499 Jay Windom Martin Residence Hvac Design HVAC Load Calculations

for

499 Jay Windom Martin Residence 6406 Westover Dr. Granbury, TX.



Prepared By:

499 Jay Windom Martin Residence 6406 Westover Dr. Granbury, TX.

Monday, October 13, 2025

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

Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, and ACCA Manual D.

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Project Report

General Project Information

Project Filename: C:\User\User\Uper\AppData\Local\Elite Software\Rhvac 10\499 Jay Windom RESIDENCE

GREEN HOUSE.r10

Project Title: 499 Jay Windom Martin Residence Hvac Design

Designed By: Engr Rahaman

Project Date: Friday, October 22, 2025

Client Address: 499 Jay Windom Martin Residence
Client City: 6406 Westover Dr. Granbury, TX.
Company Address: 499 Jay Windom Martin Residence
Company City: 6406 Westover Dr. Granbury, TX.

Permit Number(s): HV2025001

Design Data

Reference City: Fort Worth Carswell AFB, Texas

Building Orientation: Front door faces North

Daily Temperature Range: Medium
Latitude: 32 Degrees
Elevation: 650 ft.
Altitude Factor: 0.977

| | Outdoor | Outdoor | Outdoor | Indoor | Indoor | Grains |
|---------|----------|----------|---------|---------|----------|-------------------|
| | Dry Bulb | Wet Bulb | Rel.Hum | Rel.Hum | Dry Bulb | <u>Difference</u> |
| Winter: | 40 | 20.42 | 0% | 30% | 72 | 46.90 |
| Summer: | 100 | 74 | 30% | 50% | 75 | 21 |

Check Figures

| Square ft. of Room Area: | 450 | Square ft. Per Ton: | 163 |
|----------------------------|-----|---------------------|-------|
| Total Building Supply CFM: | 788 | CFM Per Square ft.: | 1.752 |

Volume (ft³) (Above Grade): 3,600 Volume (ft³) (Total): 3,600

Building Loads

| Total Heating Required Including Ventilation Air: | 35,095 | Btuh | 35.095 | MBH |
|---|--------|------|--------|-----|
| Total Sensible Gain: | 21,240 | Btuh | 64 | % |
| Total Latent Gain: | 11,947 | Btuh | 36 | % |

Total Cooling Required Including Ventilation Air: 33,187 Btuh 2.77 Tons (Based On Sensible + Latent)

Notes

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Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, 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.

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Load Preview Report

| Scope | Has AED | Net Ton | ft.² /Ton | Area | Sen Gain | Lat Gain | Net Gain | Sen Loss | Min Htg CFM | Min Clg CFM | Sys Htg CFM | Sys Clg CFM | Sys Act CFM | |
|----------------------------|------------|------------|--------------|------|-------------|-------------|-------------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------|
| Building | | 2.77 | 163 | 450 | 21,240 | 11,947 | 33,187 | 35,095 | 393 | 788 | 393 | 788 | 788 | |
| System 1 Main Floor | Yes | 2.77 | 163 | 450 | 21,240 | 11,947 | 33,187 | 35,095 | 393 | 788 | 393 | 788 | 788 | 10x15 |
| Ventilation | | | | | 4,298 | 5,658 | 9,956 | 5,501 | | | 400 | 400 | 400 | |
| Humidification | | | | | | | | 12,458 | | | | | | |
| Zone 1 | | | | 450 | 16,942 | 6,288 | 23,231 | 17,135 | 393 | 788 | 393 | 788 | 788 | 10x15 |
| 1-Second Floor Green House | | | | 450 | 16,942 | 6,288 | 23,231 | 17,135 | 393 | 788 | 393 | 788 | 788 | 114 |
| | | | | | | | | | | | | | | |

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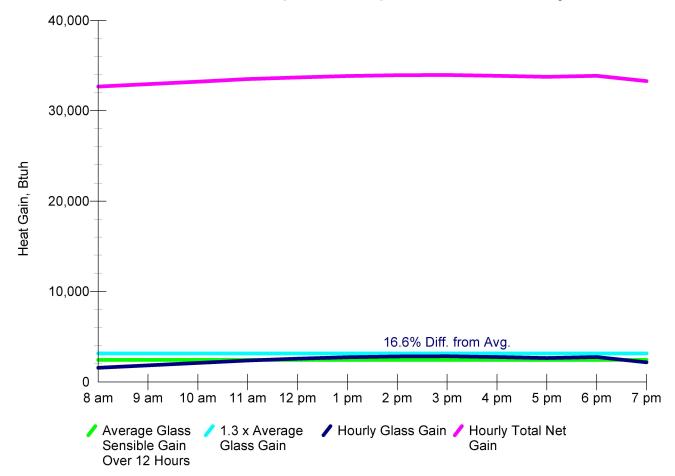
Duct Size Preview

| Room or Duct Name | Source | Minimum Velocity | Maximum Velocity | Rough. Factor | Design L/100 | SP Loss | Duct Velocity | Duct Length | | Clg Flow | Act. Flow | Duct Size | Reg Size |
|----------------------------|----------|---------------------|---------------------|------------------|-----------------|------------|------------------|----------------|--------|-------------|--------------|--------------|-------------|
| System 1 | | | - | | | | | | 1 1011 | | | O.L.C | |
| Supply Runouts | | | | | | | | | | | | | |
| Zone 1 | | | | | | | | | | | | | |
| 1-Second Floor Green House | Built-In | 0 | 750 | 0.01 | 0.1 | | 737.6 | | 393 | 788 | 788 | 114 | |
| Other Ducts in System 1 | | | | | | | | | | | | | |
| Supply Main Trunk | Built-In | 0 | 900 | 0.003 | 0.1 | | 756.9 | | 393 | 788 | 788 | 10x15 | |

| | Summary |
|---------------|---------|
| System 1 | |
| Heating Flow: | 393 |
| Cooling Flow: | 788 |

System 1 - Main Floor - Adequate Exposure Diversity Test

Test For Adequate Exposure Diversity



AED Calculation Summary

--- SYSTEM HAS ADEQUATE EXPOSURE DIVERSITY. ---

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

Peak load exceeds 12-hour average load by 16.6%.

AED Excursion (amount by which peak exceeds 1.3 x average): 0 Btuh

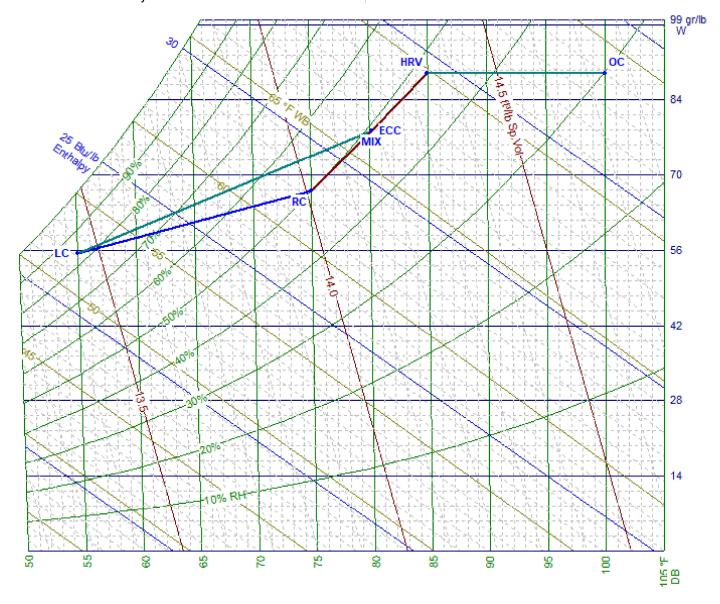
Definition: A system has adequate exposure diversity if the peak-hour glass load for the entire conditioned space does not exceed the average glass load for the entire conditioned space by more than 30 percent.



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System 1 - Main Floor - Psychrometric Chart

| Name | Description | DB | WB | Name | Description | DB | WB |
|------|--------------------------|-----|------|------|-------------------------|------|------|
| RC | Room Condition | 75 | 62.4 | OC | Outdoor Condition | 100 | 74 |
| LC | Leaving Coil Condition | 55 | 52.2 | ECC | Entering Coil Condition | 80.2 | 66.4 |
| 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 | 80.2 | 66.4 |
| 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 | 85 | 69.8 | | | | |



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Total Building Summary Loads

| Component | Area | Sen | Lat | Sen | Total |
|---|------|-------------|------------|------------|------------|
| Description | Quan | Loss | Gain | Gain | Gain |
| 1G-cm-s: Glazing-Double pane with storm, clear, metal frame no break, U-value 0.55, SHGC 0.62 | 80 | 1,408 | 0 | 2,122 | 2,122 |
| 11F: Door-Wood - Solid Core With Metal Storm, U-value 0.28 | 48 | 430 | 0 | 484 | 484 |
| Frame wall-R-23: Wall-Frame, Custom, R-23 insulation, U-value 0.043 | 312 | 433 | 0 | 298 | 298 |
| 16A-38: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Unvented Attic, No Radiant Barrier, Any Roofing Material, Any Roof Color, R-38 insulation, Uvalue 0.026 | 450 | 374 | 0 | 936 | 936 |
| 19A1-11op: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, spray foam insulation, passive, R-11 open cell 1/2 lb. spray foam, 3 inches in 2 x 10 joist cavity, U-value 0.072 | 450 | 738 | 0 | 576 | 576 |
| Subtotals for structure: | | 3,383 | 0 | 4,416 | 4,416 |
| People: | 1 | | 230 | 300 | 530 |
| Equipment: | 000 | | 400 | 800 | 1,200 |
| Lighting: | 200 | 0 | 0 | 682 | 682 |
| Ductwork: | | 0 42.752 | 0 | 0 | 0 |
| Infiltration: Winter CFM: 400, Summer CFM: 400 | | 13,752 | 5,658 | 10,744 | 16,403 |
| Ventilation: Winter CFM: 400, Summer CFM: 400 | | 5,501 | 5,658 0 | 4,298 0 | 9,956 0 |
| Humidification (Winter) 33.97 gal/day : | | 12,458 | • | • | |
| Total Building Load Totals: | | 35,095 | 11,947 | 21,240 | 33,187 |

| - | | | | | | |
|----------|----|----|----|----|----|----------|
| Ch | 20 | v | Ηı | ai | ır | 20 |
| 011 | - | r\ | | ч٠ | ш | $ \circ$ |

| 788 | CFM Per Square ft.: | 1.752 |
|-------|---------------------|----------------------------------|
| 450 | Square ft. Per Ton: | 163 |
| 3,600 | | |
| 3,600 | | |
| | 450 3,600 | 450 Square ft. Per Ton: 3,600 |

