & Ventilation Sensible Gain Multiplier: Infiltration & Ventilation Latent Gain Multiplier: Infiltration & Ventilation Sensible Loss Multiplier:  3,996 Cu.ft./hr X 0.0167  CFM 30 CFM  30 CFM  15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference) Infiltration & Ventilation Latent Gain Multiplier: 33.90 = (0.68 X 0.999 X 49.90 Grains Difference) Infiltration & Ventilation Sensible Loss Multiplier: 58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  |   | Υ                                     |   |                                  |  |   |                            |                                   |                |
| X 0.0167 Total Building Infiltration: 138 CFM Total Building Ventilation: 30 CFM System 1 Infiltration & Ventilation Sensible Gain Multiplier: 15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference) Infiltration & Ventilation Sensible Loss Multiplier: 33.90 = (0.68 X 0.999 X 49.90 Grains Difference) Infiltration & Ventilation Sensible Loss Multiplier: 58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  | Above Glade volume.   | Δ.                                    |   |                                  |  |   |                            |                                   |                |
| Total Building Infiltration:  138 CFM Total Building Ventilation:  30 CFM  30 CFM  30 CFM System 1 Infiltration & Ventilation Sensible Gain Multiplier: Infiltration & Ventilation Latent Gain Multiplier: Infiltration & Ventilation Sensible Loss Multiplier:  15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference)  33.90 = (0.68 X 0.999 X 49.90 Grains Difference)  15.35 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  |   | <b>\</b>                              |   | Cu.it./iii                       |  |   |                            |                                   |                |
| Total Building Ventilation: 30 CFM 30 CFM System 1 Infiltration & Ventilation Sensible Gain Multiplier: 15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference) Infiltration & Ventilation Latent Gain Multiplier: 33.90 = (0.68 X 0.999 X 49.90 Grains Difference) Infiltration & Ventilation Sensible Loss Multiplier: 58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)   | Total Building Infiltration:  | 2                                     |   | CEM                              | <u> </u>                                 |   |                            |                                   |                |
| System 1 Infiltration & Ventilation Sensible Gain Multiplier: Infiltration & Ventilation Latent Gain Multiplier: Infiltration & Ventilation Sensible Loss Multiplier:  15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference) 33.90 = (0.68 X 0.999 X 49.90 Grains Difference) 58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  |   |                                       |   |                                  |  |   |                            |                                   |                |
| Infiltration & Ventilation Sensible Gain Multiplier: 15.39 = (1.10 X 0.999 X 14.00 Summer Temp. Difference) Infiltration & Ventilation Latent Gain Multiplier: 33.90 = (0.68 X 0.999 X 49.90 Grains Difference) Infiltration & Ventilation Sensible Loss Multiplier: 58.25 = (1.10 X 0.999 X 53.00 Winter Temp. Difference)  | Total building Ventilation.   |                                       | 30  | OI W                             |  | 30 CI W                                     |                            |                                   |                |
| Summer Infiltration Specified: 0.400 AC/hr (73 CFM), Construction: Semi-Loose  | Infiltration & Ventilation Se<br>Infiltration & Ventilation Lat<br>Infiltration & Ventilation Se<br>Winter Infiltration Specified | tent Gain M<br>nsible Los:<br>l: 0.77 | /lultiplier:<br>s Multiplie<br>'0 AC/hr ( | 33.9<br>r: 58.29<br>141 CFM), Co | 0 = (0.68)<br>5 = (1.10)<br>onstruction: | X 0.999 X 49<br>X 0.999 X 53<br>Semi-Loose, | .90 Grains I<br>.00 Winter | Difference)<br>Femp. Differ       | ence)          |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |
|  |   |                                       |   |                                  |  |   |                            |                                   |                |

#### System 1 - Main - Adequate Exposure Diversity Test



#### **AED Calculation Summary**

--- SYSTEM DOES NOT HAVE ADEQUATE EXPOSURE DIVERSITY. ---

System is on N, E, S, W rosette.

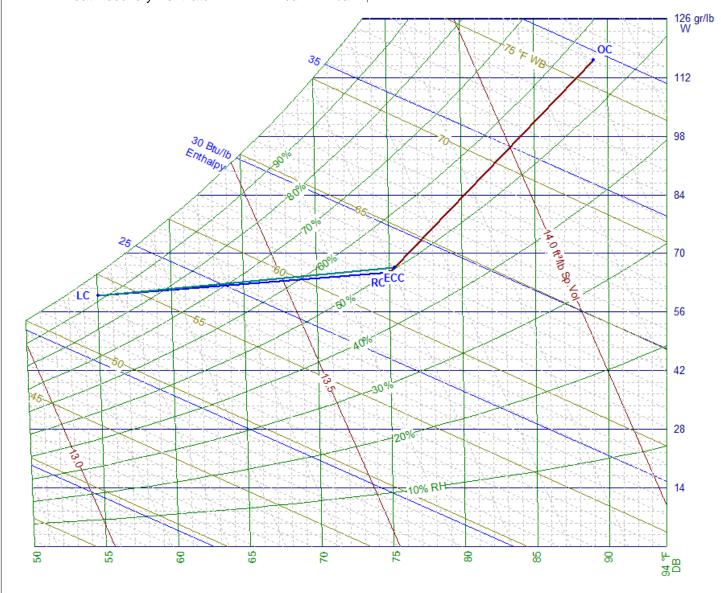
Peak load exceeds 12-hour average load by 35.3%.

AED Excursion (amount by which peak exceeds 1.3 x average): 452 Btuh

Definition: A system has adequate exposure diversity if the peak-hour glass load for the entire conditioned space does not exceed the average glass load for the entire conditioned space by more than 30 percent.

# System 1 - Main - Psychrometric Chart

| Name | Description              | DB  | WB   | Name | Description             | DB   | WB   |
|------|--------------------------|-----|------|------|-------------------------|------|------|
| RC   | Room Condition           | 75  | 62.5 | OC   | Outdoor Condition       | 89   | 76   |
| LC   | Leaving Coil Condition   | 55  | 53.7 | ECC  | Entering Coil Condition | 75.3 | 62.9 |
| SD   | Supply Duct Gain         | n/a | n/a  | DTF  | Draw-thru Fan S.Gain    | n/a  | n/a  |
| RD   | Return Duct Gain         | n/a | n/a  | MIX  | Mixed Air Point         | 75.3 | 62.9 |
| RML  | Return Misc Latent       | n/a | n/a  | ML   | Supply Misc Latent      | n/a  | n/a  |
| RMS  | Return Misc Sensible     | n/a | n/a  | MS   | Supply Misc Sensible    | n/a  | n/a  |
| HRV  | Heat Recovery Ventilator | n/a | n/a  |      |                         |      |      |



| Rhvac - Residential & Light Commercial HVAC Loads Correct Air Engineering 100 Waibel Road, Port Deposit, MD 21904   |                            |   |                      | Software Devel<br>nd Ave., Baltimon | -                                  |
|---|----------------------------|---|----------------------|-------------------------------------|------------------------------------|
| Total Building Summary Loads  |                            |   |                      |                                     |                                    |
| Component   | Area                       | Sen   | Lat                  | Sen                                 | Total                              |
| Description   | Quan                       | Loss  | Gain                 | Gain                                | Gain                               |
| 1D-cv-o: Glazing-Double pane, operable window, clear,<br>vinyl frame, U-value 0.57, SHGC 0.56   | , 198.7                    | 6,005   | 0                    | 9,410                               | 9,410                              |
| 11D: Door-Wood - Solid Core, U-value 0.39   | 53.3                       | 1,104   | 0                    | 519                                 | 519                                |
| 15B11-4w-8: Wall-Basement, , framing with R-11 sill to floor in 2 x 4 cavity, core, 3' R-4 board insulation, plus interior finish, wood studs, 8' floor depth, U-val 0.045, above grade U-value 0.071   | 326.7                      | 780   | 0                    | 0                                   | 0                                  |
| 15B11-4w-2: Wall-Basement, , framing with R-11 sill to floor in 2 x 4 cavity, core, 3' R-4 board insulation, plus interior finish, wood studs, 2' floor depth, U-val 0.053, above grade U-value 0.071   |                            | 134   | 0                    | 13                                  | 13                                 |
| 14E-10-8b: Wall-two courses brick, brick on concrete or<br>inches concrete, two courses (8 inches) brick with F<br>10 board insulation, U-value 0.079   |                            | 8,515   | 0                    | 1,671                               | 1,671                              |
| 16B-50: Roof/Ceiling-Under Attic with Insulation on Attic<br>Floor (also use for Knee Walls and Partition Ceiling<br>Vented Attic, No Radiant Barrier, Dark Asphalt<br>Shingles or Dark Metal, Tar and Gravel or Membral<br>R-50 insulation, U-value 0.02 | ıs),                       | 711   | 0                    | 657                                 | 657                                |
| 21A-20: Floor-Basement, Concrete slab, any thickness,<br>or more feet below grade, no insulation below floor,<br>any floor cover, shortest side of floor slab is 20' wid<br>U-value 0.027   | ,                          | 392   | 0                    | 0                                   | 0                                  |
| Subtotals for structure: People: Equipment: Lighting:   | 6<br>527                   | 17,641  | 0<br>1,200<br>1,366  | 12,270<br>1,380<br>10,100<br>1,797  | 12,270<br>2,580<br>11,466<br>1,797 |
| Ductwork:   |                            | 0   | 0                    | 0                                   | 0                                  |
| Infiltration: Winter CFM: 138, Summer CFM: 67   |                            | 8,015   | 2,256                | 1,024                               | 3,280                              |
| Ventilation: Winter CFM: 30, Summer CFM: 30   |                            | 1,771   | 1,031                | 468                                 | 1,498                              |
| Humidification (Winter) 7.03 gal/day:   |                            | 2,579   | 0                    | 0                                   | 0                                  |
| AED Excursion:  |                            | 0   | 0                    | 452                                 | 452                                |
| Total Building Load Totals:   |                            | 30,006  | 5,853                | 27,491                              | 33,344                             |
| Check Figures   |                            |   |                      |                                     |                                    |
| Total Building Supply CFM: 1,229 Square ft. of Room Area: 1,537 Volume (ft³) (Above Grade): 10,980 Volume (ft³) (Total): 12,521   | Square                     | r Square ft.:<br>ft. Per Ton:<br>over Rate (per | hour):               |                                     | 0.800<br>503<br>5.9                |
| Building Loads  |                            |   |                      |                                     |                                    |
| Total Heating Required Including Ventilation Air: Total Sensible Gain:  | 30,006 Btuh<br>27,491 Btuh | 30.006<br>82                                    | MBH<br>%             |                                     |                                    |
| Total Latent Gain:  | 5,853 Btuh                 | 18  |                      |                                     |                                    |
| Total Cooling Required Including Ventilation Air:   | 33,344 Btuh                | 2.78  | Tons (Bas<br>Latent) | sed On Sens                         |                                    |
|   |                            | 3.05  | Tons (Bas Capacity)  | sed On 75%                          | Sensible                           |
| Notes  Physician ACCA approved Manual I. D. and S. comp   |                            |   |                      |                                     |                                    |

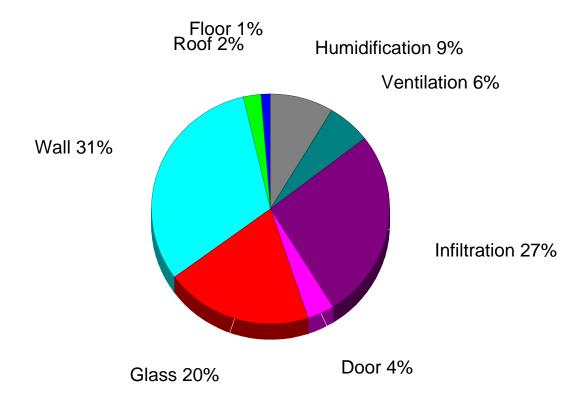
Rhvac is an ACCA approved Manual J, D and S computer program.

