

*Residence
HVAC Load Calculations*

for

-



RHVAC RESIDENTIAL
HVAC LOADS

Prepared By:
Monday, December 02, 2013

Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.



Project Report

General Project Information

Project Title:
 Designed By:
 Project Date: Wednesday, October 30, 2013
 Client Name:
 Company Name:
 Company Representative:
 Company Address:
 Company City:
 Company Phone:
 Company Fax:
 Company E-Mail Address:
 Company Website:
 Company Comment:

Design Data

Reference City: Suffolk County, New York
 Building Orientation: Front door faces Northeast
 Daily Temperature Range: Medium
 Latitude: 40 Degrees
 Elevation: 67 ft.
 Altitude Factor: 0.998

| | Outdoor Dry Bulb | Outdoor Wet Bulb | Outdoor Rel.Hum | Indoor Rel.Hum | Indoor Dry Bulb | Grains Difference |
|---------|---------------------|---------------------|--------------------|-------------------|--------------------|----------------------|
| Winter: | 10 | 9 | n/a | n/a | 70 | n/a |
| Summer: | 83 | 71 | 56% | 50% | 75 | 30 |

Check Figures

| | | | |
|---|--------|---------------------|-------|
| Total Building Supply CFM: | 751 | CFM Per Square ft.: | 0.456 |
| Square ft. of Room Area: | 1,646 | Square ft. Per Ton: | 565 |
| Volume (ft ³) of Cond. Space: | 16,134 | | |

Building Loads

| | | |
|---|-------------|--|
| Total Heating Required Including Ventilation Air: | 42,848 Btuh | 42.848 MBH |
| Total Sensible Gain: | 16,480 Btuh | 65 % |
| Total Latent Gain: | 8,735 Btuh | 35 % |
| Total Cooling Required Including Ventilation Air: | 25,214 Btuh | 2.10 Tons (Based On Sensible + Latent) |
| | | 2.91 Tons (Based On 75% Sensible Capacity) |

Notes

Rhvac is an ACCA approved Manual J and Manual D 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.



Miscellaneous Report

| System 1 Entire House Input Data | Outdoor Dry Bulb | Outdoor Wet Bulb | Outdoor Rel.Hum | Indoor Rel.Hum | Indoor Dry Bulb | Grains Difference |
|-------------------------------------|---------------------|---------------------|--------------------|-------------------|--------------------|----------------------|
| Winter: | 10 | 9 | 80% | n/a | 70 | n/a |
| Summer: | 83 | 71 | 56% | 50% | 75 | 30.17 |

Duct Sizing Inputs

| | Main Trunk | Runouts |
|-------------------|-----------------------|-----------------------|
| 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 | Summer |
|------------------------------|-------------------------------------|-------------------------------------|
| Infiltration Specified: | 0.334 AC/hr 90 CFM | 0.140 AC/hr 38 CFM |
| Infiltration Actual: | 0.918 AC/hr | 0.867 AC/hr |
| Above Grade Volume: | X 16,134 Cu.ft. 14,817 Cu.ft./hr | X 16,134 Cu.ft. 13,984 Cu.ft./hr |
| | X 0.0167 | X 0.0167 |
| Total Building Infiltration: | 247 CFM | 233 CFM |
| Total Building Ventilation: | 0 CFM | 0 CFM |

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 8.78 = (1.10 X 0.998 X 8.00 Summer Temp. Difference)
 Infiltration & Ventilation Latent Gain Multiplier: 20.47 = (0.68 X 0.998 X 30.17 Grains Difference)
 Infiltration & Ventilation Sensible Loss Multiplier: 65.84 = (1.10 X 0.998 X 60.00 Winter Temp. Difference)
 Winter Infiltration Specified: 0.260 AC/hr (70 CFM), Construction: Semi-Tight, Fireplaces: 1, 20 CFM, Average
 Summer Infiltration Specified: 0.140 AC/hr (38 CFM), Construction: Semi-Tight

Duct Load Factor Scenarios for System 1

| No. | Type | Description | Location | Attic Ceiling | Duct Leakage | Duct Insulation | Surface Area | From [T]MDD |
|-----|--------|-------------|----------|------------------|-----------------|--------------------|-----------------|----------------|
| 1 | Supply | | Attic | 16B | 0.09 | 8 | 444 | No |
| 1 | Return | | Attic | 16B | 0.15 | 8 | 165 | No |



Load Preview Report

| Scope | Net Ton | Rec Ton | ft. ² /Ton | Area | Sen Gain | Lat Gain | Net Gain | Sen Loss | Sys Htg CFM | Sys Clg CFM | Sys Act CFM | Duct Size |
|--|---------|---------|-----------------------|-------|----------|----------|----------|----------|-------------|-------------|-------------|-----------|
| Building | 2.10 | 2.91 | 565 | 1,646 | 16,480 | 8,735 | 25,214 | 42,848 | 558 | 751 | 751 | |
| System 1 | 2.10 | 2.91 | 565 | 1,646 | 16,480 | 8,735 | 25,214 | 42,848 | 558 | 751 | 751 | 10x15 |
| Blower | | | | | 341 | | 341 | | | | | |
| Duct Latent | | | | | | 714 | 714 | | | | | |
| Zone 1 - Clg.: 64%, Htg.: 61% | | | | 1,031 | 11,351 | 5,389 | 16,740 | 26,309 | 342 | 527 | 527 | 9x12 |
| 1-Family Room | | | | 178 | 1,400 | 910 | 2,310 | 5,232 | 68 | 65 | 65 | 1-5 |
| 2-Mud Room | | | | 86 | 692 | 492 | 1,184 | 3,354 | 44 | 32 | 32 | 1-4 |
| 3-Foyer | | | | 63 | 521 | 239 | 760 | 2,252 | 29 | 24 | 24 | 1-4 |
| 4-Dining Room | | | | 160 | 1,222 | 386 | 1,608 | 3,153 | 41 | 57 | 57 | 1-4 |
| 5-Powder Room | | | | 25 | 293 | 133 | 426 | 984 | 13 | 14 | 14 | 1-4 |
| 6-Kitchen | | | | 216 | 2,458 | 1,479 | 3,937 | 4,486 | 58 | 114 | 114 | 2-4 |
| 7-Living Room | | | | 280 | 4,543 | 1,632 | 6,175 | 5,901 | 77 | 211 | 211 | 2-6 |
| 8-Pantry | | | | 23 | 222 | 118 | 340 | 946 | 12 | 10 | 10 | 1-4 |
| Zone 2 - Clg.: 36%, Htg.: 39% | | | | 615 | 6,300 | 2,632 | 8,932 | 16,540 | 215 | 293 | 293 | 8x8 |
| 9-Bedroom 1 | | | | 122 | 1,081 | 472 | 1,553 | 2,869 | 37 | 50 | 50 | 1-4 |
| 10-Bedroom 2 | | | | 120 | 1,571 | 720 | 2,291 | 4,236 | 55 | 73 | 73 | 1-5 |
| 11-Hall Bath | | | | 55 | 327 | 118 | 445 | 1,091 | 14 | 15 | 15 | 1-4 |
| 12-Master Bedroom | | | | 150 | 2,411 | 879 | 3,290 | 5,154 | 67 | 112 | 112 | 2-4 |
| 13-Master Walk-In Closet | | | | 36 | 178 | 130 | 308 | 945 | 12 | 8 | 8 | 1-4 |
| 14-Master Bath | | | | 132 | 732 | 313 | 1,045 | 2,245 | 29 | 34 | 34 | 1-4 |
| Sum of room airflows may be greater than system airflow because system has multiple zones. | | | | | | | | | | | | |