Building Loads

| Danang Loado | | | | |
|---|--------|------|--------|-----------------------------------|
| Total Heating Required Including Ventilation Air: | 35,095 | Btuh | 35.095 | MBH |
| Total Sensible Gain: | 21,240 | Btuh | 64 | % |
| Total Latent Gain: | 11,947 | Btuh | 36 | % |
| Total Cooling Required Including Ventilation Air: | 33,187 | Btuh | 2.77 | Tons (Based On Sensible + Latent) |

Notes

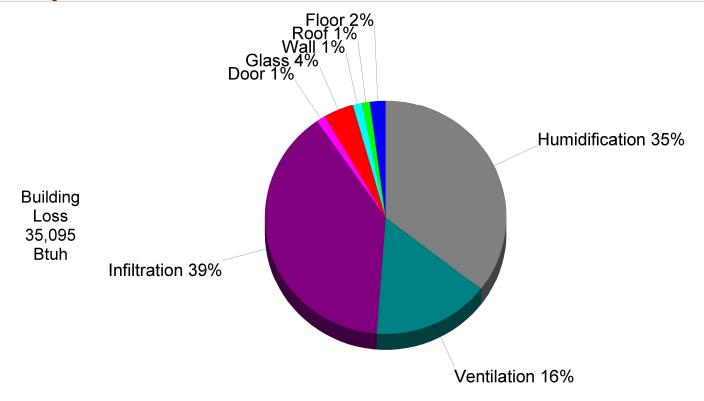
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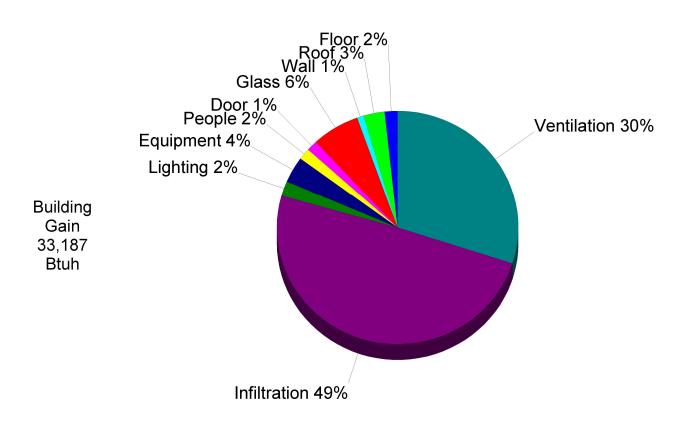
Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, and ACCA Manual D.

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

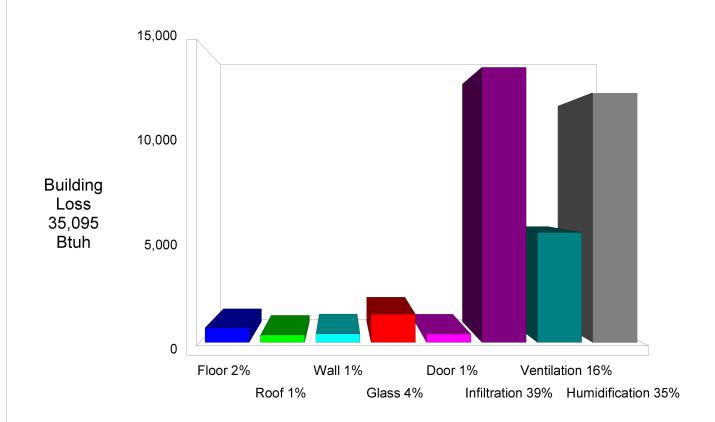


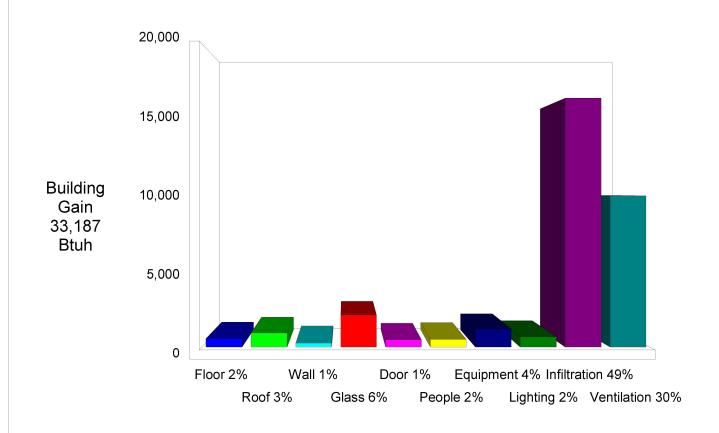


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Building Bar Graph





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System 1 Main Floor Summary Loads

| Component | Area | Sen | Lat | Sen | Total |
|---|------|--------|--------|--------|--------|
| Description | Quan | Loss | Gain | Gain | Gain |
| 1G-cm-s: Glazing-Double pane with storm, clear, metal frame no break, U-value 0.55, SHGC 0.62 | 80 | 1,408 | 0 | 2,122 | 2,122 |
| 11F: Door-Wood - Solid Core With Metal Storm, U-value 0.28 | 48 | 430 | 0 | 484 | 484 |
| Frame wall-R-23: Wall-Frame, Custom, R-23 insulation, U-value 0.043 | 312 | 433 | 0 | 298 | 298 |
| 16A-38: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Unvented Attic, No Radiant Barrier, Any Roofing Material, Any Roof Color, R-38 insulation, Uvalue 0.026 | 450 | 374 | 0 | 936 | 936 |
| 19A1-11op: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, spray foam insulation, passive, R-11 open cell 1/2 lb. spray foam, 3 inches in 2 x 10 joist cavity, U-value 0.072 | 450 | 738 | 0 | 576 | 576 |
| Subtotals for structure: | | 3,383 | 0 | 4,416 | 4,416 |
| People: | 1 | | 230 | 300 | 530 |
| Equipment: | | | 400 | 800 | 1,200 |
| Lighting: | 200 | | | 682 | 682 |
| Ductwork: | | 0 | 0 | 0 | 0 |
| Infiltration: Winter CFM: 400, Summer CFM: 400 | | 13,752 | 5,658 | 10,744 | 16,403 |
| Ventilation: Winter CFM: 400, Summer CFM: 400 | | 5,501 | 5,658 | 4,298 | 9,956 |
| Humidification (Winter) 33.97 gal/day : | | 12,458 | 0 | 0 | 0 |
| System 1 Main Floor Load Totals: | | 35,095 | 11,947 | 21,240 | 33,187 |

| 1 | C | h | e | Cl | < | H | g | ur | e | S |
|---|---|---|---|----|---|---|---|----|---|---|
| | | | | | | | | | | |

| Supply CFM: | 788 | CFM Per Square ft.: | 1.752 |
|-----------------------------|-------|---------------------|-------|
| Square ft. of Room Area: | 450 | Square ft. Per Ton: | 163 |
| Volume (ft³) (Above Grade): | 3,600 | | |
| Volume (ft³) (Total): | 3,600 | | |

System Loads

| Total Heating Required Including Ventilation Air: | 35,095 | Btuh | 35.095 MBH | 5 MB | |
|---|--------|------|--|-------|---|
| Total Sensible Gain: | 21,240 | Btuh | 64 % | 4 % | |
| Total Latent Gain: | 11,947 | Btuh | 36 % | 3 % | |
| Total Cooling Required Including Ventilation Air: | 33,187 | Btuh | 2.77 Tons (Based On Sensible + Latent) | 7 Ton | j |

Notes

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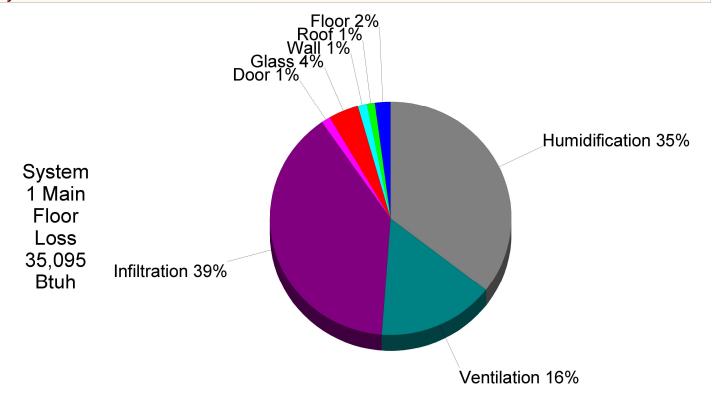
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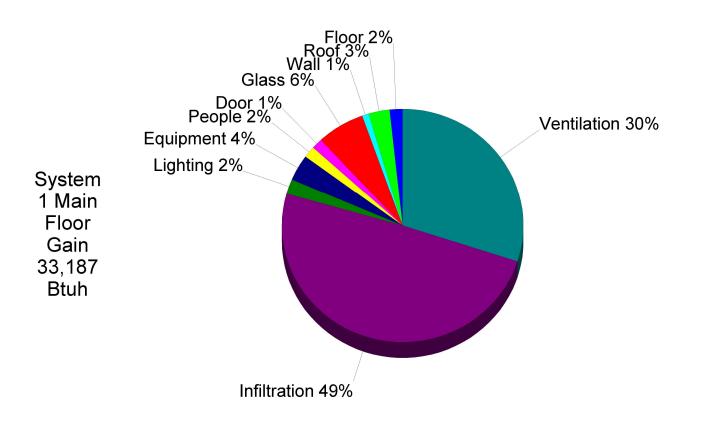
All computed results are estimates as building use and weather may vary.