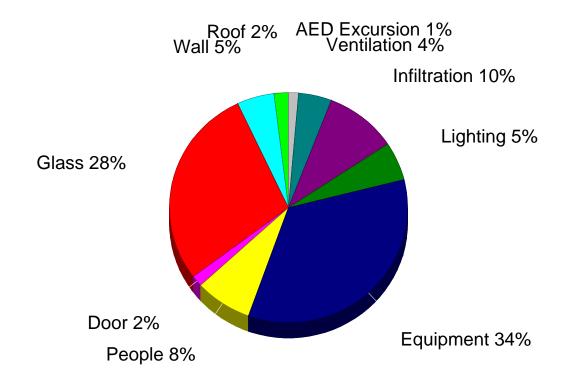
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.

All computed results are estimates as building use and weather may vary.

Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

**Building Pie Chart** 





| Rhvac - Residential & Light Commercial HVAC Loads<br>Correct Air Engineering<br>100 Waibel Road, Port Deposit, MD 21904  |                           |               |                     | <b>Software Devel</b> d Ave., Baltimor |                           |
|--|---------------------------|---------------|---------------------|--|---------------------------|
| System 1 Main Summary Loads  |                           |               |                     |  |                           |
| Component  | Area                      | Sen           | Lat                 | Sen                                    | Total                     |
| Description  | Quan                      | Loss          | Gain                | Gain                                   | Gain                      |
| D-cv-o: Glazing-Double pane, operable window, clear,   | 198.7                     | 6,005         | 0                   | 9,410                                  | 9,410                     |
| vinyl frame, U-value 0.57, SHGC 0.56<br>1D: Door-Wood - Solid Core, U-value 0.39   | 53.3                      | 1,104         | 0                   | 519                                    | 519                       |
| 5B11-4w-8: Wall-Basement, , framing with R-11 sill to floor in 2 x 4 cavity, core, 3' R-4 board insulation,  | 326.7                     | 780           | 0                   | 0                                      | 0                         |
| plus interior finish, wood studs, 8' floor depth, U-value 0.045, above grade U-value 0.071 5B11-4w-2: Wall-Basement, , framing with R-11 sill to   | 41.6                      | 134           | 0                   | 13                                     | 13                        |
| floor in 2 x 4 cavity, core, 3' R-4 board insulation, plus interior finish, wood studs, 2' floor depth, U-value 0.053, above grade U-value 0.071   |                           |               |                     |  |                           |
| 4E-10-8b: Wall-two courses brick, brick on concrete or 8 inches concrete, two courses (8 inches) brick with R-10 board insulation, U-value 0.079   | 2034.2                    | 8,515         | 0                   | 1,671                                  | 1,671                     |
| 6B-50: Roof/Ceiling-Under Attic with Insulation on Attic<br>Floor (also use for Knee Walls and Partition Ceilings),<br>Vented Attic, No Radiant Barrier, Dark Asphalt<br>Shingles or Dark Metal, Tar and Gravel or Membrane,   |                           | 711           | 0                   | 657                                    | 657                       |
| R-50 insulation, U-value 0.02<br>21A-20: Floor-Basement, Concrete slab, any thickness, 2<br>or more feet below grade, no insulation below floor,<br>any floor cover, shortest side of floor slab is 20' wide,<br>U-value 0.027 |                           | 392           | 0                   | 0                                      | 0                         |
| Subtotals for structure:<br>People:<br>Equipment:  | 6                         | 17,641        | 0<br>1,200<br>1,366 | 12,270<br>1,380<br>10,100              | 12,270<br>2,580<br>11,466 |
| Lighting:  | 527                       | _             | _                   | 1,797                                  | 1,797                     |
| Ductwork:  |                           | 0             | 0                   | 0                                      | 0                         |
| Infiltration: Winter CFM: 138, Summer CFM: 67  |                           | 8,015         | 2,256               | 1,024                                  | 3,280                     |
| Ventilation: Winter CFM: 30, Summer CFM: 30  |                           | 1,771         | 1,031               | 468                                    | 1,498                     |
| Humidification (Winter) 7.03 gal/day :   |                           | 2,579         | 0                   | 0                                      | 450                       |
| AED Excursion: System 1 Main Load Totals:  |                           | 0<br>30,006   | 0<br>5,853          | 452<br>27,491                          | 452<br>33,344             |
| •  |                           | 30,000        | J,033               | 27,491                                 | 33,344                    |
| Check Figures  | CEM Dan                   | Caucro # :    |                     |  | 0.900                     |
| Supply CFM: 1,229<br>Square ft. of Room Area: 1,537  |                           | Square ft.:   |                     |  | 0.800                     |
|  | Square ft.                |               | hour).              |  | 503                       |
| Volume (ft³) (Above Grade): 10,980   | Air Turnov                | ver Rate (per | nour):              |  | 5.9                       |
| Volume (ft³) (Total): 12,521   |                           |               |                     |  |                           |
| System Loads Total Heating Required Including Ventilation Air:   | 30,006 Btuh               | 30.006        | MDLI                |  |                           |
|  | 27,491 Btuh               | 82            |                     |  |                           |
| Total Sensible Gain.<br>Total Latent Gain:   | •                         | 18            |                     |  |                           |
|  | 5,853 Btuh<br>33,344 Btuh |               |                     | ed On Sens                             | ible +                    |
| Total Cooling Required Including Ventilation Air:  |                           |               |                     |  |                           |

Rhvac is an ACCA approved Manual J, D and S computer program.

Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.

All computed results are estimates as building use and weather may vary.

Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

# Detailed Room Loads - Room 1 - Basement Master Bedroom (Average Load Procedure)

| General              |             |                |                       |     |       |
|----------------------|-------------|----------------|-----------------------|-----|-------|
| Calculation Mode:    | Htg. & clg. |                | Occurrences:          | 1   |       |
| Room Length:         | 10.5        | ft.            | System Number:        | 1   |       |
| Room Width:          | 12.0        | ft.            | Zone Number:          | 1   |       |
| Area:                | 126.0       | sq.ft.         | Supply Air:           | 117 | CFM   |
| Ceiling Height:      | 6.7         | ft.            | Supply Air Changes:   | 8.3 | AC/hr |
| Volume:              | 840         | cu.ft.         | Req. Vent. Clg:       | 0   | CFM   |
| Number of Registers: | 2           |                | Actual Winter Vent.:  | 2   | CFM   |
| Runout Air:          | 58          | CFM            | Percent of Supply.:   | 1   | %     |
| Runout Duct Size:    | 5           | in.            | Actual Summer Vent.:  | 3   | CFM   |
| Runout Air Velocity: | 428         | ft./min.       | Percent of Supply:    | 2   | %     |
| Runout Air Velocity: | 428         | ft./min.       | Actual Winter Infil.: | 2   | CFM   |
| Actual Loss:         | 0.152       | in.wg./100 ft. | Actual Summer Infil.: | 1   | CFM   |

| Item                              | Area     | -U-   | Htg   | Sen   | Clg   | Lat  | Sen   |
|-----------------------------------|----------|-------|-------|-------|-------|------|-------|
| Description                       | Quantity | Value | HTM   | Loss  | HTM   | Gain | Gain  |
| N -Wall-15B11-4w-8 12 X 6.7       | 80       | 0.045 | 2.4   | 191   | 0.0   | 0    | 0     |
| - Abv. grade U-value 0.071        |          |       |       |       |       |      |       |
| E -Wall-15B11-4w-8 4.5 X 6.7      | 30       | 0.045 | 2.4   | 72    | 0.0   | 0    | 0     |
| - Abv. grade U-value 0.071        |          |       |       |       |       |      |       |
| W -Wall-15B11-4w-8 12 X 6.7       | 80       | 0.045 | 2.4   | 191   | 0.0   | 0    | 0     |
| - Abv. grade U-value 0.071        |          |       |       |       |       |      |       |
| E -Wall-15B11-4w-2 6 X 6.7        | 13.1     | 0.053 | 2.9   | 38    | 0.1   | 0    | 1     |
| - Abv. grade U-value 0.071        |          |       |       |       |       |      |       |
| E -Door-11D 2.7 X 6.7             | 17.8     | 0.390 | 20.7  | 368   | 9.8   | 0    | 173   |
| E -Gls-1D-cv-o shgc-0.56 0%S      | 9.2      | 0.570 | 30.2  | 277   | 61.0  | 0    | 559   |
| Floor-21A-20 12 X 10.5            | 126      | 0.027 | 1.4   | 180   | 0.0   | 0    | 0     |
| Subtotals for Structure:          |          |       |       | 1,317 |       | 0    | 733   |
| Infil.: Win.: 1.7, Sum.: 0.8      | 28       |       | 3.464 | 97    | 0.429 | 27   | 12    |
| AED Excursion:                    |          |       |       |       |       |      | 43    |
| People: 200 lat/per, 230 sen/per: | 2        |       |       |       |       | 400  | 460   |
| Equipment:                        |          |       |       |       |       | 0    | 1,218 |
| Lighting:                         | 30       |       |       |       |       |      | 102   |
| Room Totals:                      |          |       |       | 1,414 |       | 427  | 2,568 |

Equipment Cooling Loads

| Equipment cooling Loads  |        |        |        |       |       |      |
|--------------------------|--------|--------|--------|-------|-------|------|
|                          | Cont.  | Cont.  |        |       |       |      |
|                          | Output | Output | Avg.   | Pct   | Sens. | Lat. |
|                          | Sens.  | Lat.   | In-Use | Used  | Load  | Load |
| Item Name                | Btuh   | Btuh   | Output | /Hour | Btuh  | Btuh |
| Color television LED 55" | 1218   | 0      | 100    | 100   | 1218  | 0    |
| Total                    |        |        |        |       | 1218  | 0    |