Duct Size Preview

| Room or Duct Name | Source | Minimum Velocity | Maximum Velocity | Rough Factor | Design L/100 | SP Loss | Duct Velocity | Duct Length | Htg Flow | Clg Flow | Act. Flow | Duct Size |
|--------------------------------|----------|------------------|------------------|--------------|--------------|---------|---------------|-------------|----------|----------|-----------|-----------|
| System 1 | | | | | | | | | | | | |
| Supply Runouts | | | | | | | | | | | | |
| Zone 1 | | | | | | | | | | | | |
| 1-Family Room | Built-In | 450 | 750 | 0 | 0.1 | | 476.9 | | 68 | 65 | 65 | 1--5 |
| 2-Mud Room | Built-In | 450 | 750 | 0 | 0.1 | | 368.3 | | 44 | 32 | 32 | 1--4 |
| 3-Foyer | Built-In | 450 | 750 | 0 | 0.1 | | 277.3 | | 29 | 24 | 24 | 1--4 |
| 4-Dining Room | Built-In | 450 | 750 | 0 | 0.1 | | 650.5 | | 41 | 57 | 57 | 1--4 |
| 5-Powder Room | Built-In | 450 | 750 | 0 | 0.1 | | 155.7 | | 13 | 14 | 14 | 1--4 |
| 6-Kitchen | Built-In | 450 | 750 | 0 | 0.1 | | 654.1 | | 58 | 114 | 114 | 2--4 |
| 7-Living Room | Built-In | 450 | 750 | 0 | 0.1 | | 537.3 | | 77 | 211 | 211 | 2--6 |
| 8-Pantry | Built-In | 450 | 750 | 0 | 0.1 | | 118 | | 12 | 10 | 10 | 1--4 |
| Zone 2 | | | | | | | | | | | | |
| 9-Bedroom 1 | Built-In | 450 | 750 | 0 | 0.1 | | 575.2 | | 37 | 50 | 50 | 1--4 |
| 10-Bedroom 2 | Built-In | 450 | 750 | 0 | 0.1 | | 535.1 | | 55 | 73 | 73 | 1--5 |
| 11-Hall Bath | Built-In | 450 | 750 | 0 | 0.1 | | 174.2 | | 14 | 15 | 15 | 1--4 |
| 12-Master Bedroom | Built-In | 450 | 750 | 0 | 0.1 | | 641.7 | | 67 | 112 | 112 | 2--4 |
| 13-Master Walk-In Closet | Built-In | 450 | 750 | 0 | 0.1 | | 94.6 | | 12 | 8 | 8 | 1--4 |
| 14-Master Bath | Built-In | 450 | 750 | 0 | 0.1 | | 389.6 | | 29 | 34 | 34 | 1--4 |
| Other Ducts in System 1 | | | | | | | | | | | | |
| Supply Main Trunk | Built-In | 650 | 900 | 0 | 0.1 | | 720.9 | | 558 | 751 | 751 | 10x15 |

Summary

System 1

Heating Flow: 558

Cooling Flow: 751



Total Building Summary Loads

| Component Description | Area Quan | Sen Loss | Lat Gain | Sen Gain | Total Gain |
|--|-----------|---------------|--------------|---------------|---------------|
| New Material: Glazing-Eagle Axiom, u-value 0.32, SHGC 0.19 | 277.9 | 5,332 | 0 | 2,795 | 2,795 |
| 11D: Door-Wood - Solid Core | 21 | 491 | 0 | 156 | 156 |
| 12D1-6sw: Wall-Frame, R-21 closed cell 2 lb. spray foam insulation in 2 x 4 stud cavity, R-6 board insulation, siding finish, wood studs | 1315.9 | 4,106 | 0 | 391 | 391 |
| 16B-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-30 insulation | 1644.8 | 3,158 | 0 | 2,263 | 2,263 |
| 19A-11p: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, R-11 blanket | 1644.8 | 5,106 | 0 | 680 | 680 |
| Subtotals for structure: | | 18,193 | 0 | 6,285 | 6,285 |
| People: | 4 | | 800 | 920 | 1,720 |
| Equipment: | | | 2,450 | 2,450 | 4,900 |
| Lighting: | 0 | | | 0 | 0 |
| Ductwork: | | 8,395 | 714 | 4,363 | 5,076 |
| Infiltration: Winter CFM: 247, Summer CFM: 233 | | 16,260 | 4,771 | 2,046 | 6,817 |
| Ventilation: Winter CFM: 0, Summer CFM: 0 | | 0 | 0 | 0 | 0 |
| Exhaust: Winter CFM: 230, Summer CFM: 230 | | | | | |
| Blower Heat Gain, 100 watts: | | 0 | 0 | 341 | 341 |
| AED Excursion: | | 0 | 0 | 75 | 75 |
| Total Building Load Totals: | | 42,848 | 8,735 | 16,480 | 25,214 |

Check Figures

| | | | |
|---|--------|---------------------|-------|
| Total Building Supply CFM: | 751 | CFM Per Square ft.: | 0.456 |
| Square ft. of Room Area: | 1,646 | Square ft. Per Ton: | 565 |
| Volume (ft ³) of Cond. Space: | 16,134 | | |

Building Loads

| | | |
|---|-------------|--|
| Total Heating Required Including Ventilation Air: | 42,848 Btuh | 42.848 MBH |
| Total Sensible Gain: | 16,480 Btuh | 65 % |
| Total Latent Gain: | 8,735 Btuh | 35 % |
| Total Cooling Required Including Ventilation Air: | 25,214 Btuh | 2.10 Tons (Based On Sensible + Latent) |
| | | 2.91 Tons (Based On 75% Sensible Capacity) |

Notes

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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 Entire House Summary Loads

| Component Description | Area Quan | Sen Loss | Lat Gain | Sen Gain | Total Gain |
|--|-----------|----------|----------|----------|------------|
| New Material: Glazing-Eagle Axiom, u-value 0.32, SHGC 0.19 | 277.9 | 5,332 | 0 | 2,795 | 2,795 |
| 11D: Door-Wood - Solid Core | 21 | 491 | 0 | 156 | 156 |
| 12D1-6sw: Wall-Frame, R-21 closed cell 2 lb. spray foam insulation in 2 x 4 stud cavity, R-6 board insulation, siding finish, wood studs | 1315.9 | 4,106 | 0 | 391 | 391 |
| 16B-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-30 insulation | 1644.8 | 3,158 | 0 | 2,263 | 2,263 |
| 19A-11p: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, R-11 blanket | 1644.8 | 5,106 | 0 | 680 | 680 |
| Subtotals for structure: | | 18,193 | 0 | 6,285 | 6,285 |
| People: | 4 | | 800 | 920 | 1,720 |
| Equipment: | | | 2,450 | 2,450 | 4,900 |
| Lighting: | 0 | | | 0 | 0 |
| Ductwork: | | 8,395 | 714 | 4,363 | 5,076 |
| Infiltration: Winter CFM: 247, Summer CFM: 233 | | 16,260 | 4,771 | 2,046 | 6,817 |
| Ventilation: Winter CFM: 0, Summer CFM: 0 | | 0 | 0 | 0 | 0 |
| Exhaust: Winter CFM: 230, Summer CFM: 230 | | | | | |
| Blower Heat Gain, 100 watts: | | 0 | 0 | 341 | 341 |
| AED Excursion: | | 0 | 0 | 75 | 75 |
| System 1 Entire House Load Totals: | | 42,848 | 8,735 | 16,480 | 25,214 |

Check Figures

| | | | |
|---|--------|---------------------|-------|
| Supply CFM: | 751 | CFM Per Square ft.: | 0.456 |
| Square ft. of Room Area: | 1,646 | Square ft. Per Ton: | 565 |
| Volume (ft ³) of Cond. Space: | 16,134 | | |

System Loads

| | | |
|---|-------------|--|
| Total Heating Required Including Ventilation Air: | 42,848 Btuh | 42.848 MBH |
| Total Sensible Gain: | 16,480 Btuh | 65 % |
| Total Latent Gain: | 8,735 Btuh | 35 % |
| Total Cooling Required Including Ventilation Air: | 25,214 Btuh | 2.10 Tons (Based On Sensible + Latent) |
| | | 2.91 Tons (Based On 75% Sensible Capacity) |