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



System 1 Main Floor Pie Chart



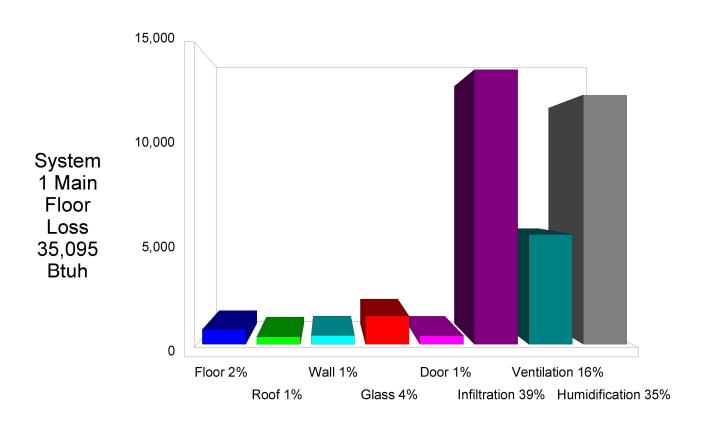


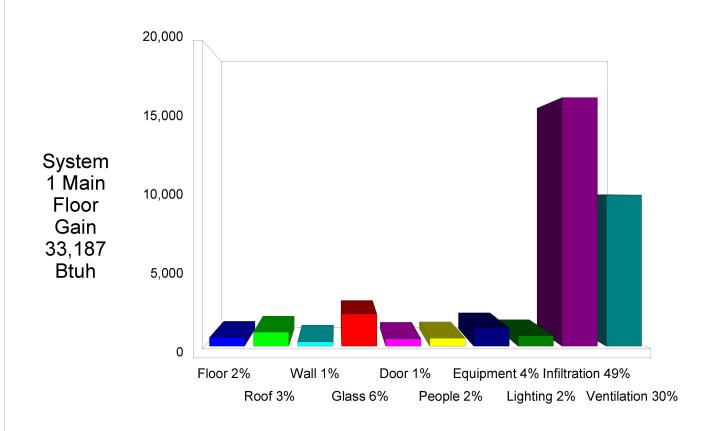
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System 1 Main Floor Bar Graph







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Equipment Data - System 1 - Main Floor

Cooling

System Type: Standard Air Conditioner

Outdoor Model: PACKAGE UNIT MODEL :GPG1336090M418

Outdoor Manufacturer: GOODMAN

Description: 0
Nominal Capacity: 36,000
Adjusted Capacity: 36000
Adjusted Sensible Capacity: 36000
Efficiency: 16 SEER

Heating

System Type: Electric Resistance

Model: PACKAGE UNIT MODEL :GPG1336090M418

Manufacturer: GOODMAN

Description: 0
Capacity: 36,000
Efficiency: 0%

This system's equipment was selected in accordance with ACCA Manual S.

Manual S equipment sizing data: SODB: 100F, SOWB: 74F, WODB: 40F, SIDB: 75F, SIRH: 50%, WIDB: 72F, Sen. gain: 21,240 Btuh, Lat. gain: 11,947 Btuh, Sen. loss: 35,095 Btuh, Entering clg. coil DB: 87.7F, Entering clg. coil WB: 68.7F, Entering htg. coil DB: 59F, Clg. coil TD: 20F, Htg. coil TD: 70F, Req. clg. airflow: 788 CFM, Req. htg. airflow: 393 CFM

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Manual S Performance Data - System 1 - Main Floor

Loads and Design Conditions

Cooling:

| Outdoor Dry Bulb: | 100 | Sensible Gain: | 21.240 |
|-------------------|-----|--------------------|--------|
| Outdoor Wet Bulb: | 74 | Latent Gain: | 11.947 |
| Indoor Dry Bulb: | 75 | Total Gain: | 33.187 |
| Indoor RH: | 50 | Load SHR: | 0.64 |
| Supply Airflow: | 779 | Entering Dry Bulb: | 87.9 |
| | | Entering Wet Bulb: | 68.7 |

Heating:

Outdoor Dry Bulb:40Sensible Loss:35.095Indoor Dry Bulb:72Entering Dry Bulb:59.0Indoor RH:30Supply Airflow:393

Equipment Performance Data at System Design Conditions

This system's equipment was selected in accordance with ACCA Manual S.

Cooling:

Model Type: Standard Air Conditioner, Model: PACKAGE UNIT MODEL::GPG1336090M418

Nominal Capacity: 36.000, Manufacturer: GOODMAN

Entered Interpolation Data:

| EWB | Air Flow | ODB | Total | Power | | EDB 87.9 °F |
|-------|----------|-----|-------------------|-------------|-----|-------------------------------|
| °F | CFM | °F | Capacity MBtuh | Input kW | S/T | Sensible Capacity MBtuh |
| 68.73 | 779 | 100 | 60 | 0 | 1 | 60 |

Interpolation Results:

| | | | Percent |
|--------------------|--------|-------------|---------|
| | | <u>Load</u> | of Load |
| Sensible Capacity: | 60.000 | 21.240 | 282% |
| Latent Capacity: | 0.000 | 11.947 | 0% |
| Total Capacity: | 60.000 | 33.187 | 181% |

Heating:

Model Type: Electric Resistance, Model: PACKAGE UNIT MODEL: GPG1336090M418, Nominal Capacity: 36.000,

Manufacturer: GOODMAN

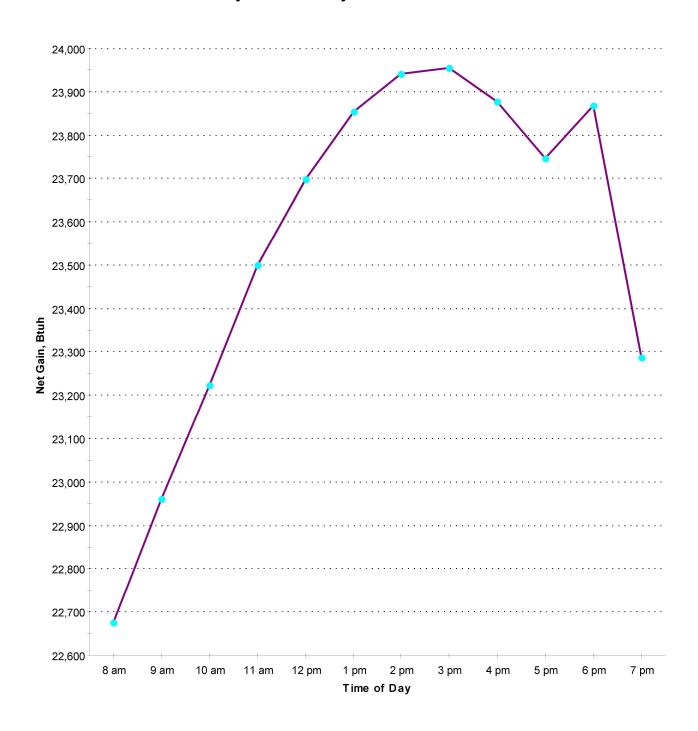
Results:

| | | | Percent |
|-------------------|--------|-------------|---------|
| | | <u>Load</u> | of Load |
| Heating Capacity: | 36.000 | 35.095 | 103% |



System 1 - Hourly Room Net Gain

System 1 Hourly Room Net Gain



Second Floor Green House (9%)

Note: Glass gain as a percent of net gain is shown in parenthesis. Although floor, roof, wall and door gains also vary throughout the day, for this graph and in Manual J glass gains are the only ones that fluctuate.

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System 1, Zone 1 Summary Loads (Average Load Procedure for Rooms)

| Component | Area | Sen | Lat | Sen | Total |
|---|------|--------|-------|------------|--------------|
| Description | Quan | Loss | Gain | Gain | Gain |
| 1G-cm-s: Glazing-Double pane with storm, clear, metal frame no break, U-value 0.55, SHGC 0.62 | 80 | 1,408 | 0 | 2,122 | 2,122 |
| 11F: Door-Wood - Solid Core With Metal Storm, U-value 0.28 | 48 | 430 | 0 | 484 | 484 |
| Frame wall-R-23: Wall-Frame, Custom, R-23 insulation, U-value 0.043 | 312 | 433 | 0 | 298 | 298 |
| 16A-38: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Unvented Attic, No Radiant Barrier, Any Roofing Material, Any Roof Color, R-38 insulation, Uvalue 0.026 | 450 | 374 | 0 | 936 | 936 |
| 19A1-11op: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, spray foam insulation, passive, R-11 open cell 1/2 lb. spray foam, 3 inches in 2 x 10 joist cavity, U-value 0.072 | 450 | 738 | 0 | 576 | 576 |
| Subtotals for structure: | | 3,383 | 0 | 4,416 | 4,416 |
| People: | 1 | | 230 | 300 | 530 |
| Equipment: | 200 | | 400 | 800 682 | 1,200 682 |
| Lighting: Ductwork: | 200 | 0 | 0 | 002 | 002 |
| Infiltration: Winter CFM: 400, Summer CFM: 400 | | 13,752 | 5,658 | 10,744 | 16,403 |
| System 1, Zone 1 Load Totals: | | 17,135 | 6,288 | 16,942 | 23,231 |

| Check Figures | | | |
|-----------------------------|-------|---------------------|-------|
| Supply CFM: | 788 | CFM Per Square ft.: | 1.752 |
| Square ft. of Room Area: | 450 | Square ft. Per Ton: | 232 |
| Volume (ft³) (Above Grade): | 3,600 | | |
| Volume (ft³) (Total): | 3,600 | | |

| Zone Loads | | | |
|-------------------------|-----------|-----------|-----------------------------------|
| Total Heating Required: | 17,135 Bt | uh 17.135 | MBH |
| Total Sensible Gain: | 16,942 Bt | uh 73 | % |
| Total Latent Gain: | 6,288 Bt | uh 27 | % |
| Total Cooling Required: | 23,231 Bt | uh 1.94 | Tons (Based On Sensible + Latent) |

Notes

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Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, 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.