# Detailed Room Loads - Room 2 - Basement Stairs And Hallway (Average Load Procedure)

| Frocedure)                  |             |                |              |             |     |          |      |
|-----------------------------|-------------|----------------|--------------|-------------|-----|----------|------|
| General                     |             |                |              |             |     |          |      |
| Calculation Mode:           | Htg. & clg. |                | Occurrence   | s:          |     | 1        |      |
| Room Length:                | n/a         |                | System Nur   | nber:       |     | 1        |      |
| Room Width:                 | n/a         |                | Zone Numb    | er:         |     | 1        |      |
| Area:                       | 94.0        | sq.ft.         | Supply Air:  |             |     | 8 CFM    |      |
| Ceiling Height:             | 6.7         | ft.            | Supply Air ( | Changes:    |     | 0.8 AC/h | nr   |
| Volume:                     | 627         | cu.ft.         | Req. Vent.   | Clg:        |     | 0 CFM    |      |
| Number of Registers:        | 1           |                | Actual Winte | er Vent.:   |     | 1 CFM    |      |
| Runout Air:                 | 8           | CFM            | Percent of S | Supply.:    |     | 9 %      |      |
| Runout Duct Size:           | 5           | in.            | Actual Sum   | mer Vent.:  |     | 0 CFM    |      |
| Runout Air Velocity:        | 59 ft./min. |                | Percent of S | Supply:     |     | 2 %      |      |
| Runout Air Velocity:        | 59          | ft./min.       | Actual Winte | er Infil.:  |     | 1 CFM    |      |
| Actual Loss:                | 0.003       | in.wg./100 ft. | Actual Sum   | mer Infil.: |     | 0 CFM    |      |
| Item                        | Are         | ea -U          | - Htg        | Sen         | Clg | Lat      | Sen  |
| Description                 | Quant       | ity Value      | e HTM        | Loss        | HTM | Gain     | Gain |
| S -Wall-15B11-4w-8 10 X 6.7 | 66          | 0.04           | 5 2.4        | 159         | 0.0 | 0        | 0    |
| - Abv. grade U-value 0.071  |             |                |              |             |     |          |      |
| N -Wall-15B11-4w-8 7 X 6.7  | 46          | 6.7 0.04       | 5 2.4        | 111         | 0.0 | 0        | 0    |
| - Abv. grade U-value 0.071  |             |                |              |             |     |          |      |
| S -Wall-15B11-4w-2 3 X 6.7  | 17          | '.3 0.053      | 3.4          | 60          | 0.4 | 0        | 8    |

| Detailed Room Loads - Room 3 - Basement Bathroom (Average Load Procedure) |             |                |                 |             |       |           |      |  |
|---|-------------|----------------|-----------------|-------------|-------|-----------|------|--|
| General   |             |                |                 |             |       |           |      |  |
| Calculation Mode:   | Htg. & clg. |                | Occurrences     | <b>:</b> :  |       | 1         |      |  |
| Room Length:  | 9.0         | ft.            | System Num      | ıber:       |       | 1         |      |  |
| Room Width:   | 6.0         | ft.            | Zone Number     | er:         |       | 1         |      |  |
| Area:   | 54.0        | sq.ft.         | Supply Air:     |             |       | 27 CFM    |      |  |
| Ceiling Height:   | 6.7         | ft.            | Supply Air C    | hanges:     |       | 4.5 AC/hr |      |  |
| Volume:   | 360         | cu.ft.         | Req. Vent. Clg: |             |       | 0 CFM     |      |  |
| Number of Registers:  | 1           |                |                 | r Vent.:    |       | 1 CFM     |      |  |
| Runout Air:   | 27          |                |                 | upply.:     |       | 2 %       |      |  |
| Runout Duct Size:   | 5           | in.            | Actual Sumn     |             |       | 1 CFM     |      |  |
| Runout Air Velocity:  | 199         | ft./min.       | Percent of S    |             |       | 2 %       |      |  |
| Runout Air Velocity:  |             | ft./min.       | Actual Winte    |             |       | 1 CFM     |      |  |
| Actual Loss:  | 0.034       | in.wg./100 ft. | Actual Sumn     | ner Infil.: |       | 0 CFM     |      |  |
| Item  | Are         | ea -U-         | Htg             | Sen         | Clg   | Lat       | Sen  |  |
| Description   | Quant       |                | HTM             | Loss        | HTM   | Gain      | Gain |  |
| N -Wall-15B11-4w-8 3.5 X 6.7  | 23          | 0.045          | 2.4             | 56          | 0.0   | 0         | 0    |  |
| - Abv. grade U-value 0.071  |             |                |                 |             |       |           |      |  |
| E -Wall-15B11-4w-2 3 X 6.7  | 11          | .2 0.053       | 3.3             | 36          | 0.3   | 0         | 4    |  |
| - Abv. grade U-value 0.071  |             |                | 00.0            |             | 0.4.0 | •         | =00  |  |
| E -Gls-1D-cv-o shgc-0.56 0%S  |             | 0.570          | 30.2            | 267         | 61.0  | 0         | 538  |  |
| Floor-21A-20 6 X 9  |             | 54 0.027       | 1.4             | 77          | 0.0   | 0         | 0    |  |
| Subtotals for Structure:  |             |                |                 | 436         |       | 0         | 542  |  |
| Infil.: Win.: 0.8, Sum.: 0.4  | •           | 14             | 3.500           | 49          | 0.429 | 14        | 6    |  |
| AED Excursion:  |             |                |                 |             |       |           | 10   |  |
| Lighting:   |             | 11             |                 |             |       |           | 38   |  |
| Room Totals:  |             |                |                 | 485         |       | 14        | 595  |  |

# Detailed Room Loads - Room 4 - 1st Flr Foyer (Average Load Procedure)

Room Totals:

|                               |             |               | <i>-</i>             |                       |       |          |      |  |
|-------------------------------|-------------|---------------|----------------------|-----------------------|-------|----------|------|--|
| General                       |             |               |                      |                       |       |          |      |  |
| Calculation Mode:             | Htg. & clg. |               | Occurrences          | S:                    |       | 1        |      |  |
| Room Length:                  | n/a         |               | System Nun           | nber:                 |       | 1        |      |  |
| Room Width:                   | n/a         |               | Zone Numb            | er:                   |       | 1        |      |  |
| Area:                         | 19.2        | sq.ft.        | Supply Air:          |                       |       | 23 CFM   |      |  |
| Ceiling Height:               | 9.0         | ft.           | Supply Air C         | hanges:               |       | 7.9 AC/h | ır   |  |
| Volume:                       | 173         | cu.ft.        | Req. Vent. 0         | Clg:                  |       | 0 CFM    |      |  |
| Number of Registers:          | 1           |               | Actual Winte         | er Vent.:             |       | 2 CFM    |      |  |
| Runout Air:                   | 23          | CFM           | Percent of S         | Supply.:              | 10 %  |          |      |  |
| Runout Duct Size:             | 5           | in.           | Actual Summer Vent.: |                       |       | 1 CFM    |      |  |
| Runout Air Velocity:          | 167         | ft./min.      | Percent of S         | Percent of Supply:    |       | 2 %      |      |  |
| Runout Air Velocity:          | 167         | ft./min.      | Actual Winte         | Actual Winter Infil.: |       | 12 CFM   |      |  |
| Actual Loss:                  | 0.024       | in.wg./100 ft | Actual Sumr          | mer Infil.:           |       | 6 CFM    |      |  |
| Item                          | Ar          | ea -U         | - Htg                | Sen                   | Clg   | Lat      | Sen  |  |
| Description                   | Quant       | ity Valu      | e HTM                | Loss                  | HTM   | Gain     | Gain |  |
| S -Wall-14E-10-8b 19.2 X 9    | 172         | 2.8 0.07      | 9 4.2                | 724                   | 8.0   | 0        | 142  |  |
| W -Wall-14E-10-8b 4 X 9       | 18          | 3.2 0.07      | 9 4.2                | 76                    | 0.8   | 0        | 15   |  |
| W -Door-11D 2.7 X 6.7         | 17          | 7.8 0.39      | 20.7                 | 368                   | 9.8   | 0        | 173  |  |
| Subtotals for Structure:      |             |               |                      | 1,168                 |       | 0        | 330  |  |
| Infil.: Win.: 12.5, Sum.: 6.0 | 2           | 09            | 3.477                | 726                   | 0.445 | 205      | 93   |  |
| AED Excursion:                |             |               |                      |                       |       |          | 8    |  |
| Lighting:                     |             | 20            |                      |                       |       |          | 68   |  |

1,894

205

500

# Detailed Room Loads - Room 5 - 1st Flr Dining Rm (Average Load Procedure)

| 0 1                             |             |                             |                      |                    |       |           |                 |
|---------------------------------|-------------|-----------------------------|----------------------|--------------------|-------|-----------|-----------------|
| General                         |             |                             |                      |                    |       |           |                 |
| Calculation Mode:               | Htg. & clg. |                             | Occurrence           | s:                 |       | 1         |                 |
| Room Length:                    | 10.2        | ft.                         | System Nur           | mber:              |       | 1         |                 |
| Room Width:                     | 12.7        | ft.                         | Zone Numb            | er:                |       | 1         |                 |
| Area:                           | 128.8       | sq.ft.                      | Supply Air:          |                    |       | 109 CFM   |                 |
| Ceiling Height:                 | 9.0         | 9.0 ft.                     |                      | Changes:           |       | 5.7 AC/hr |                 |
| Volume:                         | 1,159       | 159 cu.ft. Req. Vent. Clg:  |                      |                    | 0 CFM |           |                 |
| Number of Registers:            | 1           | 1 Actual Winter Vent.:      |                      |                    | 3 CFM |           |                 |
| Runout Air:                     | 109         | 109 CFM Percent of Supply.: |                      |                    | 3 %   |           |                 |
| Runout Duct Size:               | 6           | in.                         | Actual Summer Vent.: |                    |       | 3 CFM     | l               |
| Runout Air Velocity:            | 557         | ft./min.                    | Percent of S         | Percent of Supply: |       | 2 %       |                 |
| Runout Air Velocity:            | 557         | ft./min.                    | Actual Wint          |                    |       | 12 CFM    | 1               |
| Actual Loss:                    |             | in.wg./100 ft               | Actual Sum           | mer Infil.:        |       | 6 CFM     |                 |
| Item                            | Ar          |                             |                      | Sen                | Clg   | Lat       | Sen             |
|                                 |             |                             |                      |                    |       |           |                 |
| Description                     | Quant       |                             |                      | Loss               | HTM   | Gain      | Gain            |
| N -Wall-14E-10-8b 12.7 X 9      |             | 14 0.07                     |                      | 477                | 0.8   | 0         | 94              |
| W -Wall-14E-10-8b 10.2 X 9      |             | 59 0.07                     |                      | 247                | 0.8   | 0         | 48              |
| W -Gls-1D-cv-o shgc-0.56 0%S (2 | 2) 32       | 2.5 0.57                    | 30.2                 | 982                | 60.9  | 0         | 1,980           |
| Subtotals for Structure:        |             |                             |                      | 1,706              |       | 0         | 2,122           |
| Infil.: Win.: 12.3, Sum.: 5.9   | 2           | 06                          | 3.479                | 715                | 0.443 | 201       | <sup>′</sup> 91 |
| AED Excursion:                  |             |                             |                      |                    |       |           | 40              |
| Lighting:                       |             | 44                          |                      |                    |       |           | 150             |
| Room Totals:                    |             |                             |                      | 2,421              |       | 201       | 2,403           |