Notes

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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, Zone 1 Summary Loads (Peak Load Procedure for Rooms)

| Component Description | Area Quan | Sen Loss | Lat Gain | Sen Gain | Total Gain |
|--|-----------|----------|----------|----------|------------|
| New Material: Glazing-Eagle Axiom, u-value 0.32, SHGC 0.19 | 151.4 | 2,904 | 0 | 2,424 | 2,424 |
| 11D: Door-Wood - Solid Core | 21 | 491 | 0 | 156 | 156 |
| 12D1-6sw: Wall-Frame, R-21 closed cell 2 lb. spray foam insulation in 2 x 4 stud cavity, R-6 board insulation, siding finish, wood studs | 822.4 | 2,566 | 0 | 245 | 245 |
| 16B-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-30 insulation | 1030.1 | 1,978 | 0 | 1,417 | 1,417 |
| 19A-11p: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, R-11 blanket | 1030.1 | 3,198 | 0 | 425 | 425 |
| Subtotals for structure: | | 11,137 | 0 | 4,667 | 4,667 |
| People: | 4 | | 800 | 920 | 1,720 |
| Equipment: | | | 1,650 | 1,650 | 3,300 |
| Lighting: | 0 | | | 0 | 0 |
| Ductwork: | | 5,155 | 0 | 2,805 | 2,805 |
| Infiltration: Winter CFM: 152, Summer CFM: 144 | | 10,017 | 2,939 | 1,260 | 4,199 |
| System 1, Zone 1 Load Totals: | | 26,309 | 5,389 | 11,351 | 16,740 |

Check Figures

| | | | |
|---|--------|---------------------|-------|
| Supply CFM: | 527 | CFM Per Square ft.: | 0.511 |
| Square ft. of Room Area: | 1,031 | Square ft. Per Ton: | 564 |
| Volume (ft ³) of Cond. Space: | 11,217 | | |

Zone Loads

| | | |
|-------------------------|-------------|--|
| Total Heating Required: | 26,309 Btuh | 26.309 MBH |
| Total Sensible Gain: | 11,351 Btuh | 68 % |
| Total Latent Gain: | 5,389 Btuh | 32 % |
| Total Cooling Required: | 16,740 Btuh | 1.39 Tons (Based On Sensible + Latent) |
| | | 1.83 Tons (Based On 75% Sensible Capacity) |

Notes

Rhvac is an ACCA approved Manual J and Manual D 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.



System 1, Zone 2 Summary Loads (Peak Load Procedure for Rooms)

| Component Description | Area Quan | Sen Loss | Lat Gain | Sen Gain | Total Gain |
|--|-----------|----------|----------|----------|------------|
| New Material: Glazing-Eagle Axiom, u-value 0.32, SHGC 0.19 | 126.5 | 2,428 | 0 | 1,883 | 1,883 |
| 12D1-6sw: Wall-Frame, R-21 closed cell 2 lb. spray foam insulation in 2 x 4 stud cavity, R-6 board insulation, siding finish, wood studs | 493.5 | 1,540 | 0 | 146 | 146 |
| 16B-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-30 insulation | 614.7 | 1,180 | 0 | 846 | 846 |
| 19A-11p: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, R-11 blanket | 614.7 | 1,908 | 0 | 255 | 255 |
| Subtotals for structure: | | 7,056 | 0 | 3,130 | 3,130 |
| People: | 0 | | 0 | 0 | 0 |
| Equipment: | | | 800 | 800 | 1,600 |
| Lighting: | 0 | | | 0 | 0 |
| Ductwork: | | 3,241 | 0 | 1,557 | 1,557 |
| Infiltration: Winter CFM: 95, Summer CFM: 89 | | 6,243 | 1,832 | 786 | 2,618 |
| System 1, Zone 2 Load Totals: | | 16,540 | 2,632 | 6,300 | 8,932 |

Check Figures

| | | | |
|---|-------|---------------------|-------|
| Supply CFM: | 293 | CFM Per Square ft.: | 0.476 |
| Square ft. of Room Area: | 615 | Square ft. Per Ton: | 625 |
| Volume (ft ³) of Cond. Space: | 4,917 | | |

Zone Loads

| | | |
|-------------------------|-------------|--|
| Total Heating Required: | 16,540 Btuh | 16.540 MBH |
| Total Sensible Gain: | 6,300 Btuh | 71 % |
| Total Latent Gain: | 2,632 Btuh | 29 % |
| Total Cooling Required: | 8,932 Btuh | 0.74 Tons (Based On Sensible + Latent) |
| | | 0.98 Tons (Based On 75% Sensible Capacity) |

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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 - Family Room (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 13.7 ft. | System Number: | 1 |
| Room Width: | 13.0 ft. | Zone Number: | 1 |
| Area: | 178.0 sq.ft. | Supply Air: | 65 CFM |
| Ceiling Height: | 9.0 ft. | Supply Air Changes: | 2.4 AC/hr |
| Volume: | 1,603.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 65 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 5 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 477 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 477 ft./min. | Actual Winter Infil.: | 37 CFM |
| Actual Loss: | 0.188 in.wg./100 ft. | Actual Summer Infil.: | 35 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| E -Wall-12D1-6sw 13 X 9 | 108.1 | 0.052 | 3.1 | 337 | 0.3 | 0 | 32 |
| N -Wall-12D1-6sw 13.7 X 9 | 123.3 | 0.052 | 3.1 | 385 | 0.3 | 0 | 37 |
| E -Gls-New Material shgc-0.19 0%S | 8.9 | 0.320 | 19.2 | 170 | 17.6 | 0 | 156 |
| UP-Ceil-16B-30 13.7 X 13 | 178.1 | 0.032 | 1.9 | 342 | 1.4 | 0 | 245 |
| Floor-19A-11p 13 X 13.7 | 178.1 | 0.073 | 3.1 | 553 | 0.4 | 0 | 74 |
| Subtotals for Structure: | | | | 1,787 | | 0 | 544 |
| Infil.: Win.: 36.7, Sum.: 34.7 | 240 | | 10.071 | 2,420 | 1.265 | 710 | 304 |
| Ductwork: | | | | 1,025 | | | 346 |
| AED Excursion: | | | | | | | 6 |
| Equipment: | | | | | | 200 | 200 |
| Room Totals: | | | | 5,232 | | 910 | 1,400 |



Detailed Room Loads - Room 2 - Mud Room (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 9.5 ft. | System Number: | 1 |
| Room Width: | 9.0 ft. | Zone Number: | 1 |
| Area: | 86.0 sq.ft. | Supply Air: | 32 CFM |
| Ceiling Height: | 9.0 ft. | Supply Air Changes: | 2.5 AC/hr |
| Volume: | 770.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 32 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 368 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 368 ft./min. | Actual Winter Infil.: | 25 CFM |
| Actual Loss: | 0.155 in.wg./100 ft. | Actual Summer Infil.: | 24 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 9 X 9 | 76.5 | 0.052 | 3.1 | 239 | 0.3 | 0 | 23 |
| E -Wall-12D1-6sw 9.5 X 9 | 85.5 | 0.052 | 3.1 | 267 | 0.3 | 0 | 25 |
| S -Gls-New Material shgc-0.19 0%S | 4.5 | 0.320 | 19.2 | 86 | 23.6 | 0 | 106 |
| UP-Ceil-16B-30 9.5 X 9 | 85.5 | 0.032 | 1.9 | 164 | 1.4 | 0 | 118 |
| Floor-19A-11p 9 X 9.5 | 85.5 | 0.073 | 3.1 | 265 | 0.4 | 0 | 35 |
| Subtotals for Structure: | | | | 1,021 | | 0 | 307 |
| Infil.: Win.: 25.5, Sum.: 24.0 | 167 | | 10.066 | 1,676 | 1.267 | 492 | 211 |
| Ductwork: | | | | 657 | | | 171 |
| AED Excursion: | | | | | | | 3 |
| Room Totals: | | | | 3,354 | | 492 | 692 |