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Detailed Room Loads - Room 1 - Second Floor Green House (Average Load Procedure)

| General | | | | | |
|----------------------|-------------|----------------|-----------------------|------|-------|
| Calculation Mode: | Htg. & clg. | | Occurrences: | 1 | |
| Room Length: | 10.0 | ft. | System Number: | 1 | |
| Room Width: | 45.0 | ft. | Zone Number: | 1 | |
| Area: | 450.0 | sq.ft. | Supply Air: | 788 | CFM |
| Ceiling Height: | 8.0 | ft. | Supply Air Changes: | 13.1 | AC/hr |
| Volume: | 3,600 | cu.ft. | Req. Vent. Clg: | 400 | CFM |
| Number of Registers: | 1 | | Actual Winter Vent.: | 400 | CFM |
| Runout Air: | 788 | CFM | Percent of Supply.: | 51 | % |
| Runout Duct Size: | 14 | in. | Actual Summer Vent.: | 400 | CFM |
| Runout Air Velocity: | 738 | ft./min. | Percent of Supply: | 51 | % |
| Runout Air Velocity: | 738 | ft./min. | Actual Winter Infil.: | 400 | CFM |
| Actual Loss: | 0.107 | in.wg./100 ft. | Actual Summer Infil.: | 400 | CFM |
| | | | | | |

| Item | Area | -U- | Htg | Sen | Clg | Lat | Sen |
|-----------------------------------|----------|-------|--------|--------|--------|-------|--------|
| Description | Quantity | Value | HTM | Loss | HTM | Gain | Gain |
| N -Wall-Frame wall-R-23 45 X 8 | 232 | 0.043 | 1.4 | 322 | 1.0 | 0 | 222 |
| E -Wall-Frame wall-R-23 10 X 8 | 80 | 0.043 | 1.4 | 111 | 1.0 | 0 | 76 |
| N -Door-11F 3 X 8 | 24 | 0.280 | 9.0 | 215 | 10.1 | 0 | 242 |
| N -Door-11F 3 X 8 | 24 | 0.280 | 9.0 | 215 | 10.1 | 0 | 242 |
| N -Gls-1G-cm-s shgc-0.62 100%S | 80 | 0.550 | 17.6 | 1,408 | 26.5 | 0 | 2,122 |
| UP-Ceil-16A-38 10 X 45 | 450 | 0.026 | 0.8 | 374 | 2.1 | 0 | 936 |
| Floor-19A1-11op 45 X 10 | 450 | 0.072 | 1.6 | 738 | 1.3 | 0 | 576 |
| Subtotals for Structure: | | | | 3,383 | | 0 | 4,416 |
| Infil.: Win.: 400.0, Sum.: 400.0 | 440 | | 31.256 | 13,752 | 24.418 | 5,658 | 10,744 |
| People: 230 lat/per, 300 sen/per: | 1 | | | | | 230 | 300 |
| Equipment: | | | | | | 400 | 800 |
| Lighting: | 200 | | | | | | 682 |
| Room Totals: | | | | 17,135 | | 6,288 | 16,942 |

| Rhvac - Residential & Light Cor Panshe Enterprice Dhaka, Bangladesh, BSMRMU 12 | | AC Loads | 1 | | | 499 Jay Wir | Elite Softwa ndom Martin Ro | | |
|---|-----------------|---|---|---------------------|--------------------|---|--|-------------------|-------------------|
| System 1 Room Lo | ad Sum | mary | | | | | | | |
| Room No Name Zone 1 | Area SF | Htg Sens Btuh | Min Htg CFM | Run Duct Size | Run Duct Vel | Clg Sens Btuh | Clg Lat Btuh | Min Clg CFM | Act Sys CFM |
| 1 Second Floor Green House | 450 | 17,135 | 393 | 1-14 | 738 | 16,942 | 6,288 | 788 | 788 |
| Ventilation Humidification | | 5,501 12,458 | | | | 4,298 | 5,658 | | |
| System 1 total | 450 | 35,095 | 393 | | | 21,240 | 11,947 | 788 | 788 |
| System 1 Main Trunk Size: Velocity: Loss per 100 ft.: | | 10x15 ir 757 ft 0.100 ir | ./min | | | | | | |
| Cooling System Summary | | | | | | | | | |
| | Cooling Tons | | ible/Latent Split | | Sensible Btuh | | Latent Btuh | | Total Btuh |
| Net Required: Actual: | 2.77 3.00 | (| 34% / 36% | | 21,240 | | 11,947 | | 33,187 36,000 |
| Equipment Data | | | | | | 0 " 0 | | | |
| Type: Model: Indoor Model: | | Electric PACKA | <u>I System</u> Resistance GE UNIT Mo 336090M418 | | | PACKAG | Air Condition Section 1985 Air Condition 1985 Air C | | |
| Brand: Description: Efficiency: Sound: Capacity: Adjusted Capacity: Sensible Capacity: Adjusted Sensible Capacity: Latent Capacity: | | 0 0% 0 36,000 n/a n/a n/a | Btuh | | | 0 16 SEER 0 36,000 B 36,000 B 0 Btuh 36,000 B 0 Btuh | tuh tuh | | |

This system's equipment was selected in accordance with ACCA Manual S.

Manual S equipment sizing data: SODB: 100F, SOWB: 74F, WODB: 40F, SIDB: 75F, SIRH: 50%, WIDB: 72F, Sen. gain: 21,240 Btuh, Lat. gain: 11,947 Btuh, Sen. loss: 35,095 Btuh, Entering clg. coil DB: 87.7F, Entering clg. coil WB: 68.7F, Entering htg. coil DB: 59F, Clg. coil TD: 20F, Htg. coil TD: 70F, Req. clg. airflow: 788 CFM, Req. htg. airflow: 393 CFM

Panshe Enterprice Dhaka, Bangladesh, BSMRMU 1212



Elite Software Development, Inc. 499 Jay Windom Martin Residence Hvac Design Page 19

Building Rotation Duct Sizes

| | Direction Front door Faces | | | | | | | | | | | | | | | | |
|-------------------------------|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Room or | | ١ | N | E | E | <u> </u> | S | E | 5 | 3 | S | W | , | W | N | W | Max Duct |
| Duct Name | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Htg Flow | Clg Flow | Size |
| System 1 | | | | | | | | | | | | | | | | | |
| Supply Runouts | | | | | | | | | | | | | | | | | |
| Zone 1 | | | | | | | | | | | | | | | | | |
| 1-Second Floor Green House | 393 | 788 | 393 | 903 | 393 | 940 | 393 | 850 | 393 | 805 | 393 | 938 | 393 | 1,054 | 393 | 981 | 117 |
| Other Ducts in System | | | | | | | | | | | | | | | | | |
| Supply Main Trunk | 393 | 788 | 393 | 903 | 393 | 940 | 393 | 850 | 393 | 805 | 393 | 938 | 393 | 1,054 | 393 | 981 | 11x16 |
| Bldg. High Dir.: Southwest | | | | | | | | | | | | | | | | | |
| Sensible Gain: 24,454 | | | | | | | | | | | | | | | | | |
| Latent Gain: 11,947 | | | | | | | | | | | | | | | | | |

| | Summary |
|---------------|---------|
| System 1 | |
| Heating Flow: | 393 |
| Cooling Flow: | 788 |



Elite Software Development, Inc. 499 Jay Windom Martin Residence Hvac Design Page 20

Building Rotation Report

All rotation degree values in this report are clockwise with respect to the project's original orientation. Building orientation as entered (zero degrees rotation): Front door faces North

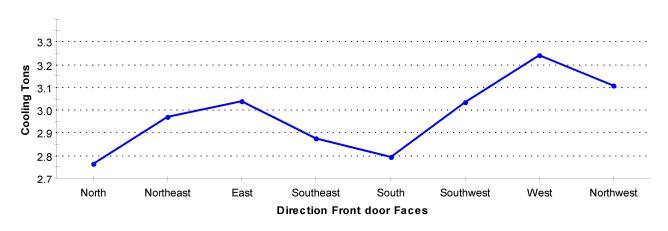
| Indivi | dual Rooms | | | | | | | | | |
|--------|-----------------------------|------|------|------|------|------|------|--------|------|------|
| | | 0° | 45° | 90° | 135° | 180° | 225° | 270° | 315° | High |
| Rm. | Room | Rot. | Rot. | Duct |
| No. | Name | CFM | CFM | Size |
| Syste | em 1: | | | | | | | | | |
| Zon | e 1: | | | | | | | | | |
| 1 | Second Floor Green House | 788 | 903 | 940 | 850 | 805 | 938 | *1,054 | 981 | 117 |

^{*} Indicates highest CFM of all rotations.

| Whole Bui | lding | | | | |
|-----------|------------|--------|----------|---------|-------|
| Rotation | Front door | Supply | Sensible | Latent | Net |
| Degrees | Faces | CFM | Gain | Gain | Tons |
| 0° | North | 788 | 21,240 | *11,947 | 2.77 |
| 45° | Northeast | 903 | 23,707 | 11,947 | 2.97 |
| 90° | East | 940 | 24,501 | 11,947 | 3.04 |
| 135° | Southeast | 850 | 22,564 | 11,947 | 2.88 |
| 180° | South | 805 | 21,605 | 11,947 | 2.80 |
| 225° | Southwest | 938 | 24,454 | 11,947 | 3.03 |
| 270° | West | *1,054 | *26,940 | 11,947 | *3.24 |
| 315° | Northwest | 981 | 25,371 | 11,947 | 3.11 |

^{*} Indicates highest value of all rotations.