| Detailed Room Loads - Room 6 - 1st Flr Hall To Dining Rm (Average Load Procedure) |              |              |               |                       |       |           |      |  |
|---|--------------|--------------|---------------|-----------------------|-------|-----------|------|--|
| General   |              |              |               |                       |       |           |      |  |
| Calculation Mode:   | Htg. & clg.  |              | Occurrenc     | es:                   |       | 1         |      |  |
| Room Length:  | 6.5          | ft.          | System Nu     | ımber:                |       | 1         |      |  |
| Room Width:   | 4.0          | ft.          | Zone Num      | ber:                  |       | 1         |      |  |
| Area:   | 26.0         | 26.0 sq.ft.  |               | :                     |       | 5 CFM     |      |  |
| Ceiling Height:   | 9.0          | 9.0 ft. S    |               | Changes:              |       | 1.3 AC/hr | r    |  |
| Volume:   | 234 cu.ft. F |              | Req. Vent.    | Clg:                  |       | 0 CFM     |      |  |
| Number of Registers:  | 1 A          |              | Actual Wir    | iter Vent.:           |       | 1 CFM     |      |  |
| Runout Air:   | 5            | 5 CFM P      |               | Supply.:              |       | 11 %      |      |  |
| Runout Duct Size:   | 5            | 5 in. A      |               | nmer Vent.:           |       | 0 CFM     |      |  |
| Runout Air Velocity:  | 37           | ft./min.     | Percent of    | Supply:               |       | 2 %       |      |  |
| Runout Air Velocity:  | 37           | ft./min.     | Actual Wir    | Actual Winter Infil.: |       |           |      |  |
| Actual Loss:  | 0.001        | in.wg./100 f | t. Actual Sur | Actual Summer Infil.: |       | 2 CFM     |      |  |
| Item  | Are          | ea -l        | J- Htg        | Sen                   | Clg   | Lat       | Sen  |  |
| Description   | Quant        | ity Valı     | ue HTM        | Loss                  | HTM   | Gain      | Gain |  |
| N -Wall-14E-10-8b 6.5 X 9   | 58           | 3.5 0.07     | 79 4.2        | 245                   | 0.8   | 0         | 48   |  |
| Subtotals for Structure:  |              |              |               | 245                   |       | 0         | 48   |  |
| Infil.: Win.: 3.5, Sum.: 1.7  |              | 59           | 3.487         | 204                   | 0.444 | 57        | 26   |  |
| AED Excursion:  |              |              |               |                       |       |           | 2    |  |
| Lighting:   |              | 10           |               |                       |       |           | 34   |  |
| Room Totals:  |              |              |               | 449                   |       | 57        | 110  |  |

# Detailed Room Loads - Room 7 - 1st Flr Living Room (Average Load Procedure)

|                               |             |                 |                       | ·                    |       |          |       |  |  |
|-------------------------------|-------------|-----------------|-----------------------|----------------------|-------|----------|-------|--|--|
| General                       |             |                 |                       |                      |       |          |       |  |  |
| Calculation Mode:             | Htg. & clg. |                 | Occurrences           | :                    |       | 1        |       |  |  |
| Room Length:                  | 14.0        | ft.             | System Num            |                      | 1     |          |       |  |  |
| Room Width:                   | 12.3        | 12.3 ft. 2      |                       | er:                  |       | 1        |       |  |  |
| Area:                         | 171.5       | 171.5 sq.ft.    |                       | Supply Air:          |       |          | 1     |  |  |
| Ceiling Height:               | 9.0         |                 |                       | hanges:              |       | 0.9 AC/h | nr    |  |  |
| Volume:                       | 1,544       | 1,544 cu.ft. Re |                       | Req. Vent. Clg:      |       |          | l     |  |  |
| Number of Registers:          | 1           | 1 /             |                       | Actual Winter Vent.: |       |          | 2 CFM |  |  |
| Runout Air:                   | 24          | CFM             | Percent of S          | upply.:              |       | 8 %      |       |  |  |
| Runout Duct Size:             | 5           | 5 in.           |                       | ner Vent.:           |       | 1 CFM    |       |  |  |
| Runout Air Velocity:          | 178         | ft./min.        | Percent of S          | upply:               |       | 2 %      |       |  |  |
| Runout Air Velocity:          | 178         | ft./min.        | Actual Winter Infil.: |                      |       | 13 CFM   |       |  |  |
| Actual Loss:                  | 0.028       | in.wg./100 ft.  | Actual Sumn           | ner Infil.:          |       | 6 CFM    | 1     |  |  |
| Item                          | Are         | ea -U-          | Htg                   | Sen                  | Clg   | Lat      | Sen   |  |  |
| Description                   | Quanti      | ty Value        | HTM                   | Loss                 | HTM   | Gain     | Gain  |  |  |
| N -Wall-14E-10-8b 12.2 X 9    | 110         | .2 0.079        | 4.2                   | 462                  | 8.0   | 0        | 91    |  |  |
| S -Wall-14E-10-8b 12.2 X 9    | 110         | .2 0.079        | 4.2                   | 462                  | 0.8   | 0        | 91    |  |  |
| Subtotals for Structure:      |             |                 |                       | 924                  |       | 0        | 182   |  |  |
| Infil.: Win.: 13.2, Sum.: 6.4 | 22          | 21              | 3.478                 | 767                  | 0.444 | 216      | 98    |  |  |

1,691

72

AED Excursion:

Room Totals:

Lighting:

9

246

534

216

# Detailed Room Loads - Room 8 - 1st Flr Bath & Stairs Hall (Average Load Procedure)

| Detailed Rootti Loads - I      | NUUIII O    | · ISTII Da     | iii & Staiis        | Tiali (AV   | erage Lu | au Froceu | ur <del>e</del> ) |
|--------------------------------|-------------|----------------|---------------------|-------------|----------|-----------|-------------------|
| General                        |             |                |                     |             |          |           |                   |
| Calculation Mode:              | Htg. & clg. |                | Occurrences         | :           |          | 1         |                   |
| Room Length:                   | 11.8        | ft.            | System Num          | ber:        |          | 1         |                   |
| Room Width:                    | 8.0         |                | Zone Number         | er:         |          | 1         |                   |
| Area:                          | 94.0        | sq.ft.         | Supply Air:         |             |          | 23 CFM    |                   |
| Ceiling Height:                | 9.0         | ft.            | Supply Air C        | hanges:     |          | 1.7 AC/h  | •                 |
| Volume:                        | 846         | cu.ft.         | Req. Vent. C        | ilg:        |          | 0 CFM     |                   |
| Number of Registers:           | 1           |                | <b>Actual Winte</b> | r Vent.:    |          | 2 CFM     |                   |
| Runout Air:                    | 23          | CFM            | Percent of St       | upply.:     |          | 7 %       |                   |
| Runout Duct Size:              | 5           | in.            | Actual Summ         | ner Vent.:  |          | 1 CFM     |                   |
| Runout Air Velocity:           | 172         | ft./min.       | Percent of S        | upply:      |          | 2 %       |                   |
| Runout Air Velocity:           | 172         | ft./min.       | <b>Actual Winte</b> | r Infil.:   |          | 9 CFM     |                   |
| Actual Loss:                   | 0.026       | in.wg./100 ft. | Actual Summ         | ner Infil.: |          | 4 CFM     |                   |
| Item                           | Are         | ea -U-         | Htg                 | Sen         | Clg      | Lat       | Sen               |
| Description                    | Quant       | ity Value      | HTM                 | Loss        | HTM      | Gain      | Gain              |
| N -Wall-14E-10-8b 8 X 9        | 63          | 0.079          | 4.2                 | 264         | 0.8      | 0         | 52                |
| S -Wall-14E-10-8b 8 X 9        | -           | 72 0.079       | 4.2                 | 301         | 0.8      | 0         | 59                |
| N -Gls-1D-cv-o shgc-0.56 100%S |             | .8 0.570       | 30.2                | 267         | 18.9     | 0         | 167               |
| Subtotals for Structure:       |             |                |                     | 832         |          | 0         | 278               |
| Infil.: Win.: 8.6, Sum.: 4.2   | 14          | 44             | 3.479               | 501         | 0.444    | 141       | 64                |
| AED Excursion:                 |             |                |                     |             |          |           | 9                 |
| Lighting:                      |             | 48             |                     |             |          |           | 164               |
| Room Totals:                   |             |                |                     | 1,333       |          | 141       | 514               |

# Detailed Room Loads - Room 9 - 1st Flr Kitchen (Average Load Procedure)

| General              |             |                |                       |      |       |
|----------------------|-------------|----------------|-----------------------|------|-------|
| Calculation Mode:    | Htg. & clg. |                | Occurrences:          | 1    |       |
| Room Length:         | 11.8        | ft.            | System Number:        | 1    |       |
| Room Width:          | 13.0        | ft.            | Zone Number:          | 1    |       |
| Area:                | 152.8       | sq.ft.         | Supply Air:           | 235  | CFM   |
| Ceiling Height:      | 9.0         | ft.            | Supply Air Changes:   | 10.3 | AC/hr |
| Volume:              | 1,375       | cu.ft.         | Req. Vent. Clg:       | 0    | CFM   |
| Number of Registers: | 3           |                | Actual Winter Vent.:  | 4    | CFM   |
| Runout Air:          | 78          | CFM            | Percent of Supply.:   | 2    | %     |
| Runout Duct Size:    | 5           | in.            | Actual Summer Vent.:  | 6    | CFM   |
| Runout Air Velocity: | 575         | ft./min.       | Percent of Supply:    | 2    | %     |
| Runout Air Velocity: | 575         | ft./min.       | Actual Winter Infil.: | 20   | CFM   |
| Actual Loss:         | 0.272       | in.wg./100 ft. | Actual Summer Infil.: | 10   | CFM   |

| Item                           | Area     | -U-   | Htg   | Sen   | Cig   | Lat   | Sen   |
|--------------------------------|----------|-------|-------|-------|-------|-------|-------|
| Description                    | Quantity | Value | HTM   | Loss  | HTM   | Gain  | Gain  |
| N -Wall-14E-10-8b 13 X 9       | 104.5    | 0.079 | 4.2   | 438   | 0.8   | 0     | 86    |
| S -Wall-14E-10-8b 13 X 9       | 117      | 0.079 | 4.2   | 490   | 8.0   | 0     | 96    |
| E -Wall-14E-10-8b 11.8 X 9     | 75.5     | 0.079 | 4.2   | 316   | 0.8   | 0     | 62    |
| E -Door-11D 2.7 X 6.7          | 17.8     | 0.390 | 20.7  | 368   | 9.8   | 0     | 173   |
| N -Gls-1D-cv-o shgc-0.56 100%S | 12.5     | 0.570 | 30.2  | 378   | 18.9  | 0     | 236   |
| E -Gls-1D-cv-o shgc-0.56 0%S   | 12.5     | 0.570 | 30.2  | 378   | 61.0  | 0     | 762   |
| Subtotals for Structure:       |          |       |       | 2,368 |       | 0     | 1,415 |
| Infil.: Win.: 20.3, Sum.: 9.8  | 340      |       | 3.479 | 1,182 | 0.444 | 333   | 151   |
| AED Excursion:                 |          |       |       |       |       |       | 87    |
| Equipment:                     |          |       |       |       |       | 683   | 3,217 |
| Lighting:                      | 88       |       |       |       |       |       | 300   |
| Room Totals:                   |          |       |       | 3,550 |       | 1,016 | 5,170 |