Detailed Room Loads - Room 3 - Foyer (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 7.0 ft. | System Number: | 1 |
| Room Width: | 9.0 ft. | Zone Number: | 1 |
| Area: | 63.0 sq.ft. | Supply Air: | 24 CFM |
| Ceiling Height: | 9.0 ft. | Supply Air Changes: | 2.6 AC/hr |
| Volume: | 567.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 24 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 277 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 277 ft./min. | Actual Winter Infil.: | 12 CFM |
| Actual Loss: | 0.089 in.wg./100 ft. | Actual Summer Infil.: | 12 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|--------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 9 X 9 | 60 | 0.052 | 3.1 | 187 | 0.3 | 0 | 18 |
| S -Door-11D 3 X 7 | 21 | 0.390 | 23.4 | 491 | 7.4 | 0 | 156 |
| UP-Ceil-16B-30 7 X 9 | 63 | 0.032 | 1.9 | 121 | 1.4 | 0 | 87 |
| Floor-19A-11p 9 X 7 | 63 | 0.073 | 3.1 | 196 | 0.4 | 0 | 26 |
| Subtotals for Structure: | | | | 995 | | 0 | 287 |
| Infil.: Win.: 12.4, Sum.: 11.7 | 81 | | 10.074 | 816 | 1.272 | 239 | 103 |
| Ductwork: | | | | 441 | | | 129 |
| AED Excursion: | | | | | | | 2 |
| Room Totals: | | | | 2,252 | | 239 | 521 |



Detailed Room Loads - Room 4 - Dining Room (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 16.0 ft. | System Number: | 1 |
| Room Width: | 10.0 ft. | Zone Number: | 1 |
| Area: | 160.0 sq.ft. | Supply Air: | 57 CFM |
| Ceiling Height: | 12.0 ft. | Supply Air Changes: | 1.8 AC/hr |
| Volume: | 1,920.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 57 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 651 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 651 ft./min. | Actual Winter Infil.: | 12 CFM |
| Actual Loss: | 0.475 in.wg./100 ft. | Actual Summer Infil.: | 12 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 10 X 8 | 38 | 0.052 | 3.1 | 119 | 0.3 | 0 | 11 |
| N -Gls-New Material shgc-0.19 0%S | 42 | 0.320 | 19.2 | 806 | 8.7 | 0 | 367 |
| UP-Ceil-16B-30 16 X 10 | 160 | 0.032 | 1.9 | 307 | 1.4 | 0 | 220 |
| Floor-19A-11p 10 X 16 | 160 | 0.073 | 3.1 | 497 | 0.4 | 0 | 66 |
| Subtotals for Structure: | | | | 1,729 | | 0 | 664 |
| Infil.: Win.: 12.2, Sum.: 11.5 | 80 | | 10.075 | 806 | 1.263 | 236 | 101 |
| Ductwork: | | | | 618 | | | 302 |
| AED Excursion: | | | | | | | 5 |
| Equipment: | | | | | | 150 | 150 |
| Room Totals: | | | | 3,153 | | 386 | 1,222 |



Detailed Room Loads - Room 5 - Powder Room (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 5.0 ft. | System Number: | 1 |
| Room Width: | 5.0 ft. | Zone Number: | 1 |
| Area: | 25.0 sq.ft. | Supply Air: | 14 CFM |
| Ceiling Height: | 9.0 ft. | Supply Air Changes: | 3.6 AC/hr |
| Volume: | 225.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 14 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 156 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 156 ft./min. | Actual Winter Infil.: | 7 CFM |
| Actual Loss: | 0.029 in.wg./100 ft. | Actual Summer Infil.: | 6 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 5 X 9 | 40.5 | 0.052 | 3.1 | 126 | 0.3 | 0 | 12 |
| S -Gls-New Material shgc-0.19 0%S | 4.5 | 0.320 | 19.2 | 86 | 23.6 | 0 | 106 |
| UP-Ceil-16B-30 5 X 5 | 25 | 0.032 | 1.9 | 48 | 1.4 | 0 | 34 |
| Floor-19A-11p 5 X 5 | 25 | 0.073 | 3.1 | 78 | 0.4 | 0 | 10 |
| Subtotals for Structure: | | | | 338 | | 0 | 162 |
| Infil.: Win.: 6.9, Sum.: 6.5 | 45 | | 10.067 | 453 | 1.267 | 133 | 57 |
| Ductwork: | | | | 193 | | | 72 |
| AED Excursion: | | | | | | | 1 |
| Room Totals: | | | | 984 | | 133 | 293 |



Detailed Room Loads - Room 6 - Kitchen (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 12.0 ft. | System Number: | 1 |
| Room Width: | 18.0 ft. | Zone Number: | 1 |
| Area: | 216.0 sq.ft. | Supply Air: | 114 CFM |
| Ceiling Height: | 12.0 ft. | Supply Air Changes: | 2.6 AC/hr |
| Volume: | 2,592.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 2 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 57 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 654 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 654 ft./min. | Actual Winter Infil.: | 25 CFM |
| Actual Loss: | 0.480 in.wg./100 ft. | Actual Summer Infil.: | 23 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|--|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 18 X 9 | 138 | 0.052 | 3.1 | 431 | 0.3 | 0 | 41 |
| N -Gls-New Material shgc-0.19 0%S (4) | 24 | 0.320 | 19.2 | 460 | 8.7 | 0 | 208 |
| UP-Ceil-16B-30 12 X 18 | 216 | 0.032 | 1.9 | 415 | 1.4 | 0 | 297 |
| Floor-19A-11p 18 X 12 | 216 | 0.073 | 3.1 | 670 | 0.4 | 0 | 89 |
| Subtotals for Structure: | | | | 1,976 | | 0 | 635 |
| Infil.: Win.: 24.8, Sum.: 23.4 | 162 | | 10.068 | 1,631 | 1.265 | 479 | 205 |
| Ductwork: | | | | 879 | | | 608 |
| AED Excursion: | | | | | | | 10 |
| Equipment: | | | | | | 1,000 | 1,000 |
| Room Totals: | | | | 4,486 | | 1,479 | 2,458 |



Detailed Room Loads - Room 7 - Living Room (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 14.0 ft. | System Number: | 1 |
| Room Width: | 20.0 ft. | Zone Number: | 1 |
| Area: | 280.0 sq.ft. | Supply Air: | 211 CFM |
| Ceiling Height: | 12.0 ft. | Supply Air Changes: | 3.8 AC/hr |
| Volume: | 3,360.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 2 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 106 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 6 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 537 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 537 ft./min. | Actual Winter Infil.: | 28 CFM |
| Actual Loss: | 0.184 in.wg./100 ft. | Actual Summer Infil.: | 26 CFM |

| Item Description | Area Quantity | -U-Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|--|---------------|----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 20 X 9 | 120 | 0.052 | 3.1 | 374 | 0.3 | 0 | 36 |
| S -Gls-New Material shgc-0.19 0%S (4) | 60 | 0.320 | 19.2 | 1,152 | 23.6 | 0 | 1,416 |
| UP-Ceil-16B-30 14 X 20 | 280 | 0.032 | 1.9 | 538 | 1.4 | 0 | 385 |
| Floor-19A-11p 20 X 14 | 280 | 0.073 | 3.1 | 869 | 0.4 | 0 | 116 |
| Subtotals for Structure: | | | | 2,933 | | 0 | 1,953 |
| Infil.: Win.: 27.5, Sum.: 26.0 | 180 | | 10.067 | 1,812 | 1.267 | 532 | 228 |
| Ductwork: | | | | 1,156 | | | 1,123 |
| AED Excursion: | | | | | | | 19 |
| People: 200 lat/per, 230 sen/per: | 4 | | | | | 800 | 920 |
| Equipment: | | | | | | 300 | 300 |
| Room Totals: | | | | 5,901 | | 1,632 | 4,543 |