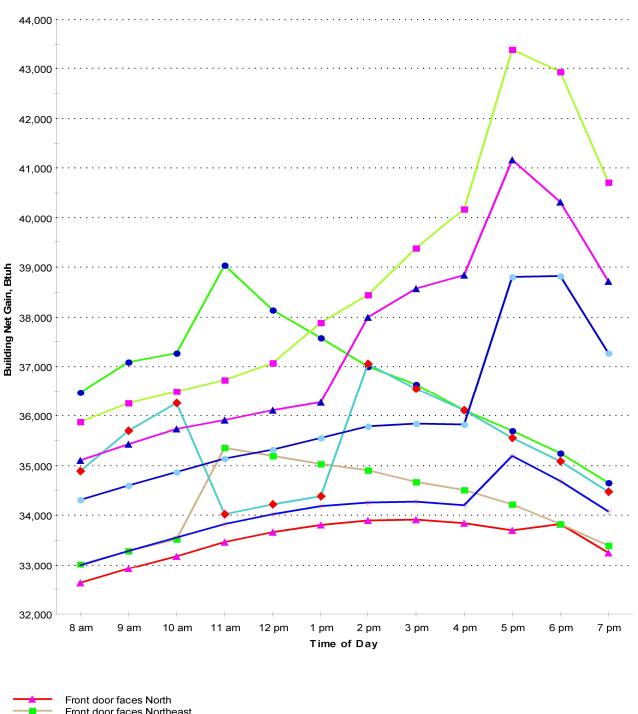
Building Rotation Tonnage





Building Rotation Report (cont'd)

Building Rotation Hourly Net Gain







Form RPER 1.01 8 Mar 10

County, Town, Municipality, Jurisdiction Header Information

| Contractor John Doe | | rieader iiiioiiii | REQUIRED ATTAC | HMENTS1 | | ATTACHED |
|--|-------------------------|---|---|---------------|----------------------------|--|
| · - | | | Manual J1 Form (and or MJ1AE Form² (and | | · · · · · · | = = |
| Mechanical License # 12345 | | | OEM performance da | | · · | No ⊠ |
| Building Plan # | | | Manual D Friction Ra Duct distribution systematics | | t: Yes Yes | = = |
| Home Address (Street or Lot#, Block, St | ubdivision) | | , | | 1 00 | |
| HVAC LOAD CALCULATION | (IRC M14 | 01.3) | | | | |
| Design Conditions | | <u>B</u> | uilding Constructi | on Inforr | nation | |
| Winter Design Conditions | 4.0 | | Building | _ | N.I. a41a | |
| Outdoor temperature | 10 | °F | Orientation (Front doc | , , | North | Occathornest |
| Indoor temperature | <u>72</u> | °F | North, East, West, So | uth, Northeas | t, Northwest, Southeast O | , Southwest |
| Total heat loss3 | <u>5095</u> в | tu/h | | | 450 Sq Ft | |
| Summer Design Conditions | 100 | ۰ | Conditioned floor area | | 450 | |
| Outdoor temperature | 100 | °F | Number of occupants | | 1 | |
| Indoor temperature | 10 | °F | Windows | | | Roof |
| | @ <u>50</u> % I | | Eave overhang depth | | 4 Ft | |
| | <u> </u> | tu/h | Internal shade | | | Eave |
| <u> </u> | <u></u> | tu/h | Blinds, drapes, etc | | _ | Depth Window |
| | <u> </u> | tu/h | Number of skylights | | 0 | l |
| HVAC EQUIPMENT SELECTI | ON (IRC | • | | | | |
| Heating Equipment Data | | Cooling Equipme | | | Blower Data | |
| Equipment type Electric R Furnace, Heat pump, Boiler, etc. | esistance | Equipment type Air Conditioner, Heat pu | Standard Air Cor | nditioner | Heating CFM _ | 788 CFM |
| PMONAGE UNIT MODEL :GPG1336 | 6090M418 | PMONAGE UNIT N | MODEL :GPG13360 | 90M418 | Cooling CFM | 788 CFM |
| Heating output capacity 360 | | Sensible cooling cap | eacity 6000 | O Btu/h | = | |
| Heat pumps - capacity at winter design outdoor cond | itions | Latent cooling capac | city | Btu/h | | |
| Auxiliary heat output capacity | Btu/h | Total cooling capacit | y <u>6000</u> | O Btu/h | | |
| HVAC DUCT DISTRIBUTION | SYSTEM | DESIGN (IRC M | 1601.1) | | | |
| Design airflow | CFM | Longest supply duct: | Ft | Duct Mat | erials Used (circle) | |
| External Static Pressure (ESP) | IWC | Longest return duct: | Ft | Trunk Du | ct: Duct board, Fle | x, Sheet metal, etal, Other (specify) |
| · · · — | | o | | | Linea enect me | val, carer (openly) |
| Component Pressure Losses (CPL) | IWC | Total Effective Lengt | · · · — | Branch D | uct: Duct board, Fl | |
| Available Static Pressure (ASP) ASP = ESP - CPL | IWC | Friction Rate: Friction Rate = (ASP × 10 | IWC | | Linea sneet m | etal, Other (specify) |
| I declare the load calculation, equipmen | nt sele <u>ction. a</u> | , | • | formed bas | sed on the buildin | g plan listed |
| above, I understand the claims made of | | | | | | 5 - |
| Contractor's Printed Name John [| Ooe | | | Date | | |
| Contractor's Signature John X | loe | | | _ | | |

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The AHJ shall have the discretion to accept Required Attachments printed from approved ACCA software vendors, see list on page 2 of instructions.
 If abridged version of Manual J is used for load calculation, then verify residence meets requirements, see Abridged Edition Checklist on page 13 of instructions.
 Form generated by ACCA-approved Manual J Eighth Edition Version 2 Elite Software Rhvac program.



Form RPER 1.01 8 Mar 10

County, Town, Municipality, Jurisdiction **Header Information**

| Contractor | | | | REQUIRE | D ATTAC | HMENTS ¹ | | ATTACH | ED |
|---|----------------|------|----------------------------------|----------------------------|--------------|--|-------------------------------------|-----------------|------|
| Mechanical License # | | | | or MJ1AE F | orm² (and | supporting we supporting we come the supporting we come the supporting to the suppor | , | No 🗌 | |
| Building Plan # | | | | • | riction Rate | e Worksheet: | , | No 🗌 | |
| Home Address (Street or Lot#, Blo | ck, Subdivisio | n) | | Duct distrib | ulion syste | III SKOIOII. | 163 | S NO | |
| HVAC LOAD CALCULATI | ON (IRC I | Л14(| 01.3) | | | | | | |
| Design Conditions | | | <u>B</u> ı | uilding Cor | nstructio | on Inform | ation | | |
| Winter Design Conditions | | | | Building | | | | | |
| Outdoor temperature | | _ | °F | Orientation (I | | ′ – | | | |
| Indoor temperature | | _ | °F | North, East Number of b | | ith, Northeast, | Northwest, Southeas | st, Southwest | |
| Total heat loss | | Bt | :u/h | | | - | | | |
| Summer Design Conditions | | | | Conditioned | floor area | | Sq Ft | | |
| Outdoor temperature | | _ | °F | Number of o | ccupants | _ | | | |
| Indoor temperature | | _ | °F | Windows | | | | Roof _ | |
| Grains difference | ∆ Gr @ | % F | Rh | Eave overha | ng depth | | Ft | ROOF | |
| Sensible heat gain | | Bt | :u/h | Internal shad | le | | | Eave | |
| Latent heat gain | | _ Bt | :u/h | Blinds, drapes | s, etc | | | | ndow |
| Total heat gain | | _ Bt | :u/h | Number of s | kylights | _ | | T | |
| HVAC EQUIPMENT SELE | CTION (I | RC I | M1401.3) | | | | | | |
| Heating Equipment Data | | | Cooling Equipme | nt Data | | | Blower Data | | |
| Equipment type | | | Equipment type | | | | Heating CFM | | CFM |
| Furnace, Heat pump, Boiler, etc. Model | | | Air Conditioner, Heat pur Model | mp, etc | | | ricating or w | | |
| | _ | | | | | | Cooling CFM | | CFM |
| Heating output capacity Heat pumps - capacity at winter design outdo | | tu/h | Sensible cooling cap | | | Btu/h | | | |
| | | | Latent cooling capac | · — | | Btu/h | | | |
| Auxiliary heat output capacity | | tu/h | Total cooling capacity | | | Btu/h | | | |
| HVAC DUCT DISTRIBUTI | ON SYST | EM | DESIGN (IRC M | 1601.1) | | | | | |
| Design airflow | CF | M | Longest supply duct: | | Ft | | rials Used (circle | - | |
| External Static Pressure (ESP) | IW | 'C | Longest return duct: | | Ft | Trunk Duc | t: Duct board, Flo Lined sheet m | | |
| Component Pressure Losses (CPL) | IV | /C | Total Effective Length | n (TEL) | Ft | Branch Du | ct: Duct board, F | lev Sheet met | |
| Available Static Pressure (ASP) | IW | /C | Friction Rate: | | IWC | Branch Bu | | netal, Other (s | |
| ASP = ESP - CPL | | | Friction Rate = (ASP × 10 | 00) ÷ TEL | _ | | | | |
| I declare the load calculation, equabove, I understand the claims m | | | | | | ormed base | ed on the buildin | ng plan listed | |
| Contractor's Printed Name | | | | | | Date | | | |
| Contractor's Signature | | | | | | - | | | |