#### **Equipment Cooling Loads**

| ( = contract of co |        |        |        |       |       |      |
|--|--------|--------|--------|-------|-------|------|
|  | Cont.  | Cont.  |        |       |       |      |
|  | Output | Output | Avg.   | Pct   | Sens. | Lat. |
|  | Sens.  | Lat.   | In-Use | Used  | Load  | Load |
| Item Name  | Btuh   | Btuh   | Output | /Hour | Btuh  | Btuh |
| Cooking range with hood - four burners on high heat  | 0      | 0      | 100    | 100   | 0     | 0    |
| Dishwasher   | 4096   | 1433   | 100    | 25    | 1024  | 358  |
| Microwave  | 4949   | 1732   | 75     | 25    | 928   | 325  |
| Refrigerator or freezer - 22 cubic feet  | 1265   | 0      | 100    | 100   | 1265  | 0    |
| Total  |        |        |        |       | 3217  | 683  |

| <b>Equipment Coo</b> | ling Loads   |
|----------------------|--------------|
|                      | <del>_</del> |

| Tagain and a saming a same |                 |                 |        |       |       |      |
|----------------------------|-----------------|-----------------|--------|-------|-------|------|
|                            | Cont.<br>Output | Cont.<br>Output | Avg.   | Pct   | Sens. | Lat. |
|                            | Sens.           | Lat.            | In-Use | Used  | Load  | Load |
| Item Name                  | Btuh            | Btuh            | Output | /Hour | Btuh  | Btuh |
| Color television LED 55"   | 1218            | 0               | 100    | 100   | 1218  | 0    |
| Total                      |                 |                 |        |       | 1218  | 0    |

| Detailed Room Loads - Room 11 - 2nd Flr Hallway (Average Load Procedure) |             |                |                      |             |       |           |      |  |
|--|-------------|----------------|----------------------|-------------|-------|-----------|------|--|
| General  |             |                | <u> </u>             |             |       | ,         |      |  |
| Calculation Mode:  | Htg. & clg. |                | Occurrences          | <b>)</b> :  |       | 1         |      |  |
| Room Length:   | 30.4        | ft.            | System Num           | nber:       |       | 1         |      |  |
| Room Width:  | 3.5         | ft.            | Zone Numbe           | er:         |       | 1         |      |  |
| Area:  | 106.5       | sq.ft.         | Supply Air:          |             |       | 23 CFM    |      |  |
| Ceiling Height:  | 8.0         | ft.            | Supply Air C         | hanges:     |       | 1.6 AC/hr | r    |  |
| Volume:  | 852         | cu.ft.         | ft. Req. Vent. Clg:  |             |       | 0 CFM     |      |  |
| Number of Registers:   | 1           |                | Actual Winte         | r Vent.:    |       | 2 CFM     |      |  |
| Runout Air:  | 23          | CFM            | Percent of Supply.:  |             |       | 10 %      |      |  |
| Runout Duct Size:  | 5           | in.            | Actual Summer Vent.: |             |       | 1 CFM     |      |  |
| Runout Air Velocity:   | 170         | ft./min.       | Percent of Supply:   |             |       | 2 %       |      |  |
| Runout Air Velocity:   | 170         | ft./min.       | Actual Winte         | r Infil.:   |       | 15 CFM    |      |  |
| Actual Loss:   | 0.025       | in.wg./100 ft. | Actual Sumn          | ner Infil.: |       | 7 CFM     |      |  |
| Item   | Are         | ea -U-         | Htg                  | Sen         | Clg   | Lat       | Sen  |  |
| Description  | Quant       | ity Value      | HTM                  | Loss        | HTM   | Gain      | Gain |  |
| S -Wall-14E-10-8b 30.5 X 8   |             | 44 0.079       | 4.2                  | 1,022       | 8.0   | 0         | 200  |  |
| UP-Ceil-16B-50 30.4 X 3.5  | 106         | 6.5 0.020      | 1.1                  | 113         | 1.0   | 0         | 104  |  |
| Subtotals for Structure:   |             |                |                      | 1,135       |       | 0         | 304  |  |
| Infil.: Win.: 14.6, Sum.: 7.1  | 24          | 44             | 3.480                | 849         | 0.447 | 239       | 109  |  |
| AED Excursion:   |             |                |                      |             |       |           | 9    |  |
| Lighting:  |             | 26             |                      |             |       |           | 89   |  |
| Room Totals:   |             |                |                      | 1,984       |       | 239       | 510  |  |

# Doom 12 2nd Fly Stairwall (Avarage Load De

| Detailed Room Loads          | : - Room 12 - | 2nd Flr S      | Stairwell (A  | verage L             | oad Proc | edure)   |      |  |
|------------------------------|---------------|----------------|---------------|----------------------|----------|----------|------|--|
| General                      |               |                |               |                      |          |          |      |  |
| Calculation Mode:            | Htg. & clg.   |                | Occurrences:  |                      |          | 1        |      |  |
| Room Length:                 | 6.0 ft.       |                | System Num    | ber:                 |          | 1        |      |  |
| Room Width:                  | 10.5 ft.      |                | Zone Numbe    | r:                   |          | 1        |      |  |
| Area:                        | 63.0 sc       | ı.ft.          | Supply Air:   |                      |          | 8 CFM    |      |  |
| Ceiling Height:              | 8.0 ft.       |                | Supply Air Ch | nanges:              |          | 1.0 AC/h | ſ    |  |
| Volume:                      | 504 cu        | ı.ft.          | Req. Vent. C  | g:                   |          | 0 CFM    |      |  |
| Number of Registers:         | 1             |                |               | Vent.:               |          | 1 CFM    |      |  |
| Runout Air:                  | 8 C           | 8 CFM          |               | ıpply.:              | 6 %      |          |      |  |
| Runout Duct Size:            | 5 in          | 5 in. <i>F</i> |               | Actual Summer Vent.: |          | 0 CFM    |      |  |
| Runout Air Velocity:         | 60 ft.        | /min.          |               | Percent of Supply:   |          | 2 %      |      |  |
| Runout Air Velocity:         | 60 ft.        | /min.          | Actual Winter |                      |          | 3 CFM    |      |  |
| Actual Loss:                 | 0.003 in      | .wg./100 ft.   | Actual Summ   | er Infil.:           |          | 1 CFM    |      |  |
| Item                         | Area          | -U-            | Htg           | Sen                  | Clg      | Lat      | Sen  |  |
| Description                  | Quantity      | Value          | HTM           | Loss                 | HTM      | Gain     | Gain |  |
| N -Wall-14E-10-8b 6 X 8      | 48            | 0.079          | 4.2           | 201                  | 0.8      | 0        | 39   |  |
| UP-Ceil-16B-50 6 X 10.5      | 63            | 0.020          | 1.1           | 67                   | 1.0      | 0        | 62   |  |
| Subtotals for Structure:     |               |                |               | 268                  |          | 0        | 101  |  |
| Infil.: Win.: 2.9, Sum.: 1.4 | 48            |                | 3.479         | 167                  | 0.438    | 47       | 21   |  |
| AED Excursion:               |               |                |               |                      |          |          | 3    |  |
| Lighting:                    | 16            |                |               |                      |          |          | 55   |  |
| Room Totals:                 |               |                |               | 435                  |          | 47       | 180  |  |

# Detailed Room Loads - Room 13 - 2nd Flr Bedroom Center (Average Load Procedure)

| General              |             |                |                       |     |       |
|----------------------|-------------|----------------|-----------------------|-----|-------|
| Calculation Mode:    | Htg. & clg. |                | Occurrences:          | 1   |       |
| Room Length:         | 10.1        | ft.            | System Number:        | 1   |       |
| Room Width:          | 12.3        | ft.            | Zone Number:          | 1   |       |
| Area:                | 123.5       | sq.ft.         | Supply Air:           | 72  | 2 CFM |
| Ceiling Height:      | 8.0         | ft.            | Supply Air Changes:   | 4.4 | AC/hr |
| Volume:              | 988         | cu.ft.         | Req. Vent. Clg:       | C   | ) CFM |
| Number of Registers: | 1           |                | Actual Winter Vent.:  | 2   | 2 CFM |
| Runout Air:          | 72          | CFM            | Percent of Supply.:   | 3   | 8 %   |
| Runout Duct Size:    | 5           | in.            | Actual Summer Vent.:  | 2   | 2 CFM |
| Runout Air Velocity: | 531         | ft./min.       | Percent of Supply:    | 2   | 2 %   |
| Runout Air Velocity: | 531         | ft./min.       | Actual Winter Infil.: | 8   | 3 CFM |
| Actual Loss:         | 0.233       | in.wg./100 ft. | Actual Summer Infil.: | 4   | CFM   |
|                      |             |                |                       |     |       |

| Item                              | Area     | -U-   | Htg   | Sen   | Clg   | Lat  | Sen   |
|-----------------------------------|----------|-------|-------|-------|-------|------|-------|
| Description                       | Quantity | Value | HTM   | Loss  | HTM   | Gain | Gain  |
| N -Wall-14E-10-8b 12.2 X 8        | 98       | 0.079 | 4.2   | 410   | 8.0   | 0    | 81    |
| N -Wall-14E-10-8b 4 X 8           | 12.5     | 0.079 | 4.2   | 52    | 8.0   | 0    | 10    |
| N -Gls-1D-cv-o shgc-0.56 100%S    | 19.5     | 0.570 | 30.2  | 589   | 18.9  | 0    | 368   |
| UP-Ceil-16B-50 10.1 X 12.2        | 123.5    | 0.020 | 1.1   | 131   | 1.0   | 0    | 121   |
| Subtotals for Structure:          |          |       |       | 1,182 |       | 0    | 580   |
| Infil.: Win.: 7.8, Sum.: 3.8      | 130      |       | 3.477 | 452   | 0.446 | 127  | 58    |
| AED Excursion:                    |          |       |       |       |       |      | 27    |
| People: 200 lat/per, 230 sen/per: | 1        |       |       |       |       | 200  | 230   |
| Equipment:                        |          |       |       |       |       | 0    | 615   |
| Lighting:                         | 24       |       |       |       |       |      | 82    |
| Room Totals:                      |          |       |       | 1,634 |       | 327  | 1,591 |