Detailed Room Loads - Room 8 - Pantry (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 2 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 4.5 ft. | System Number: | 1 |
| Room Width: | 5.0 ft. | Zone Number: | 1 |
| Area: | 23.0 sq.ft. | Supply Air: | 10 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 3.4 AC/hr |
| Volume: | 180.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 10 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 118 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 118 ft./min. | Actual Winter Infil.: | 6 CFM |
| Actual Loss: | 0.017 in.wg./100 ft. | Actual Summer Infil.: | 6 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 5 X 8 | 32.5 | 0.052 | 3.1 | 101 | 0.3 | 0 | 10 |
| N -Gls-New Material shgc-0.19 0%S | 7.5 | 0.320 | 19.2 | 144 | 8.7 | 0 | 65 |
| UP-Ceil-16B-30 4.5 X 5 | 22.5 | 0.032 | 1.9 | 43 | 1.4 | 0 | 31 |
| Floor-19A-11p 5 X 4.5 | 22.5 | 0.073 | 3.1 | 70 | 0.4 | 0 | 9 |
| Subtotals for Structure: | | | | 358 | | 0 | 115 |
| Infil.: Win.: 6.1, Sum.: 5.8 | 40 | | 10.075 | 403 | 1.275 | 118 | 51 |
| Ductwork: | | | | 185 | | | 55 |
| AED Excursion: | | | | | | | 1 |
| Room Totals: | | | | 946 | | 118 | 222 |



Detailed Room Loads - Room 9 - Bedroom 1 (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 10.6 ft. | System Number: | 1 |
| Room Width: | 11.5 ft. | Zone Number: | 2 |
| Area: | 122.0 sq.ft. | Supply Air: | 50 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 3.1 AC/hr |
| Volume: | 975.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 50 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 575 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 575 ft./min. | Actual Winter Infil.: | 14 CFM |
| Actual Loss: | 0.372 in.wg./100 ft. | Actual Summer Infil.: | 13 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|---------------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 11.5 X 8 | 62 | 0.052 | 3.1 | 193 | 0.3 | 0 | 18 |
| N -Gls-New Material shgc-0.19 0%S (2) | 30 | 0.320 | 19.2 | 576 | 8.5 | 0 | 256 |
| UP-Ceil-16B-30 10.6 X 11.5 | 121.9 | 0.032 | 1.9 | 234 | 1.4 | 0 | 168 |
| Floor-19A-11p 11.5 X 10.6 | 121.9 | 0.073 | 3.1 | 378 | 0.4 | 0 | 50 |
| Subtotals for Structure: | | | | 1,381 | | 0 | 492 |
| Infil.: Win.: 14.1, Sum.: 13.3 | 92 | | 10.065 | 926 | 1.272 | 272 | 117 |
| Ductwork: | | | | 562 | | | 267 |
| AED Excursion: | | | | | | | 5 |
| Equipment: | | | | | | 200 | 200 |
| Room Totals: | | | | 2,869 | | 472 | 1,081 |



Detailed Room Loads - Room 10 - Bedroom 2 (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 12.0 ft. | System Number: | 1 |
| Room Width: | 10.0 ft. | Zone Number: | 2 |
| Area: | 120.0 sq.ft. | Supply Air: | 73 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 4.6 AC/hr |
| Volume: | 960.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 73 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 5 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 535 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 535 ft./min. | Actual Winter Infil.: | 27 CFM |
| Actual Loss: | 0.236 in.wg./100 ft. | Actual Summer Infil.: | 25 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 10 X 8 | 65 | 0.052 | 3.1 | 203 | 0.3 | 0 | 19 |
| E -Wall-12D1-6sw 12 X 8 | 81 | 0.052 | 3.1 | 253 | 0.3 | 0 | 24 |
| S -Gls-New Material shgc-0.19 0%S | 15 | 0.320 | 19.2 | 288 | 18.7 | 0 | 281 |
| E -Gls-New Material shgc-0.19 0%S | 15 | 0.320 | 19.2 | 288 | 14.3 | 0 | 214 |
| UP-Ceil-16B-30 12 X 10 | 120 | 0.032 | 1.9 | 230 | 1.4 | 0 | 165 |
| Floor-19A-11p 10 X 12 | 120 | 0.073 | 3.1 | 372 | 0.4 | 0 | 50 |
| Subtotals for Structure: | | | | 1,634 | | 0 | 753 |
| Infil.: Win.: 26.9, Sum.: 25.4 | 176 | | 10.068 | 1,772 | 1.267 | 520 | 223 |
| Ductwork: | | | | 830 | | | 388 |
| AED Excursion: | | | | | | | 7 |
| Equipment: | | | | | | 200 | 200 |
| Room Totals: | | | | 4,236 | | 720 | 1,571 |



Detailed Room Loads - Room 11 - Hall Bath (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 11.0 ft. | System Number: | 1 |
| Room Width: | 5.0 ft. | Zone Number: | 2 |
| Area: | 55.0 sq.ft. | Supply Air: | 15 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 2.1 AC/hr |
| Volume: | 440.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 15 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 174 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 174 ft./min. | Actual Winter Infil.: | 6 CFM |
| Actual Loss: | 0.036 in.wg./100 ft. | Actual Summer Infil.: | 6 CFM |

| Item Description | Area Quantity | -U-Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|----------|---------|----------|---------|----------|----------|
| S -Wall-12D1-6sw 5 X 8 | 35.5 | 0.052 | 3.1 | 111 | 0.3 | 0 | 11 |
| S -Gls-New Material shgc-0.19 0%S | 4.5 | 0.320 | 19.2 | 86 | 18.7 | 0 | 84 |
| UP-Ceil-16B-30 11 X 5 | 55 | 0.032 | 1.9 | 106 | 1.4 | 0 | 76 |
| Floor-19A-11p 5 X 11 | 55 | 0.073 | 3.1 | 171 | 0.4 | 0 | 23 |
| Subtotals for Structure: | | | | 474 | | 0 | 194 |
| Infil.: Win.: 6.1, Sum.: 5.8 | 40 | | 10.075 | 403 | 1.275 | 118 | 51 |
| Ductwork: | | | | 214 | | | 81 |
| AED Excursion: | | | | | | | 1 |
| Room Totals: | | | | 1,091 | | 118 | 327 |



Detailed Room Loads - Room 12 - Master Bedroom (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 12.0 ft. | System Number: | 1 |
| Room Width: | 12.5 ft. | Zone Number: | 2 |
| Area: | 150.0 sq.ft. | Supply Air: | 112 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 5.6 AC/hr |
| Volume: | 1,200.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 2 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 56 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 642 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 642 ft./min. | Actual Winter Infil.: | 30 CFM |
| Actual Loss: | 0.462 in.wg./100 ft. | Actual Summer Infil.: | 28 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|---------------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 12.5 X 8 | 75 | 0.052 | 3.1 | 234 | 0.3 | 0 | 22 |
| W -Wall-12D1-6sw 12 X 8 | 71 | 0.052 | 3.1 | 222 | 0.3 | 0 | 21 |
| N -Gls-New Material shgc-0.19 0%S (2) | 25 | 0.320 | 19.2 | 480 | 8.5 | 0 | 212 |
| W -Gls-New Material shgc-0.19 0%S (2) | 25 | 0.320 | 19.2 | 480 | 29.4 | 0 | 734 |
| UP-Ceil-16B-30 12 X 12.5 | 150 | 0.032 | 1.9 | 288 | 1.4 | 0 | 206 |
| Floor-19A-11p 12.5 X 12 | 150 | 0.073 | 3.1 | 466 | 0.4 | 0 | 62 |
| Subtotals for Structure: | | | | 2,170 | | 0 | 1,257 |
| Infil.: Win.: 30.0, Sum.: 28.3 | 196 | | 10.071 | 1,974 | 1.265 | 579 | 248 |
| Ductwork: | | | | 1,010 | | | 596 |
| AED Excursion: | | | | | | | 10 |
| Equipment: | | | | | | 300 | 300 |
| Room Totals: | | | | 5,154 | | 879 | 2,411 |