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Form RPER 1.01 8 Mar 10

County, Town, Municipality, Jurisdiction Header Information

| Contractor John Doe | | rieadei iiiloiiila | REQUIRED ATTAC | HMENTS ¹ | | ATTACHED |
|--|--------------------|---------------------------------|--|---------------------|---------------------------------------|---|
| | | | Manual J1 Form (and | | | = = |
| Mechanical License # 12345 | | | or MJ1AE Form² (and OEM performance dat | | | = = |
| Building Plan # | | | Manual D Friction Rate Duct distribution syste | | :: Yes[Yes | = = |
| Home Address (Street or Lot#, Block, | Subdivision) | | Buot distribution syste | in okcion. | 163[| |
| HVAC LOAD CALCULATIO | N (UMC 110 | 06.1) | | | | |
| Design Conditions | · | • | uilding Construction | on Inforn | nation_ | |
| Winter Design Conditions | 4.0 | | Building | | N.I41. | |
| Outdoor temperature | 10 | °F | Orientation (Front door | - | North | Occuthousest |
| Indoor temperature | 72 | °F | North, East, West, Sou Number of bedrooms | itn, Northeast | , Northwest, Southeast | , Southwest |
| Total heat loss | 35095 Bt | tu/h | | | 450 Sq Ft | |
| Summer Design Conditions | 100 | o <i>-</i> | Conditioned floor area | | 430 | |
| Outdoor temperature | 100 | °F | Number of occupants | | 1 | |
| Indoor temperature | 10 | °F | Windows | | | Roof |
| | Gr @ <u>50</u> % F | | Eave overhang depth | | 4 Ft | |
| Sensible heat gain | <u> </u> | tu/h | Internal shade Blinds, drapes, etc | | | Eave Danth |
| Latent heat gain | 11011 | tu/h tu/h | Number of skylights | | 0 | Depth Window |
| | 00101 | .u/II | Number of skylights | | U | ı |
| HVAC EQUIPMENT SELEC | | O!i | | | Dlawa Data | |
| Heating Equipment Data Equipment type Electric | Resistance | Cooling Equipme Equipment type | | ditionor | Blower Data | |
| Furnace, Heat pump, Boiler, etc. | Resistance | Air Conditioner, Heat pur | Standard Air Con | ullioner | Heating CFM _ | <u>788</u> cfm |
| PMONAGE UNIT MODEL :GPG13 | 36090M418 | PMONAGE UNIT M | 10DEL :GPG133609 | 0M418 | Cooling CFM | 788 CFM |
| | 000 Btu/h | Sensible cooling capa | acity6000 | D Btu/h | | |
| Heat pumps - capacity at winter design outdoor c | onditions | Latent cooling capaci | ity | Btu/h | | |
| Auxiliary heat output capacity | Btu/h | Total cooling capacity | 60000 | D Btu/h | | |
| HVAC DUCT DISTRIBUTIO | N SYSTEM | DESIGN (UMC 6 | 801.2) | | | |
| Design airflow | CFM | Longest supply duct: | Ft | | erials Used (circle) | |
| External Static Pressure (ESP) | IWC | Longest return duct: | Ft | Trunk Du | ct: Duct board, Fle Lined sheet me | x, Sheet metal, tal, Other (specify) |
| Component Pressure Losses (CPL) | IWC | Total Effective Length | | | | |
| · · · · · · · · · · · · · · · · · · · | IWC | Friction Rate: | IWC | Branch D | uct: Duct board, FI Lined sheet m | ex, Sheet metal, etal, Other (specify) |
| Available Static Pressure (ASP) ASP = ESP - CPL | | Friction Rate = (ASP × 10 | | | | |
| I declare the load calculation, equipn | | | | ormed bas | ed on the building | g plan listed |
| above, I understand the claims made | e on these forms | s will be subject to rev | iew and verification. | | | |
| Contractor's Printed Name John | n Doe | | | Date | | |
| Contractor's Signature John | Doe | | | | | |

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The AHJ shall have the discretion to accept Required Attachments printed from approved ACCA software vendors, see list on page 2 of instructions.
 If abridged version of Manual J is used for load calculation, then verify residence meets requirements, see Abridged Edition Checklist on page 13 of instructions.
 Form generated by ACCA-approved Manual J Eighth Edition Version 2 Elite Software Rhvac program.



Form RPER 1.01 8 Mar 10

County, Town, Municipality, Jurisdiction **Header Information**

| Contractor | | | REQUIRED ATTACHMENTS¹ ATTACHED Manual J1 Form (and supporting worksheets): Yes No | | | | | |
|--|-----------------|-------------------------|--|----------------|--|-----------------------|--|--|
| Mechanical License # | | | or MJ1AE Form² (an | d supporting w | orksheets): Yes | No 🗌 | | |
| Building Plan # | | | OEM performance d Manual D Friction Ra | | _ | | | |
| Home Address (Street or Lot#, Block, | Subdivision) | | Duct distribution sys | tem sketch: | Yes | □ No □ | | |
| HVAC LOAD CALCULATION | V (UMC 11 | ne 1) | | | | | | |
| Design Conditions | V (OWO 110 | | Building Construct | tion Inform | nation | | | |
| Winter Design Conditions | | | Building | | | | | |
| Outdoor temperature | | °F | Orientation (Front do | or faces) | | | | |
| Indoor temperature | | °F | | | Northwest, Southeast, | Southwest | | |
| Total heat loss | В | tu/h | Number of bedrooms | | | | | |
| Summer Design Conditions | | | Conditioned floor are | ea | Sq Ft | | | |
| Outdoor temperature | | °F | Number of occupants | S | | | | |
| Indoor temperature | | °F | Windows | | | Dest | | |
| Grains difference △ (| Gr @ % | Rh | Eave overhang depth | า | Ft | Roof | | |
| Sensible heat gain | В | tu/h | Internal shade | | | ← ∐ ave ∏ | | |
| Latent heat gain | В | tu/h | Blinds, drapes, etc | | | Depth Window | | |
| Total heat gain | В | tu/h | Number of skylights | - | | T | | |
| HVAC EQUIPMENT SELEC | TION | | | | | | | |
| Heating Equipment Data | | Cooling Equipn | nent Data | | Blower Data | | | |
| Equipment type | | Equipment type | | | Heating CEM | CFM | | |
| Furnace, Heat pump, Boiler, etc. | | Air Conditioner, Hear | t pump, etc | | Heating CFM _ | | | |
| Model | | | | | Cooling CFM _ | CFM | | |
| Heating output capacity Heat pumps - capacity at winter design outdoor co | Btu/h | Sensible cooling of | capacity | Btu/h | | | | |
| Tour parties capacity at miles accegn calacter at | | Latent cooling cap | pacity | Btu/h | | | | |
| Auxiliary heat output capacity | Btu/h | Total cooling capa | | Btu/h | | | | |
| HVAC DUCT DISTRIBUTION | N SYSTEM | DESIGN (UMC | C 601.2) | | | | | |
| Design airflow | CFM | Longest supply duct | :: Ft | | erials Used (circle) | Chart motal | | |
| External Static Pressure (ESP) | IWC | Longest return duct: | Ft | | t: Duct board, Flex Lined sheet met | al, Other (specify) | | |
| Component Pressure Losses (CPL) | IWC | Total Effective Len | gth (TEL) Ft | Branch Du | ıct: Duct board, Fle | ex Sheet metal | | |
| Available Static Pressure (ASP) | IWC | Friction Rate: | IWC | | | etal, Other (specify) | | |
| ASP = ESP - CPL | | Friction Rate = (ASP | × 100) ÷ TEL | | | | | |
| I declare the load calculation, equipm | | | | rformed bas | ed on the building | g plan listed | | |
| above, I understand the claims made | e on these form | is will be subject to i | review and verification. | | | | | |
| Contractor's Printed Name | | | | Date — | | | | |
| Contractor's Signature | | | | | | | | |

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ENERGY STAR Single-Family New Homes National HVAC Design Report, Version 3 / 3.1 / 3.2 (Rev. 13)1

HVAC Designer Responsibilities:

OMB Control Number: 2060-0586

- · Complete one National HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with different configurations (i.e., different elevations, options, and/or orientations). Visit www.energystar.gov/newhomeshvacdesign and see Footnote 2 for more information.²
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder or Rater.³

| • Provi | de the completed National HVAC Design Re | port to the | builder or | credentiale | ed HVAC c | ontractor a | and to the F | Rater. | | |
|-------------|--|----------------------|-----------------------|---------------|-------------|--------------|---------------------------------|---------------|--------------------------|-------------------------|
| 1. Desig | ın Overview | | | | | | | | | |
| 1.1 Des | gner Name: <u>Engr Rahaman</u> | | De | esigner cor | npany: | | | | Date: October | 22, 2025 |
| 1.2 Sele | ct which party you are providing these desig | n services | to: | ☐ Bui | lder | or | | redentiale | d HVAC conf | tractor |
| 1.3 Nam | ie of company you are providing these desig | n services | to (if differ | ent than It | em 1.1): | | | | | |
| | that system serves: | | Jpper-leve | | Lower-lev | el [| Other | | | |
| | ooling system for a temporary occupant load | | - 1 1 | ☐ Ye | _ | | _ | | | |
| | se plan: 499 Jay Windom Martin Residen | | es@meck.b | _ | | | m design is | s site-spec | ific or part of | a group: 2 |
| | Site-specific design. Option(s) & elevation | | - | ox to maio | 410 WHOIHO | i alo oyoto | iii doolgii k | one opec | ano or part or | a group. |
| | Group design. Group #: out of | | | for this hou | ico plan | Configure | ation model | lod: | | |
| | ling Unit Mechanical Ventilation System D | | | | | | | | | Designer Verified |
| Airflow | , | | | | | | | | | 1 |
| All llow | 2.1 Ventilation airflow design rate & run-tim | e meet the | requirem | ents of AS | HRAE 62.3 | 2-2010 or l | ater 9 | | | $\overline{\mathbf{V}}$ |
| | 2.2 Ventilation airflow rate required by 62.2 | | | | CFM | 2-2010 011 | ator. | | | _ |
| | 2.3 Design for this system: Vent. airflow ra | | | | | minuto | s Cycle tin | | minutes | _ |
| Cyctom | | ite. <u>400</u> | _ CI IVI IXU | in-unie pei | cycle | !!!!!! | s Cycle III | iic | minutes | _ |
| System | Type & Controls: 2.4 Specified system type: Sup | unly \Box | Evhauet | | Balanced | | | | | |
| | | рріу 🗀 | Exhaust | | balariceu | / | NA 4 I | 414:11:4 | | - |
| | 2.5 Specified control location: | | 4 4! 11. | | | | Master ba | ın, uıllıy ro | om) | <u>-</u> |
| | 2.6 Specified controls allow the system to | • | | • | • | | | :£:4- £4 | | Ш |
| | 2.7 Specified controls include a readily-accobvious (e.g., a label is required for a t | oggle wall | switch, but | t not for a | switch that | 's on the ve | entilation e | quipment). | | |
| | 2.8 For any outdoor air inlet designed to co restrict airflow using a motorized damp | | | | | | | s automati | cally | |
| Sound: | 2.9 The fan of the specified system is rate | d <u><</u> 3 sone | s if intermi | ttent and < | 1 sone if | continuous | , or exemp | ted. 11 | | |
| Efficiency: | | | | | | | | | | |
| | 2.10 If Vent System controller operates the 4.7 is ECM / ICM or the controls will re | | | | | | | | | |
| | 2.11 If bathroom fans are specified as part | of the sys | tem, then t | hey are EN | NERGY ST | AR certifie | d. ¹³ | | | |
| Air Inle | Location: (Complete this section if syste | m has a sr | ecified air | inlet locati | on: otherw | ise check ' | 'N/A") ¹⁴ | | | □ N/A |
| 7 | 2.12 Inlet pulls ventilation air directly from o | | | | • | | | ellina unit | | |
| | 2.13 Inlet is ≥ 2 ft. above grade or roof dec | | | | | • | - | • | (e.g., | |
| 0.0 | stack, vent, exhaust, vehicles) not exitin | g the roof, | and <u>></u> 3 ft. | from knov | vn sources | exiting the | e roof. ¹⁵ | | (=-9-, | |
| | n-by-Room Heating & Cooling Loads 16 | | 24.14 | | 7,0040,44 | OUDAEE | | Поп | A 1 1 1 47 | |
| | m-by-room loads calculated using: Unab | | | | | SHRAE FL | ındamentai | is LOthe | er per AHJ ¹⁷ | - |
| | or design temperatures used in loads are 70 | | | | | | \ 10 | | | Ш |
| | loor design temperatures used in loads: (Se nty & State, or US Territory, selected: | e Footnote | e 18 and w | ww.energy | | | emps) ¹ ° 0°F Hea | ating seaso | on: <u>40</u> °F | - |
| 3.4 Num | ber of occupants used in loads: 19 | 1 | | | | | | | | - |
| 3.5 Con | ditioned floor area used in loads: 20 | 450 | | | S | q. Ft. | | | | - |
| 3.6 Win | dow area used in loads: ²¹ | 80 | | | S | q. Ft. | | | | - |
| 3.7 Pred | lominant window SHGC used in loads: 22 | 0.62 | | | | | | | | - |
| 3.8 Infilt | ration rate used in loads: 23 | Summer | 400 | | | Winter: | 400 | | | - |
| 3.9 Med | hanical ventilation rate used in loads: | 400 | | | C | FM - | | | | - |
| Loads A | At Design Conditions (kBtuh) | N | NE | Е | SE | S | SW | W | NW | - |
| | 3.10 Sensible heat gain (By orientation ²⁴) | 21.2 | 23.7 | 24.5 | 22.6 | 21.6 | 24.5 | 26.9 | 25.4 | - |
| Cooling | 3.11 Latent heat gain (Not by orientation) | 11.9 | | | | - | 1 | 1 | 1 | - |
| Journa | 3.12 Total heat gain (By orientation ²⁴) | 33.2 | 35.7 | 36.4 | 34.5 | 33.6 | 36.4 | 38.9 | 37.3 | - |
| | 3.13 Maximum - minimum total heat gain (It | | | | | tuh | Variation | | kBtuh ^{24, 25} | |
| Heating | 3.14 Total heat loss (Not by orientation) | 35.1 | | | | | 1 | | | - |