Room Totals: 1,634 327 1,591

| Equipment Cooling Loads  |        |        |        |       |       |      |
|--------------------------|--------|--------|--------|-------|-------|------|
|                          | Cont.  | Cont.  |        |       |       |      |
|                          | Output | Output | Avg.   | Pct   | Sens. | Lat. |
|                          | Sens.  | Lat.   | In-Use | Used  | Load  | Load |
| Item Name                | Btuh   | Btuh   | Output | /Hour | Btuh  | Btuh |
| Color television LCD 45" | 615    | 0      | 100    | 100   | 615   | 0    |
| Total                    |        |        |        |       | 615   | 0    |

# Detailed Room Loads - Room 14 - 2nd Flr Bathroom (Average Load Procedure)

|                                |             |                | , 1                 |             |       |          |      |
|--------------------------------|-------------|----------------|---------------------|-------------|-------|----------|------|
| General                        |             |                |                     |             |       |          |      |
| Calculation Mode:              | Htg. & clg. |                | Occurrences         | :           |       | 1        |      |
| Room Length:                   | 7.0         | ft.            | System Num          | ıber:       |       | 1        |      |
| Room Width:                    | 5.0         | ft.            | Zone Number         | er:         |       | 1        |      |
| Area:                          | 35.0        | sq.ft.         | Supply Air:         |             |       | 14 CFM   |      |
| Ceiling Height:                | 8.0         | ft.            | Supply Air C        | hanges:     |       | 3.0 AC/h | r    |
| Volume:                        | 280         | cu.ft.         | Req. Vent. C        | ilg:        |       | 0 CFM    |      |
| Number of Registers:           | 1           |                | <b>Actual Winte</b> | r Vent.:    |       | 1 CFM    |      |
| Runout Air:                    | 14          | CFM            | Percent of S        | upply.:     |       | 5 %      |      |
| Runout Duct Size:              | 5           | in.            | Actual Sumn         | ner Vent.:  |       | 0 CFM    |      |
| Runout Air Velocity:           | 104         | ft./min.       | Percent of S        | upply:      |       | 2 %      |      |
| Runout Air Velocity:           | 104         | ft./min.       | <b>Actual Winte</b> | r Infil.:   |       | 2 CFM    |      |
| Actual Loss:                   | 0.010       | in.wg./100 ft. | Actual Sumn         | ner Infil.: |       | 1 CFM    |      |
| Item                           | Ar          | ea -U-         | Htg                 | Sen         | Clg   | Lat      | Sen  |
| Description                    | Quant       | ity Value      | HTM                 | Loss        | HTM   | Gain     | Gain |
| N -Wall-14E-10-8b 5 X 8        | 31          | .2 0.079       | 4.2                 | 130         | 0.8   | 0        | 26   |
| N -Gls-1D-cv-o shgc-0.56 100%S | 8           | 3.8 0.570      | 30.2                | 267         | 18.9  | 0        | 167  |
| UP-Ceil-16B-50 7 X 5           | ;           | 35 0.020       | 1.1                 | 37          | 1.0   | 0        | 34   |
| Subtotals for Structure:       |             |                |                     | 434         |       | 0        | 227  |
| Infil.: Win.: 2.4, Sum.: 1.2   |             | 40             | 3.475               | 139         | 0.450 | 39       | 18   |
| AED Excursion:                 |             |                |                     |             |       |          | 5    |
| Lighting:                      |             | 18             |                     |             |       |          | 61   |
| Room Totals:                   |             |                |                     | 573         |       | 39       | 312  |

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# Detailed Room Loads - Room 15 - 2nd Flr Kitchen (Average Load Procedure)

| General              |             |                |                       |      |       |
|----------------------|-------------|----------------|-----------------------|------|-------|
| Calculation Mode:    | Htg. & clg. |                | Occurrences:          | 1    |       |
| Room Length:         | 8.5         | ft.            | System Number:        | 1    |       |
| Room Width:          | 7.0         | ft.            | Zone Number:          | 1    |       |
| Area:                | 59.5        | sq.ft.         | Supply Air:           | 171  | CFM   |
| Ceiling Height:      | 8.0         | ft.            | Supply Air Changes:   | 21.5 | AC/hr |
| Volume:              | 476         | cu.ft.         | Req. Vent. Clg:       | 0    | CFM   |
| Number of Registers: | 2           |                | Actual Winter Vent.:  | 1    | CFM   |
| Runout Air:          | 85          | CFM            | Percent of Supply.:   | 1    | %     |
| Runout Duct Size:    | 5           | in.            | Actual Summer Vent.:  | 4    | CFM   |
| Runout Air Velocity: | 626         | ft./min.       | Percent of Supply:    | 2    | %     |
| Runout Air Velocity: | 626         | ft./min.       | Actual Winter Infil.: | 3    | CFM   |
| Actual Loss:         | 0.322       | in.wg./100 ft. | Actual Summer Infil.: | 2    | CFM   |

| Item                           | Area     | -U-   | Htg   | Sen  | Clg   | Lat  | Sen   |
|--------------------------------|----------|-------|-------|------|-------|------|-------|
| Description                    | Quantity | Value | HTM   | Loss | HTM   | Gain | Gain  |
| N -Wall-14E-10-8b 7 X 8        | 43.5     | 0.079 | 4.2   | 182  | 0.8   | 0    | 36    |
| N -Gls-1D-cv-o shgc-0.56 100%S | 12.5     | 0.570 | 30.2  | 378  | 18.9  | 0    | 236   |
| UP-Ceil-16B-50 8.5 X 7         | 59.5     | 0.020 | 1.1   | 63   | 1.0   | 0    | 58    |
| Subtotals for Structure:       |          |       |       | 623  |       | 0    | 330   |
| Infil.: Win.: 3.3, Sum.: 1.6   | 56       |       | 3.482 | 195  | 0.446 | 55   | 25    |
| AED Excursion:                 |          |       |       |      |       |      | 63    |
| Equipment:                     |          |       |       |      |       | 683  | 3,217 |
| Lighting:                      | 34       |       |       |      |       |      | 116   |
| Room Totals:                   |          |       |       | 818  |       | 738  | 3,751 |

#### **Equipment Cooling Loads**

|   | Cont.  | Cont.  |        |       |       |      |
|---|--------|--------|--------|-------|-------|------|
|   | Output | Output | Avg.   | Pct   | Sens. | Lat. |
|   | Sens.  | Lat.   | In-Use | Used  | Load  | Load |
| Item Name   | Btuh   | Btuh   | Output | /Hour | Btuh  | Btuh |
| Cooking range with hood - four burners on high heat | 0      | 0      | 100    | 100   | 0     | 0    |
| Microwave   | 4949   | 1732   | 75     | 25    | 928   | 325  |
| Dishwasher  | 4096   | 1433   | 100    | 25    | 1024  | 358  |
| Refrigerator or freezer - 22 cubic feet             | 1265   | 0      | 100    | 100   | 1265  | 0    |
| Total   |        |        |        |       | 3217  | 683  |

| Correc | Rhvac - Residential & Light Commercial HVAC Loads Correct Air Engineering 100 Waibel Road, Port Deposit, MD 21904 |        |        |         |      |            | 38                  | Elite Softv<br>35 Roland Av | vare Develop<br>e., Baltimore, |       |
|--------|---|--------|--------|---------|------|------------|---------------------|-----------------------------|--------------------------------|-------|
| Sys    | tem 1 Room Loa  | d Sumi | mary   |         |      |            |                     |                             |                                |       |
|        |   |        | Htg    | Min     | Run  | Run        | Clg                 | Clg                         | Min                            | Act   |
|        | Room  | Area   | Sens   | Htg     | Duct | Duct       | Sens                | Lat                         | Clg                            | Sys   |
|        | Name  | SF     | Btuh   | CFM     | Size | Vel        | Btuh                | Btuh                        | CFM                            | CFM   |
|        | ne 1  | 400    | 4 44 4 | 00      | 0.5  | 400        | 0.500               | 407                         | 447                            | 4.47  |
| 1      | Basement<br>Master Badrages   | 126    | 1,414  | 20      | 2-5  | 428        | 2,568               | 427                         | 117                            | 117   |
| 2      | Master Bedroom  | 0.4    | FOF    | 0       | 4 5  | <b>5</b> 0 | 470                 | 4.4                         | 0                              | 0     |
| 2      | Basement Stairs   | 94     | 595    | 9       | 1-5  | 59         | 176                 | 14                          | 8                              | 8     |
| 3      | And Hallway<br>Basement   | 54     | 485    | 7       | 1-5  | 199        | 595                 | 14                          | 27                             | 27    |
| 3      | Bathroom  | 34     | 400    | ,       | 1-5  | 133        | 393                 | 14                          | 21                             | 21    |
| 4      | 1st Flr Foyer   | 19     | 1,894  | 27      | 1-5  | 167        | 500                 | 205                         | 23                             | 23    |
| 5      | 1st Flr Dining Rm   | 129    | 2,421  | 35      | 1-6  | 557        | 2,403               | 201                         | 109                            | 109   |
| 6      | 1st Flr Hall To   | 26     | 449    | 6       | 1-5  | 37         | 110                 | 57                          | 5                              | 5     |
| ·      | Dining Rm   |        | 1.0    | Ū       | . 0  | O.         |                     | O.                          | Ŭ                              | Ū     |
| 7      | 1st Flr Living  | 172    | 1,691  | 24      | 1-5  | 178        | 534                 | 216                         | 24                             | 24    |
|        | Room  |        | ,      |         |      |            |                     |                             |                                |       |
| 8      | 1st Flr Bath &  | 94     | 1,333  | 19      | 1-5  | 172        | 514                 | 141                         | 23                             | 23    |
|        | Stairs Hall   |        |        |         |      |            |                     |                             |                                |       |
| 9      | 1st Flr Kitchen   | 153    | 3,550  | 51      | 3-5  | 575        | 5,170               | 1,016                       | 235                            | 235   |
| 10     | 2nd Flr Master  | 177    | 3,869  | 55      | 3-5  | 602        | 5,414               | 708                         | 246                            | 246   |
|        | Bed Rm  |        |        |         |      |            |                     |                             |                                |       |
|        | 2nd Flr Hallway   | 106    | 1,984  | 28      | 1-5  | 170        | 510                 | 239                         | 23                             | 23    |
|        | 2nd Flr Stairwell   | 63     | 435    | 6       | 1-5  | 60         | 180                 | 47                          | 8                              | 8     |
| 13     | 2nd Flr Bedroom   | 124    | 1,634  | 23      | 1-5  | 531        | 1,591               | 327                         | 72                             | 72    |
|        | Center  |        |        | _       |      |            |                     |                             |                                |       |
|        | 2nd Flr Bathroom  | 35     | 573    | 8       | 1-5  | 104        | 312                 | 39                          | 14                             | 14    |
|        | 2nd Flr Kitchen   | 60     | 818    | 12      | 2-5  | 626        | 3,751               | 738                         | 171                            | 171   |
| 16     | 2nd Flr Bedroom<br>Rear   | 106    | 2,511  | 36      | 2-5  | 450        | 2,695               | 433                         | 123                            | 123   |
|        | Ventilation   |        | 1,771  |         |      |            | 468                 | 1,031                       |                                |       |
|        | Humidification  |        | 2,579  |         |      |            | 100                 | 1,001                       |                                |       |
|        | System 1 total  | 1,537  | 30,006 | 367     |      |            | 27,491              | 5,853                       | 1,229                          | 1,229 |
| O      |   | 1,001  | •      |         |      |            | ۱ ر <del>۱</del> را | 5,000                       | 1,223                          | 1,223 |
| -      | em 1 Main Trunk Size:   |        | 12x18  |         |      |            |                     |                             |                                |       |
| Velo   | per 100 ft.:  |        | 0.094  | ft./min |      |            |                     |                             |                                |       |
|        | <u> </u>  |        | 0.094  | iii.wg  |      |            |                     |                             |                                |       |
| Cool   | ing System Summary  |        |        |         |      |            |                     |                             |                                |       |
|        |   | O 1:   | _      | /       |      | Canaible   |                     |                             |                                | T ( ) |