Detailed Room Loads - Room 13 - Master Walk-In Closet (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 6.5 ft. | System Number: | 1 |
| Room Width: | 5.5 ft. | Zone Number: | 2 |
| Area: | 36.0 sq.ft. | Supply Air: | 8 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 1.7 AC/hr |
| Volume: | 286.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 8 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 95 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 95 ft./min. | Actual Winter Infil.: | 7 CFM |
| Actual Loss: | 0.011 in.wg./100 ft. | Actual Summer Infil.: | 6 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 5.5 X 8 | 44 | 0.052 | 3.1 | 137 | 0.3 | 0 | 13 |
| UP-Ceil-16B-30 6.5 X 5.5 | 35.8 | 0.032 | 1.9 | 69 | 1.4 | 0 | 49 |
| Floor-19A-11p 5.5 X 6.5 | 35.8 | 0.073 | 3.1 | 111 | 0.4 | 0 | 15 |
| Subtotals for Structure: | | | | 317 | | 0 | 77 |
| Infil.: Win.: 6.7, Sum.: 6.4 | 44 | | 10.068 | 443 | 1.273 | 130 | 56 |
| Ductwork: | | | | 185 | | | 44 |
| AED Excursion: | | | | | | | 1 |
| Room Totals: | | | | 945 | | 130 | 178 |



Detailed Room Loads - Room 14 - Master Bath (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 4 pm

| | | | |
|----------------------|----------------------|-----------------------|-----------|
| Calculation Mode: | Htg. & clg. | Occurrences: | 1 |
| Room Length: | 12.0 ft. | System Number: | 1 |
| Room Width: | 11.0 ft. | Zone Number: | 2 |
| Area: | 132.0 sq.ft. | Supply Air: | 34 CFM |
| Ceiling Height: | 8.0 ft. | Supply Air Changes: | 1.9 AC/hr |
| Volume: | 1,056.0 cu.ft. | Req. Vent. Clg: | 0 CFM |
| Number of Registers: | 1 | Actual Winter Vent.: | 0 CFM |
| Runout Air: | 34 CFM | Percent of Supply.: | 0 % |
| Runout Duct Size: | 4 in. | Actual Summer Vent.: | 0 CFM |
| Runout Air Velocity: | 390 ft./min. | Percent of Supply: | 0 % |
| Runout Air Velocity: | 390 ft./min. | Actual Winter Infil.: | 11 CFM |
| Actual Loss: | 0.173 in.wg./100 ft. | Actual Summer Infil.: | 10 CFM |

| Item Description | Area Quantity | -U- Value | Htg HTM | Sen Loss | Clg HTM | Lat Gain | Sen Gain |
|-----------------------------------|---------------|-----------|---------|----------|---------|----------|----------|
| N -Wall-12D1-6sw 9 X 8 | 60 | 0.052 | 3.1 | 187 | 0.3 | 0 | 18 |
| N -Gls-New Material shgc-0.19 0%S | 12 | 0.320 | 19.2 | 230 | 8.5 | 0 | 102 |
| UP-Ceil-16B-30 12 X 11 | 132 | 0.032 | 1.9 | 253 | 1.4 | 0 | 182 |
| Floor-19A-11p 11 X 12 | 132 | 0.073 | 3.1 | 410 | 0.4 | 0 | 55 |
| Subtotals for Structure: | | | | 1,080 | | 0 | 357 |
| Infil.: Win.: 11.0, Sum.: 10.4 | 72 | | 10.069 | 725 | 1.264 | 213 | 91 |
| Ductwork: | | | | 440 | | | 181 |
| AED Excursion: | | | | | | | 3 |
| Equipment: | | | | | | 100 | 100 |
| Room Totals: | | | | 2,245 | | 313 | 732 |



System 1 Room Load Summary

| Room No | Room Name | 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 |
|-----------------|-----------------------|---------|---------------|-------------|---------------|--------------|---------------|--------------|-------------|-------------|
| ---Zone 1--- | | | | | | | | | | |
| 1 | Family Room | 178 | 5,232 | 68 | 1-5 | 477 | 1,400 | 910 | 65 | 65 |
| 2 | Mud Room | 86 | 3,354 | 44 | 1-4 | 368 | 692 | 492 | 32 | 32 |
| 3 | Foyer | 63 | 2,252 | 29 | 1-4 | 277 | 521 | 239 | 24 | 24 |
| 4 | Dining Room | 160 | 3,153 | 41 | 1-4 | 651 | 1,222 | 386 | 57 | 57 |
| 5 | Powder Room | 25 | 984 | 13 | 1-4 | 156 | 293 | 133 | 14 | 14 |
| 6 | Kitchen | 216 | 4,486 | 58 | 2-4 | 654 | 2,458 | 1,479 | 114 | 114 |
| 7 | Living Room | 280 | 5,901 | 77 | 2-6 | 537 | 4,543 | 1,632 | 211 | 211 |
| 8 | Pantry | 23 | 946 | 12 | 1-4 | 118 | 222 | 118 | 10 | 10 |
| Zone 1 subtotal | | 1,031 | 26,309 | 342 | | | 11,351 | 5,389 | 527 | 527 |
| ---Zone 2--- | | | | | | | | | | |
| 9 | Bedroom 1 | 122 | 2,869 | 37 | 1-4 | 575 | 1,081 | 472 | 50 | 50 |
| 10 | Bedroom 2 | 120 | 4,236 | 55 | 1-5 | 535 | 1,571 | 720 | 73 | 73 |
| 11 | Hall Bath | 55 | 1,091 | 14 | 1-4 | 174 | 327 | 118 | 15 | 15 |
| 12 | Master Bedroom | 150 | 5,154 | 67 | 2-4 | 642 | 2,411 | 879 | 112 | 112 |
| 13 | Master Walk-In Closet | 36 | 945 | 12 | 1-4 | 95 | 178 | 130 | 8 | 8 |
| 14 | Master Bath | 132 | 2,245 | 29 | 1-4 | 390 | 732 | 313 | 34 | 34 |
| Zone 2 subtotal | | 615 | 16,540 | 215 | | | 6,300 | 2,632 | 293 | 293 |
| Blower Power | | | | | | | 341 | | | |
| Duct Latent | | | | | | | | 714 | | |
| System 1 total | | 1,646 | 42,848 | 558 | | | 16,480 | 8,735 | 751 | 751 |

System 1 Main Trunk Size: 10x15 in.
 Velocity: 721 ft./min
 Loss per 100 ft.: 0.092 in.wg

Note: Since the system is multizone, the Peak Fenestration Gain Procedure was used to determine glass sensible gains at the room and zone levels, so the sums of the zone sensible gains and airflows for cooling shown above are not intended to equal the totals at the system level. Room and zone sensible gains and cooling CFM values are for the hour in which the glass sensible gain for the zone is at its peak. Sensible gains at the system level are based on the "Average Load Procedure + Excursion" method.