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| 4. Heating & Cooling Equipm | nent Selection ¹⁶ | | | | | | | Designe Verified |
|--|---|---------------------------------------|-----------------|-------------------|------------------------|------------------------|---------------------|-------------------------|
| 4.1 Equipment selected per AC | CA Manual S (see | e Footnote 25 & | 26) 26, 27 | | | | | ✓ |
| Air Conditioner / Heat Pump | (Complete if air c | onditioner or he | at pump will b | e inst | alled; otherwis | e check "N/A") | | □ N/A |
| 4.2 Equipment type: | ☐ Cod | oling-only air cor | nditioner or | | Cooling & h | eating heat pum | пр | - |
| 4.3 Condenser manufacturer & | model: | GOOD | MAN, PACKA | AGE L | JNIT MODEL : | GPG1336090M | 418 | - |
| 4.4 Evaporator / fan coil manufa | acturer & model: | | | | | | | - |
| 4.5 AHRI reference #: ²⁸ | | | | | | | | - |
| 4.6 Rated cooling efficiency: 29 | 16 SEER | / | | | _ Rated heatin | g efficiency: | | |
| 4.7 Evaporator fan type: | ☐ PSC | | CM / ICM | | Other: | | | - |
| 4.8 Compressor type: | ☐ Single | -speed 🔲 T | wo-speed | | Variable-spe | ed | | - |
| 4.9 Latent capacity at design co | onditions, from OE | EM expanded pe | erformance da | ta: ³¹ | 0 | | kBtu | h - |
| 4.10 Sensible capacity at design conditions, from OEM expanded performance data: 31 60 kBtuh | | | | | | | | |
| 4.11 Total capacity at design conditions, from OEM expanded performance data: 31 60 kBtuh | | | | | | | | |
| 4.12 Air-source heat pump capacity: At 17°F: 0 kBtuh At 47°F: 0 kBtuh | | | | | | | | |
| 4.13 Cooling sizing % = Total c | <u>-</u> | | ximum total he | eat ga | in (Item 3.12): | 154 % | | |
| 4.14 Complete this item if Cond | | | | | | | A": 32 N | 'A |
| 4.14.1 Load sensible heat | | | | | | | = 64 % | _ |
| 4.14.2 HDD / CDD ratio (\ | | | | | | | | |
| 4.15 Check box of applicable co | | | | | | g | | _ |
| Equipment Type (Per Item 4.2) | | | | Con | npressor Type | (Per Item 4.8) | | |
| Climate Condition (Per Item 4.1) | | Single-Spee | d | | Two-Spe | • | Variable- | Speed |
| For Cooling-Only Equipment or For Cooling Mode of Heat Pum | poling-Only Equipment or Recommended: 90 - 115% Recommended: 90 - 120% Recommended: 90 - 120% | | | | | | | |
| Condition A Climate | | Allowed: 90 | - 130% | | Allowed: 9 | 0 - 140% | Allowed: 9 | 0 - 160% |
| For Cooling Mode of Heat Pump in Condition B Climate 90% - 100%, plus 15 kBtuh 90% - 100%, plus 15 kBtuh 90% - 100%, plus 15 kBtuh | | | | | | | plus 15 kBtuh | |
| 4.16 Cooling sizing 9/ (4.12) is | within appling sizi | ng limit (4.1E) | | | | | | |
| 4.16 Cooling sizing % (4.13) is | | | L "NI/A"\ | | | | | |
| Furnace (Complete if furnace 4.17 Furnace manufacturer & n | | | • | EL .C | DC1226000M | 410 | | □ N/A |
| 4.18 Rated heating efficiency: | lodel. GOOD | MAN, PACKAG 0 | IE UNIT MOD | AFI | | 410 | | |
| 4.19 Total capacity: 33 | | 36 | kBtuh | _ ^' ' | OL . | | | |
| 4.20 Heating sizing % = Total c | | | _ | om 2 : | 14). 102 | % | | - |
| 4.21 Check box of applicable h | <u> </u> | · · · · · · · · · · · · · · · · · · · | | eiii 3. | 14). 103 | /0 | | - |
| | | ITOTTI CHAIT DEIOV | w. | | \0/h | an Dained With | On alima | |
| | or Heating Only 0 - 140% | | Ţ. | 71 R | | en Paired With (| Allowed: 100 – 400% | , |
| | | in a limait (4 04) | L L | | tecommended | . 100 – 140% <i>P</i> | Milowed. 100 – 4005 | |
| 4.22 Heating sizing % (4.20) is | | | l ba inatalladı | رام حافان | | - ab a al ("NI/A") 16 | : | |
| 5. Duct Design (Complete if5.1 Duct system designed for the | heating or coolin | • | | | | cneck N/A) | | □ N/A |
| 5.2 Design HVAC fan airflow: 34 | | cled in Section | • | | | CEM Heating m | node <u>393</u> CFM | 1 - |
| 5.3 Design HVAC fan speed se | | edium high): 35 | | _ | node | _ | node | |
| 5.4 Design total external static | | | | | | | IWC | - |
| 5.5 Room-by-room design airflo | | | | | | | - | - |
| Room Name | Design Airflow (CFM) | Room Name | | | esign Airflow (CFM) | Room Name | , | Design Airflow (CFM) |
| 1 Second Floor Green House | 788 | 12 | | | , | 23 | | , |
| 2 | | 13 | | | | 24 | | |
| 3 | | 14 | | | | 25 | | |
| 4 | | 15 | | | | 26 | | |
| 5 | | 16 | | | | 27 | | |
| 6 7 | | 17 18 | | | | 28 29 | | |
| 8 | | 19 | | | | 30 | | |
| 9 | | 20 | | | | 31 | | |
| 10 | | 21 | | | | 32 | | |
| 11 | | 22 | | | | Total for all roo | oms | 788 |

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HVAC Designer Responsibilities:

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- Complete one National HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with different configurations (i.e., different elevations, options, and/or orientations). Visit www.energystar.gov/newhomeshvacdesign and see Footnote 2 for more information.²
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder or Rater.³