|               | Cooling<br>Tons | Sensible/Latent<br>Split | Sensible<br>Btuh | Latent<br>Btuh | Total<br>Btuh |
|---------------|-----------------|--------------------------|------------------|----------------|---------------|
|               | 10115           |                          | Diuii            | Diuii          |               |
| Net Required: | 2.78            | 82% / 18%                | 27,491           | 5,853          | 33,344        |
| Recommended:  | 3.05            | 75% / 25%                | 27,491           | 9,164          | 36,655        |



Manual J, N, D, & S Report Services!

| Ceiling | 9 | Revision 2.4    |
|---------|---|-----------------|
| 009     |   | T TO THOUGHT 2. |

# **Project Lighting Summary**

Project: 3835 Roland Avenue

1st Flr

Engineer: GMG Date: 10/15/2023

### Individual Light Data

Watts: 9.5
Lumens: 840
Lumens per Watt: 88

Light Type: LED A-19

| Room / Area            | FC | Ceiling | Width  | Length | SqFt    | Lumens per SqFt |      | per SqFt | Total<br>Watts |
|------------------------|----|---------|--------|--------|---------|-----------------|------|----------|----------------|
| Foyer                  | 20 | 9       | 19.2   | 1      | 19.2    | 45              | 864  | 0.51     | 10             |
| Kitchen                | 50 | 9       | 13     | 11.8   | 153.4   | 50.5            | 7747 | 0.57     | 88             |
| Pantry                 |    |         |        |        |         |                 |      |          |                |
| Mud Room               |    |         |        |        |         |                 |      |          |                |
| Laundry Room           |    |         |        |        |         |                 |      |          |                |
| Dinning Room           | 5  | 9       | 12.667 | 10.167 | 128.785 | 30.2            | 3889 | 0.34     | 44             |
| Living Room            | 5  | 9       | 12.25  | 14     | 171.5   | 37              | 6346 | 0.42     | 72             |
| Den/Family Room        |    |         |        |        |         |                 |      |          |                |
| Office / Library       |    |         |        |        |         |                 |      |          |                |
| Master Bed Room        |    |         |        |        |         |                 |      |          |                |
| Master Bath Room       |    |         |        |        |         |                 |      |          |                |
| Master W.I.C.          |    |         |        |        |         |                 |      |          |                |
| Bed Room 1             |    |         |        |        |         |                 |      |          |                |
| Bed Room 1 W.I.C.      |    |         |        |        |         |                 |      |          |                |
| Bed Room 2             |    |         |        |        |         |                 |      |          |                |
| Bed Room 2 W.I.C.      |    |         |        |        |         |                 |      |          |                |
| Bed Room 3             |    |         |        |        |         |                 |      |          |                |
| Bed Room 3 W.I.C.      |    |         |        |        |         |                 |      |          |                |
| Bed Room 4             |    |         |        |        |         |                 |      |          |                |
| Bed Room 4 W.I.C.      |    |         |        |        |         |                 |      |          |                |
| Bath Room 1            | 5  | 9       | 8      | 11.75  | 94      | 45              | 4230 | 0.51     | 48             |
| Bath Room 2            |    |         |        |        |         |                 |      |          |                |
| Bath Room 3            |    |         |        |        |         |                 |      |          |                |
| Bath Room 4            |    |         |        |        |         |                 |      |          |                |
| Powder Room            |    |         |        |        |         |                 |      |          |                |
| Hall 1st Floor         | 5  | 9       | 4      | 6.5    | 26      | 22              | 572  | 0.25     | 6              |
| Hall Basement          |    |         |        |        |         |                 |      |          |                |
| Stairwell Basement     |    |         |        |        |         |                 |      |          |                |
| Stairwell to 2nd Floor |    |         |        |        |         |                 |      |          |                |
| Recreation Room        |    |         |        |        |         |                 |      |          |                |
| Basement Room 1        |    |         |        |        |         |                 |      |          |                |
| Basement Room 2        |    |         |        |        |         |                 |      |          |                |
| Mechanical Room        |    |         |        |        |         |                 |      |          |                |
| Home Theater Room      |    |         |        |        |         |                 |      |          |                |
| Play Room              |    |         |        |        |         |                 |      |          |                |
| Work Shop              |    |         |        |        |         |                 |      |          |                |
| Garage                 |    |         |        |        |         |                 |      |          |                |
| <u>`</u>               |    |         |        |        |         |                 |      |          |                |
|                        |    |         |        |        |         |                 |      |          |                |
|                        |    |         |        |        |         |                 |      |          |                |
|                        |    | 1       |        |        |         |                 |      |          |                |

Total Lighting Watts
Total Lumens

267

23,648

Total



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| Ceiling | 9 | Revision 2.4 |
|---------|---|--------------|
|         |   |              |

# **Project Lighting Summary**

Project: 3835 Roland Avenue

2nd Flr

Engineer: GMG Date: 10/15/2023

Individual Light Data

Room Lumens Lumens Watts

Watts: 9.5
Lumens: 840
Lumens per Watt: 88

Light Type: LED A-19

| Room / Area            | FC   | Ceiling | Width  | Length |         | ner SaFt  |        | per SqFt  | Watte  |
|------------------------|------|---------|--------|--------|---------|-----------|--------|-----------|--------|
| Foyer                  | - 10 | l       | Width  | Lengui | Jqi t   | per oqr t | Total  | per oqrit | vvaiis |
| Kitchen                | 50   | 9       | 7      | 8.5    | 59.5    | 50.5      | 3005   | 0.57      | 34     |
| Pantry                 | 30   |         | '      | 0.0    | 33.3    | 30.3      | 3003   | 0.07      | J-T    |
| Mud Room               |      |         |        |        |         |           |        |           |        |
| Laundry Room           |      |         |        |        |         |           |        |           |        |
| Dinning Room           |      |         |        |        |         |           |        |           |        |
| Living Room            |      |         |        |        |         |           |        |           |        |
| Den/Family Room        |      |         |        |        |         |           |        |           |        |
| Office / Library       |      |         |        |        |         |           |        |           |        |
|                        | 40   |         | 40.007 | 4.4    | 477 000 | 20.75     | 2000   | 0.00      | 40     |
| Master Bed Room        | 40   | 9       | 12.667 | 14     | 177.338 | 20.75     | 3680   | 0.23      | 42     |
| Master Bath Room       |      |         |        |        |         |           |        |           |        |
| Master W.I.C.          |      |         | 40.0=  | 40.000 | 400 545 | 4= =      | 0.4.00 | 0.00      |        |
| Bed Room 1             | 5    | 9       | 12.25  | 10.083 | 123.517 | 17.5      | 2162   | 0.20      | 24     |
| Bed Room 1 W.I.C.      |      |         |        |        |         |           |        |           |        |
| Bed Room 2             | 5    | 9       | 11.75  | 9      | 105.75  | 17.5      | 1851   | 0.20      | 21     |
| Bed Room 2 W.I.C.      |      |         |        |        |         |           |        |           |        |
| Bed Room 3             |      |         |        |        |         |           |        |           |        |
| Bed Room 3 W.I.C.      |      |         |        |        |         |           |        |           |        |
| Bed Room 4             |      |         |        |        |         |           |        |           |        |
| Bed Room 4 W.I.C.      |      |         |        |        |         |           |        |           |        |
| Bath Room 1            | 5    | 9       | 5      | 7      | 35      | 45        | 1575   | 0.51      | 18     |
| Bath Room 2            |      |         |        |        |         |           |        |           |        |
| Bath Room 3            |      |         |        |        |         |           |        |           |        |
| Bath Room 4            |      |         |        |        |         |           |        |           |        |
| Powder Room            |      |         |        |        |         |           |        |           |        |
| Hall 2nd Floor         | 5    | 9       | 3.5    | 30.417 | 106.46  | 22        | 2342   | 0.25      | 26     |
| Hall Basement          |      |         |        |        |         |           |        |           |        |
| Stairwell Basement     |      |         |        |        |         |           |        |           |        |
| Stairwell to 2nd Floor | 10   | 9       | 10.5   | 6      | 63      | 22        | 1386   | 0.25      | 16     |
| Recreation Room        |      |         |        |        |         |           |        |           |        |
| Basement Room 1        |      |         |        |        |         |           |        |           |        |
| Basement Room 2        |      |         |        |        |         |           |        |           |        |
| Mechanical Room        |      |         |        |        |         |           |        |           |        |
| Home Theater Room      |      |         |        |        |         |           |        |           |        |
| Play Room              |      |         |        |        |         |           |        | 1         |        |
| Work Shop              |      |         |        |        |         |           |        |           |        |
| Garage                 |      |         |        |        | 1       |           |        |           |        |
| Carago                 |      |         |        |        |         |           |        |           |        |
|                        |      |         |        |        |         |           |        |           |        |
|                        |      |         |        |        |         |           |        |           |        |
|                        |      |         |        |        |         |           |        |           |        |