Cooling System Summary

| | Cooling Tons | Sensible/Latent Split | Sensible Btuh | Latent Btuh | Total Btuh |
|---------------|--------------|-----------------------|---------------|-------------|------------|
| Net Required: | 2.10 | 65% / 35% | 16,480 | 8,735 | 25,214 |
| Recommended: | 2.91 | 75% / 25% | 26,204 | 8,735 | 34,939 |

Equipment Data

| | Heating System | Cooling System |
|--------------------|---------------------|--------------------------|
| Type: | Natural Gas Furnace | Standard Air Conditioner |
| Model: | | |
| Indoor Model: | | |
| Brand: | | |
| Efficiency: | 0 AFUE | 0 SEER |
| Sound: | 0 | 0 |
| Capacity: | 0 Btuh | 0 Btuh |
| Sensible Capacity: | n/a | 0 Btuh |
| Latent Capacity: | n/a | 0 Btuh |



Building Rotation Duct Sizes

| Room or Duct Name | Direction Front door Faces | | | | | | | | | | | | | | | | Max Duct Size |
|--------------------------------|----------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|
| | NE | | E | | SE | | S | | SW | | W | | NW | | N | | |
| | 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 | |
| System 1 | | | | | | | | | | | | | | | | | |
| Supply Runouts | | | | | | | | | | | | | | | | | |
| Zone 1 | | | | | | | | | | | | | | | | | |
| 1-Family Room | 68 | 65 | 68 | 64 | 68 | 63 | 68 | 71 | 68 | 65 | 68 | 64 | 68 | 59 | 68 | 59 | 1-5 |
| 2-Mud Room | 44 | 32 | 44 | 34 | 44 | 34 | 44 | 30 | 44 | 28 | 44 | 28 | 44 | 29 | 44 | 29 | 1-4 |
| 3-Foyer | 29 | 24 | 29 | 24 | 29 | 24 | 29 | 24 | 29 | 24 | 29 | 24 | 29 | 24 | 29 | 24 | 1-4 |
| 4-Dining Room | 41 | 57 | 41 | 59 | 41 | 65 | 41 | 69 | 41 | 95 | 41 | 114 | 41 | 117 | 41 | 84 | 2-4 |
| 5-Powder Room | 13 | 14 | 13 | 15 | 13 | 16 | 13 | 12 | 13 | 9 | 13 | 10 | 13 | 10 | 13 | 11 | 1-4 |
| 6-Kitchen | 58 | 114 | 58 | 115 | 58 | 117 | 58 | 120 | 58 | 136 | 58 | 146 | 58 | 147 | 58 | 128 | 2-5 |
| 7-Living Room | 77 | 211 | 77 | 234 | 77 | 237 | 77 | 192 | 77 | 155 | 77 | 160 | 77 | 168 | 77 | 173 | 3-5 |
| 8-Pantry | 12 | 10 | 12 | 11 | 12 | 12 | 12 | 13 | 12 | 17 | 12 | 20 | 12 | 21 | 12 | 15 | 1-4 |
| Zone 2 | | | | | | | | | | | | | | | | | |
| 9-Bedroom 1 | 37 | 50 | 37 | 52 | 37 | 83 | 37 | 85 | 37 | 78 | 37 | 91 | 37 | 93 | 37 | 70 | 1-6 |
| 10-Bedroom 2 | 55 | 73 | 55 | 85 | 55 | 56 | 55 | 54 | 55 | 67 | 55 | 67 | 55 | 60 | 55 | 63 | 1-5 |
| 11-Hall Bath | 14 | 15 | 14 | 18 | 14 | 11 | 14 | 11 | 14 | 12 | 14 | 13 | 14 | 13 | 14 | 14 | 1-4 |
| 12-Master Bedroom | 67 | 112 | 67 | 93 | 67 | 101 | 67 | 114 | 67 | 117 | 67 | 126 | 67 | 127 | 67 | 129 | 2-5 |
| 13-Master Walk-In Closet | 12 | 8 | 12 | 8 | 12 | 8 | 12 | 8 | 12 | 8 | 12 | 8 | 12 | 8 | 12 | 8 | 1-4 |
| 14-Master Bath | 29 | 34 | 29 | 35 | 29 | 47 | 29 | 48 | 29 | 45 | 29 | 50 | 29 | 51 | 29 | 42 | 1-4 |
| Other Ducts in System 1 | | | | | | | | | | | | | | | | | |
| Supply Main Trunk | 558 | 751 | 558 | 819 | 558 | 853 | 558 | 826 | 558 | 770 | 558 | 854 | 558 | 875 | 558 | 820 | 10x17 |
| Bldg. High Dir.: East | | | | | | | | | | | | | | | | | |
| Sensible Gain: 17,979 | | | | | | | | | | | | | | | | | |
| Latent Gain: 8,737 | | | | | | | | | | | | | | | | | |

Summary

System 1

Heating Flow: 558

Cooling Flow: 751



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 Northeast

Individual Rooms

| Rm. No. | Room Name | 0° Rot. CFM | 45° Rot. CFM | 90° Rot. CFM | 135° Rot. CFM | 180° Rot. CFM | 225° Rot. CFM | 270° Rot. CFM | 315° Rot. CFM | High Duct Size |
|---------|-----------|-------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|----------------|
|---------|-----------|-------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|----------------|

System 1:

Zone 1:

| | | | | | | | | | | |
|---|-------------|-----|-----|------|-----|-----|-----|------|-----|------|
| 1 | Family Room | 65 | 64 | 63 | *71 | 65 | 64 | 59 | 59 | 1--5 |
| 2 | Mud Room | 32 | 34 | *34 | 30 | 28 | 28 | 29 | 29 | 1--4 |
| 3 | Foyer | *24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 1--4 |
| 4 | Dining Room | 57 | 59 | 65 | 69 | 95 | 114 | *117 | 84 | 2--4 |
| 5 | Powder Room | 14 | 15 | *16 | 12 | 9 | 10 | 10 | 11 | 1--4 |
| 6 | Kitchen | 114 | 115 | 117 | 120 | 136 | 146 | *147 | 128 | 2--5 |
| 7 | Living Room | 211 | 234 | *237 | 192 | 155 | 160 | 168 | 173 | 3--5 |
| 8 | Pantry | 10 | 11 | 12 | 13 | 17 | 20 | *21 | 15 | 1--4 |

Zone 2:

| | | | | | | | | | | |
|----|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|
| 9 | Bedroom 1 | 50 | 52 | 83 | 85 | 78 | 91 | *93 | 70 | 1--6 |
| 10 | Bedroom 2 | 73 | *85 | 56 | 54 | 67 | 67 | 60 | 63 | 1--5 |
| 11 | Hall Bath | 15 | *18 | 11 | 11 | 12 | 13 | 13 | 14 | 1--4 |
| 12 | Master Bedroom | 112 | 93 | 101 | 114 | 117 | 126 | 127 | *129 | 2--5 |
| 13 | Master Walk-In Closet | *8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 1--4 |
| 14 | Master Bath | 34 | 35 | 47 | 48 | 45 | 50 | *51 | 42 | 1--4 |

* Indicates highest CFM of all rotations.