| Provid | e the completed National HVAC Design Re | port to the | builder or | credentiale | ed HVAC c | ontractor a | nd to the F | Rater. | | |
|--|---|-----------------------------|---------------------------|--------------------------|---------------------------|--------------|--------------------|--------------------------|--------------------------------|----------------------|
| 1. Desig | n Overview | | | | | | | | | |
| 1.1 Desig | gner Name: | | De | signer con | npany: | | | | Date: | |
| 1.2 Selec | ct which party you are providing these desig | n services | to: | ☐ Buil | lder | or | □с | redentiale | d HVAC cont | tractor |
| 1.3 Name | e of company you are providing these desig | n services | to (if differ | ent than Ite | em 1.1): | | | | | |
| 1.4 Area | that system serves: | | Jpper-leve | ı 🗆 | Lower-lev | el 🗆 | Other | | | |
| 1.5 ls cod | oling system for a temporary occupant load | ? 4 | | ☐ Yes | s 🔲 No | | | | | |
| 1.6 Hous | e plan: | | Check b | ox to indica | ate whethe | r the svste | m desian is | site-spec | ific or part of | a group: 2 |
| Пѕ | ite-specific design. Option(s) & elevation | n(s) modele | ed: | | | , | 3 | | ' | 5 1 |
| | Group design. Group #:out of | | | | | | | ed: | | |
| 2. Dwelli | ng Unit Mechanical Ventilation System D | Design ("V | ent Syste | m") ^{5, 6, 7} { | & Inlets in | Return Di | uct ⁸ | | | Designer Verified |
| Airflow: | | | | | | | | | | |
| | 2.1 Ventilation airflow design rate & run-tim | ne meet the | requirem | ents of ASI | HRAE 62.2 | 2-2010 or la | ater. ⁹ | | | |
| | 2.2 Ventilation airflow rate required by 62.2 | | | | CFM | | | | | - |
| | 2.3 Design for this system: Vent. airflow ra | | | | cycle: | minute | s Cycle tim | ne: | minutes | _ |
| System ⁻ | Type & Controls: | | _ | | | | | | | |
| - J - G | 2.4 Specified system type: Sup | vlac | Exhaust | ПЕ | Balanced | | | | | _ |
| | 2.5 Specified control location: | , | | | | (e a | Master bat | h utility ro | nom) | _ |
| | 2.6 Specified controls allow the system to | nerate au | tomatically | without or | cupant int | | WIGOTOT DG | ir, duilty re | , oiii) | П |
| | 2.7 Specified controls include a readily-acc | essible ve | ntilation ov | erride and | a label has | s also beer | | | ion is not | |
| obvious (e.g., a label is required for a toggle wall switch, but not for a switch that's on the ventilation equipment). 2.8 For any outdoor air inlet designed to connect to a ducted return of the HVAC system, specified controls automatically restrict airflow using a motorized damper during ventilation off-cycle and occupant override. 8, 10 | | | | | | | | | | |
| Sound: | 2.9 The fan of the specified system is rate | | | | - | | | ted. ¹¹ | | |
| Efficienc | ey: | | | | | | | | | |
| | 2.10 If Vent System controller operates the 4.7 is ECM / ICM or the controls will re | HVAC far | n, then HV/ un-time by | AC fan ope | ration is ing for HVAC | termittent a | and either t | he fan typ ooling hou | e in Item rs. ¹² | |
| | 2.11 If bathroom fans are specified as part | of the syst | tem, then t | hey are EN | IERGY ST | AR certifie | d. ¹³ | | | |
| Air Inlet | Location: (Complete this section if syste | m has a sr | ecified air | inlet location | on: otherwi | ise check " | 'N/A") 14 | | | □ N/A |
| | 2.12 Inlet pulls ventilation air directly from o | • | | | | | | ellina unit | | |
| | 2.13 Inlet is ≥ 2 ft. above grade or roof dec | | | | | • | - | • | (e a | |
| | stack, vent, exhaust, vehicles) not exitin | g the roof, | and <u>></u> 3 ft. | from know | n sources | exiting the | roof. 15 | 1 Sources | (6.9., | |
| 3. Room | -by-Room Heating & Cooling Loads 16 | | | | | | | | | ı |
| 3.1 Roon | n-by-room loads calculated using: 🔲 Unab | ridged AC | CA Manual | J v8 [| 2013 AS | SHRAE Fu | ndamental | s 🔲 Othe | er per AHJ ¹⁷ | - |
| 3.2 Indoo | or design temperatures used in loads are 70 | °F for hea | ing and 75 | °F for cool | ling | | | | | |
| 3.3 Outdo Cour | oor design temperatures used in loads: (Se nty & State, or US Territory, selected: | e Footnote | e 18 and w | | star.gov/h\ Cooling se | | | ating seas | on: °F | - |
| | per of occupants used in loads: 19 | | | | | | | | | _ |
| | itioned floor area used in loads: ²⁰ | | | | S | q. Ft. | | | | _ |
| | ow area used in loads: ²¹ | | | | | q. Ft. | | | | _ |
| | ominant window SHGC used in loads: 22 | | | | | 4. I L. | | | | - |
| | ation rate used in loads: ²³ | Summer: | | | | Winter: | | | | - |
| | | Summer. | | | | _ | | | | - |
| | anical ventilation rate used in loads: | | NE | | | FM c | CVA | 10/ | AIVA/ | - |
| | t Design Conditions (kBtuh) 3.10 Sensible heat gain (By orientation ²⁴) | N | NE | E | SE | S | SW | W | NW | - |
| | | | | | | | | | | - |
| Cooming F | 3.11 Latent heat gain (Not by orientation) | | | | | | | | | - |
| L . | 3.12 Total heat gain (By orientation ²⁴) | om 2 40\ = | 0000000 | otations - | l.D. | l tub | \/o=i=ti== | | LD+ub 24 25 | - |
| | 3.13 Maximum - minimum total heat gain (It | . u iii 3. 12) 8 | ICTUSS OFFE | nauons = _ | KB | tuh | Variation | 115 _ 0 | kBtuh ^{24, 25} | |
| Heating | 3.14 Total heat loss (Not by orientation) | | | | | | | | | - |



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| 4. Heating & Cooling Equipment Selection ¹⁶ | | | | | | | | Designer Verified |
|--|-------------------------|-------------------|-------------|---------------|------------------------|------------------|----------------|---|
| 4.1 Equipment selected per ACCA Manual S (see Footnote 25 & 26) 26, 27 | | | | | | | | |
| Air Conditioner / Heat Pump (Complete if air conditioner or heat pump will be installed; otherwise check "N/A") | | | | | | | | □ N/A |
| 4.2 Equipment type: Cooling-only air conditioner or Cooling & heating heat pump | | | | | | | | - |
| 4.3 Condenser manufacturer & model: | | | | | | | | - |
| 4.4 Evaporator / fan coil manufacturer & model: | | | | | | | | - |
| 4.5 AHRI reference #: ²⁸ | | | | | | | | - |
| 4.6 Rated cooling efficiency: ²⁹ Rated heating efficiency: | | | | | | | | |
| 4.7 Evaporator fan type: PSC ECM / ICM Other: | | | | | | | | - |
| 4.8 Compressor type: Single-speed Two-speed Variable-speed | | | | | | | | - |
| 4.9 Latent capacity at design conditions, from OEM expanded performance data: 31 kBtuh | | | | | | | | h - |
| 4.10 Sensible capacity at design conditions, from OEM expanded performance data: 31 kBtuh | | | | | | | | h - |
| 4.11 Total capacity at design conditions, from OEM expanded performance data: 31 kBtuh | | | | | | | ıh - | |
| 4.12 Air-source heat pump capacity: At 17°F: kBtuh At 47°F: kBtuh | | | | | | | | /A - |
| 4.13 Cooling sizing % = Total capacity (Item 4.11) divided by maximum total heat gain (Item 3.12): | | | | | | | | |
| 4.14 Complete this item if Condition B Climate will be used to select sizing limit in Item 4.15. Otherwise, check "N/A": 32 | | | | | | | | /A |
| 4.14.1 Load sensible heat ratio = Max sensible heat gain (Item 3.10) / Max. total heat gain (Item 3.12) = % | | | | | | | | _ |
| 4.14.1 Load sensible fleat ratio – iwax sensible fleat gain (item 3.10) / iwax. total fleat gain (item 3.12) –% 4.14.2 HDD / CDD ratio (Visit energystar.gov/hvacdesigntemps to determine this value for the design location) = | | | | | | | | |
| 4.14.2 Fibb / Cbb ratio (visit energystal gov/hvacdesigntemps to determine this value for the design location) = = = | | | | | | | | |
| Equipment Type (Per Item 4.2) & Compressor Type (Per Item 4.8) | | | | | | | | |
| Climate Condition (Per Item 4.1) | | Single-Speed | | | Two-Spe | • | Variable-Speed | |
| For Cooling-Only Equipment or | , | | | | <u> </u> | | | <u> </u> |
| For Cooling Mode of Heat Pum | | Recommended: | | | | ed: 90 - 120% | | ed: 90 - 130% |
| Condition A Climate Allowed: 90 - 130% Allowed: 90 - 140% Allowed: 90 - 160% | | | | | | | | 0 - 160% |
| For Cooling Mode of Heat Pum | p in | | | | | | | |
| Condition B Climate | | 90% - 100%, plu | is 15 kBtuh | Ш | 90% - 100%, | plus 15 kBtuh | 90% - 100%, | plus 15 kBtuh |
| 4.16 Cooling sizing % (4.13) is within cooling sizing limit (4.15) | | | | | | | | |
| Furnace (Complete if furnace will be installed; otherwise check "N/A") | | | | | | | | □ N/A |
| 4.17 Furnace manufacturer & model: | | | | | | | | - |
| 4.18 Rated heating efficiency: AFUE | | | | | | | | |
| 4.19 Total capacity: 33 kBtuh | | | | | | | | |
| 4.20 Heating sizing % = Total capacity (Item 4.19) divided by total heat loss (Item 3.14): % | | | | | | | | |
| 4.20 Check box of applicable heating sizing limit from chart below: | | | | | | | | |
| When Used for Heating Only When Paired With Cooling | | | | | | | | |
| 100 - 140% Recommended: 100 – 140% Allowed: 100 – 400% | | | | | | | | <u></u> |
| 4.22 Heating sizing % (4.20) is within heating sizing limit (4.21) | | | | | | | | |
| 5. Duct Design (Complete if heating or cooling equipment will be installed with ducts; otherwise check "N/A") 16 | | | | | | | | |
| 5.1 Duct system designed for the equipment selected in Section 4, per ACCA Manual D | | | | | | | | |
| 5.1 Duct system designed for the equipment selected in Section 4, per ACCA Manual D 5.2 Design HVAC fan airflow: 34 Cooling mode CFM Heating mode CFM | | | | | | | | , |
| 5.3 Design HVAC fan speed setting (e.g., low, medium, high): 35 Cooling mode | | | | | | | | |
| 5.4 Design total external static pressure (corresponding to the mode with the higher airflow in Item 5.2): ³⁶ IWC | | | | | | | | |
| 5.5 Room-by-room design airflows documented below (which must sum to the mode with the higher airflow in Item 5.2) ^{37, 38} | | | | | | | | |
| Room Name | Design Airflow (CFM) | Airflow Room Name | | | esign Airflow (CFM) | Room Name | , | Design Airflow (CFM) |
| 1 | | 12 | | | , | 23 | | |
| 2 | | 13 | | | | 24 | | |
| 3 | | 14 | | \perp | | 25 | | <u> </u> |
| 4 | | 15 | | _ | | 26 | | <u> </u> |
| 5 | | 16 | | _ | | 27 | | |
| 6 7 | | 17 18 | | + | | 28 29 | | |
| 8 | | 19 | | + | | 30 | | |
| 9 | | 20 | | \vdash | | 31 | | |
| 10 | | 21 | | $\neg \vdash$ | | 32 | | |
| 11 | | 22 | | | | Total for all ro | oms | |

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