Total Lighting Watts

181

**Total Lumens** 

16,000



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Ceiling Revision 2.4 6.8

# **Project Lighting Summary**

Project: 3835 Roland Avenue **BASEMENT** 

Engineer: GMG Date: 10/15/2023

## Individual Light Data

Watts: 9.5 Lumens: 840 Lumens per Watt:

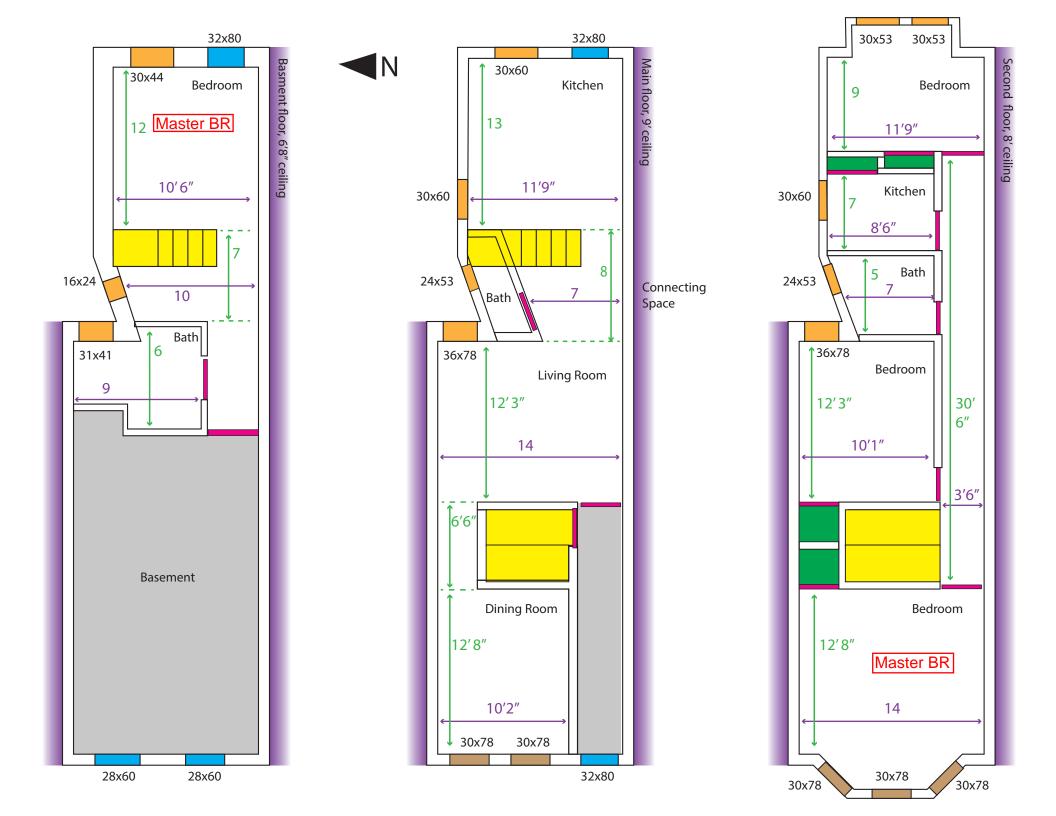
LED A-19 Light Type:

| Room / Area            | FC | Ceiling | Width | Length | SqFt | Lumens per SqFt |      | per SqFt | Total<br>Watts |
|------------------------|----|---------|-------|--------|------|-----------------|------|----------|----------------|
| Foyer                  |    |         |       |        | - 4- | 1               |      |          |                |
| Kitchen                |    |         |       |        |      |                 |      |          |                |
| Pantry                 |    |         |       |        |      |                 |      |          |                |
| Mud Room               |    |         |       |        |      |                 |      |          |                |
| Laundry Room           |    |         |       |        |      |                 |      |          |                |
| Dinning Room           |    |         |       |        |      |                 |      |          |                |
| Living Room            |    |         |       |        |      |                 |      |          |                |
| Den/Family Room        |    |         |       |        |      |                 |      |          |                |
| Office / Library       |    |         |       |        |      |                 |      |          |                |
| Master Bed Room        | 40 | 6.8     | 12    | 10.5   | 126  | 20.75           | 2615 | 0.23     | 30             |
| Master Bath Room       |    | 0.0     | ·     |        |      |                 |      | 0.20     |                |
| Master W.I.C.          |    |         |       |        |      |                 |      |          |                |
| Bed Room 1             | 5  | 6.8     | 6     | 9      | 54   | 17.5            | 945  | 0.20     | 11             |
| Bed Room 1 W.I.C.      |    | 0.0     |       |        | 0.   | 17.0            | 0.10 | 0.20     | • • •          |
| Bed Room 2             |    |         |       |        |      |                 |      |          |                |
| Bed Room 2 W.I.C.      |    |         |       |        |      |                 |      |          |                |
| Bed Room 3             |    |         |       |        |      |                 |      |          |                |
| Bed Room 3 W.I.C.      |    |         |       |        |      |                 |      |          |                |
| Bed Room 4             |    |         |       |        |      |                 |      |          |                |
| Bed Room 4 W.I.C.      |    |         |       |        |      |                 |      |          |                |
| Bath Room 1            |    |         |       |        |      |                 |      |          |                |
| Bath Room 2            |    |         |       |        |      |                 |      |          |                |
| Bath Room 3            |    |         |       |        |      |                 |      |          |                |
| Bath Room 4            |    |         |       |        |      |                 |      |          |                |
|                        |    |         |       |        |      |                 |      |          |                |
| Powder Room            |    |         |       |        |      |                 |      |          |                |
| Hall 1st Floor         |    |         |       |        |      |                 |      |          |                |
| Hall Basement          | 40 | 0.0     | 0.4   | 4      | 0.4  | - 00            | 0000 | 0.05     |                |
| Stairwell Basement     | 10 | 6.8     | 94    | 1      | 94   | 22              | 2068 | 0.25     | 23             |
| Stairwell to 2nd Floor |    |         |       |        |      |                 |      |          |                |
| Recreation Room        |    |         |       |        |      |                 |      |          |                |
| Basement Room 1        |    |         |       |        |      |                 |      |          |                |
| Basement Room 2        |    |         |       |        |      |                 |      |          |                |
| Mechanical Room        |    |         |       |        |      |                 |      |          |                |
| Home Theater Room      |    |         |       |        |      |                 |      |          |                |
| Play Room              |    |         |       |        |      | <b></b>         |      |          |                |
| Work Shop              |    |         |       |        |      | <b></b>         |      |          |                |
| Garage                 |    |         |       |        |      |                 |      |          |                |
|                        |    |         |       |        |      | <b></b>         |      |          |                |
|                        |    |         |       |        |      |                 |      |          |                |
|                        |    |         |       |        |      |                 |      |          |                |
|                        |    |         |       |        |      |                 |      |          |                |

**Total Lighting Watts** 

64 5,628

**Total Lumens** 



Rhvac - Residential & Light Commercial HVAC Loads
Correct Air Engineering, LLC.
100 Waibel Road, Port Deposit, MD 21904

Manual J Load Calculation, ACCA 8th Edition

#### HVAC System Design Disclaimer

#### **General Notes**

This report summarizes the load calculations, equipment selection, and duct design of a residence using ACCA/ASHRAE procedures (J. S. D. 62.2) and current codes (IRC, IECC). All calculations are based on information given to Correct Air Engineering, LLC. in the form of surveys, drawings, sketches, pictures, and meetings. In certain cases, Correct Air Engineering, LLC. may make reasonable assumptions about design conditions and construction materials that may or may not be accurate for the building of concern. It is the responsibility of the installing HVAC contractor to verify the design conditions, construction materials, and compatibility with existing equipment before equipment purchase and installation. All HVAC system design work provided in the following pages are based upon information provided by the particular party submitting a particular project to Correct Air Engineering, LLC. Correct Air Engineering, LLC. has not and does not independently verify that the data provided to us is correct or complete, and any design or load calculation made by Correct Air Engineering, LLC. are based upon the information provided by contracting parties. Correct Air Engineering, LLC. makes no claim that the information given to us is correct or complete. Correct Air Engineering, LLC. utilizes the latest load calculation software which is an ACCA Certified and ASHRAE recommended HVAC system design software. The mathematical model and design of the HVAC system, designed by Correct Air Engineering, LLC., is only as accurate as the data provided. Correct Air Engineering, LLC. makes every attempt possible to be as detailed and accurate as possible, however, there is no reasonable means to mathematically model an HVAC system that has not been properly installed, or has had after-the-fact building modifications or HVAC system component alterations or substitutions. If there is any construction modifications (floor plan, roofing material, window types/sizes, insulation characteristics, or any other change that will alter the load calculation results), HVAC equipment substitutions, duct sizing or layout changes, which is not noted in this report, and therefore not provided to Correct Air Engineering, LLC. for consideration for the HVAC system design, then Correct Air Engineering, LLC. may not guarantee the performance of the HVAC system design, and all design standards and procedures performed for this HVAC system design, including this report, may no longer be valid. Correct Air Engineering, LLC. will not guarantee the performance of the HVAC system design if the equipment selection and/or duct design has been performed by another party. Also, Correct Air Engineering, LLC. will not guarantee the performance of the HVAC system design that has not been properly installed or tested to verify performance has conformed to manufacturer specifications and design criteria provided in this report. It is up to the installing HVAC contractor to properly install, test, and verify all components of the HVAC system. All installing HVAC contractors are expected to follow ACCA Standards 5 and 9 for quality HVAC equipment installation. All information on any existing HVAC equipment (prior to design) to remain with an existing structure must be provided to Correct Air Engineering, LLC. prior to the design for appropriate selection of new and compatible equipment. It is up to the installing HVAC contractor to verify equipment compatibility between the newly installed equipment (per design) and any existing equipment remaining, via manufacture specifications and airflow/static pressure measurements. Correct Air Engineering, LLC. does not provide architectural or engineering plans or diagrams for the public or for use by contractors or construction companies as final "construction documents". Correct Air Engineering, LLC, works with architectural and engineering firms and with contractors in connection with their designs of HVAC systems. Copies of this report, including the completed balance report (and any other documents that need to be completed by the installing HVAC contractor verifying equipment performance meeting design requirements and manufacturer specifications), must be kept on file by the installing HVAC contractor, and also a copy given to the homeowner to remain attached to the HVAC equipment, and to any other party of specific interest (i.e., code official, county, builder/architect). All Correct Air Engineering, LLC., warranties are null and voided on unpaid accounts.

Note: block loads provide overall building required btu's for heating and cooling only and do not provide actual cfm and btu's required for each room. Btu's and cfm's for each room can vary due to exterior exposures of N, S, E, and W, by as much as 2.83 tons in some residential cases. Block loads are not able to use cathedral ceiling with flat ceilings, and will not combine basement walls with studded walls, or stone & brick walls in conjunction with studded walls. We discourage the use of block loads for any new construction job or major change of existing system. Block load are suitable when providing system change outs to compare existing system to replacement system.

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