Whole Building

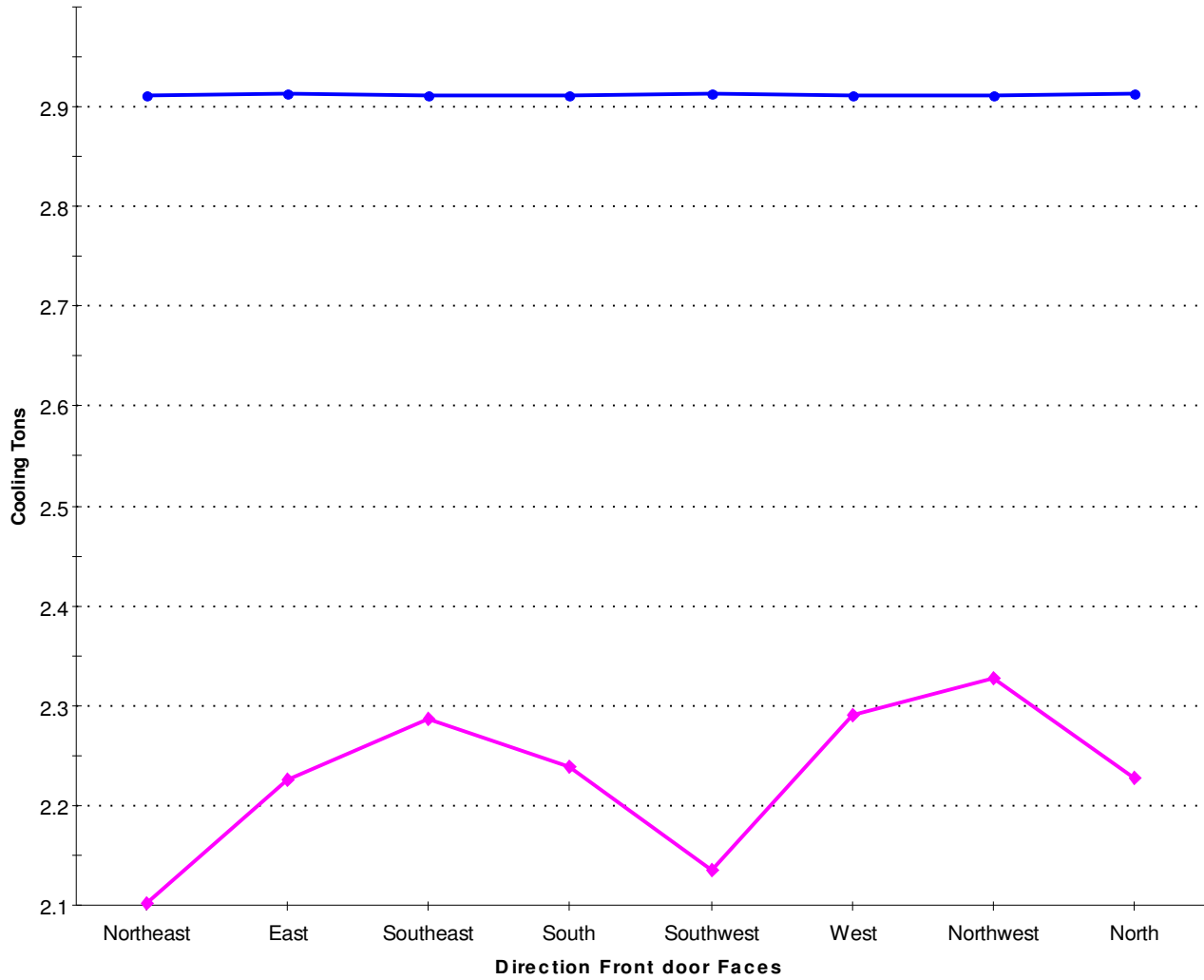
| Rotation Degrees | Front door Faces | Supply CFM | Sensible Gain | Latent Gain | Net Tons | Recommended Tons |
|------------------|------------------|------------|---------------|-------------|----------|------------------|
| 0° | Northeast | 751 | 16,480 | 8,735 | 2.10 | 2.91 |
| 45° | East | 819 | 17,979 | *8,737 | 2.23 | *2.91 |
| 90° | Southeast | 853 | 18,714 | 8,734 | 2.29 | 2.91 |
| 135° | South | 826 | 18,120 | 8,733 | 2.24 | 2.91 |
| 180° | Southwest | 770 | 16,889 | 8,737 | 2.14 | 2.91 |
| 225° | West | 854 | 18,749 | 8,733 | 2.29 | 2.91 |
| 270° | Northwest | *875 | *19,201 | 8,735 | *2.33 | 2.91 |
| 315° | North | 820 | 17,988 | 8,737 | 2.23 | 2.91 |

* Indicates highest value of all rotations.



Building Rotation Report (cont'd)

Building Rotation Tonnage

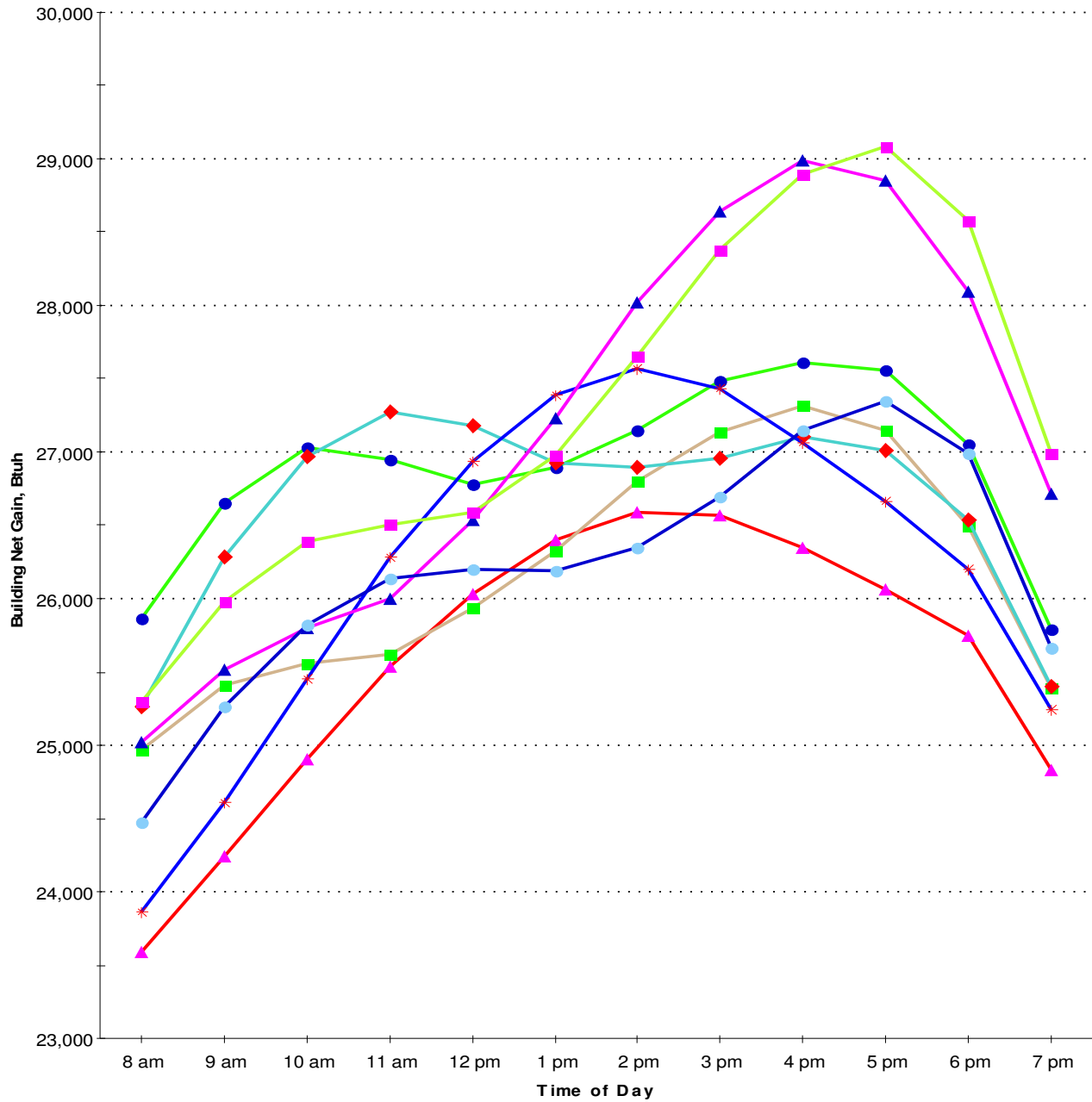


● Building Recommended Tonnage
◆ Building Net Tonnage



Building Rotation Report (cont'd)

Building Rotation Hourly Net Gain



- ▲ Front door faces Northeast
- Front door faces East
- Front door faces Southeast
- ◆ Front door faces South
- ✱ Front door faces Southwest
- ▲ Front door faces West
- Front door faces Northwest
- Front door faces North