# *CP-MRD-FC-10*
# *HVAC Load Calculations*

for

Maronda Homes

Prepared By:

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Newberry, Fl 32669
(352) 472-5661
Thursday, February 6, 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.

# *Project Report*

## General Project Information

| | |
|---|---|
| Project Title: | CP-MRD-FC-10 |
| Designed By: | Ken Fonorow |
| Project Date: | 2/4/2025 |
| Project Comment: | Huntington Model |
| Client Name: | Maronda Homes |
| Company Name: | Florida H.E.R.O., Inc. |
| Company Representative: | Ken Fonorow |
| Company Address: | 15220 NW 5th Ave |
| Company City: | Newberry, Fl 32669 |
| Company Phone: | (352) 472-5661 |
| Company E-Mail Address: | ken@floridahero.com |
| Company Website: | www.floridahero.com |

## Design Data

| | | |
|---|---|---|
| Reference City: | | Gainesville, Florida |
| Building Orientation: | | Front door faces North |
| Daily Temperature Range: | | Medium |
| Latitude: | 29 | Degrees |
| Elevation: | 152 | ft. |
| Altitude Factor: | 0.995 | |

| | Outdoor Dry Bulb | Outdoor Wet Bulb | Outdoor Rel.Hum | Indoor Rel.Hum | Indoor Dry Bulb | Grains Difference |
|---|---|---|---|---|---|---|
| Winter: | 33 | 30.8 | n/a | n/a | 72 | n/a |
| Summer: | 92 | 77 | 51% | 50% | 75 | 52 |

## Check Figures

| | | | |
|---|---|---|---|
| Total Building Supply CFM: | 1,200 | CFM Per Square ft.: | 0.525 |
| Square ft. of Room Area: | 2,286 | Square ft. Per Ton: | 871 |
| Volume (ft³): | 20,571 | | |

## Building Loads

| | | | | |
|---|---|---|---|---|
| Total Heating Required Including Ventilation Air: | 36,058 | Btuh | 36.058 | MBH |
| Total Sensible Gain: | 23,550 | Btuh | 75 | % |
| Total Latent Gain: | 7,939 | Btuh | 25 | % |
| Total Cooling Required Including Ventilation Air: | 31,489 | Btuh | 2.62 | Tons (Based On Sensible + Latent) |

## Notes

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.
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 Whole House Input Data | Outdoor Dry Bulb | Outdoor Wet Bulb | Outdoor Rel.Hum | Indoor Rel.Hum | Indoor Dry Bulb | Grains Difference |
|---|---|---|---|---|---|---|
| Winter: | 33 | 30.8 | 80% | n/a | 72 | n/a |
| Summer: | 92 | 77 | 51% | 50% | 75 | 51.69 |

## Duct Sizing Inputs

| | Main Trunk | | Runouts | |
|---|---|---|---|---|
| Calculate: | Yes | | Yes | |
| Use Schedule: | Yes | | Yes | |
| Roughness Factor: | 0.15000 | | 0.15000 | |
| 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: | 0.320 | AC/hr | 0.160 | AC/hr |
| | 110 | CFM | 55 | CFM |
| Infiltration Actual: | 0.332 | AC/hr | 0.134 | AC/hr |
| Above Grade Volume: | X 20,571 | Cu.ft. | X 20,571 | Cu.ft. |
| | 6,824 | Cu.ft./hr | 2,756 | Cu.ft./hr |
| | X 0.0167 | | X 0.0167 | |
| Total Building Infiltration: | 114 | CFM | 46 | CFM |
| Total Building Ventilation: | 25 | CFM | 55 | CFM |

---System 1---
Infiltration & Ventilation Sensible Gain Multiplier: 18.60 = (1.10 X 0.995 X 17.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 34.96 = (0.68 X 0.995 X 51.69 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 42.66 = (1.10 X 0.995 X 39.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.320 AC/hr (110 CFM), Construction: Average
Summer Infiltration Specified: 0.160 AC/hr (55 CFM), Construction: Average

## Duct Load Factor Scenarios for System 1

| No. | Type | Description | Location | Attic Ceiling | Duct Leakage | Duct Insulation | Surface Area | From [T]MDD |
|---|---|---|---|---|---|---|---|---|
| 1 | Supply | Main | Attic | 16B | 0.12 | 6 | 617 | No |
| 1 | Return | Main | Cond. Space | - | 0.24 | 6 | 24 | No |

# 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 | Reg Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System 1 | | | | | | | | | | | | | |
| **Supply Runouts** | | | | | | | | | | | | | |
| Zone 1 | | | | | | | | | | | | | |
| 1-Master Bedroom | Built-In | 450 | 750 | 0.15 | 0.1 | | 433.4 | | 100 | 170 | 170 | 2--6 | |
| 2-Master Bath | Built-In | 450 | 750 | 0.15 | 0.1 | | 531.3 | | 154 | 104 | 104 | 1--6 | |
| 3-Master WIC | Built-In | 450 | 750 | 0.15 | 0.1 | | 222.5 | | 32 | 19 | 19 | 1--4 | |
| 4-Den | Built-In | 450 | 750 | 0.15 | 0.1 | | 494.9 | | 70 | 97 | 97 | 1--6 | |
| 5-Bath 2 | Built-In | 450 | 750 | 0.15 | 0.1 | | 155.8 | | 23 | 14 | 14 | 1--4 | |
| 6-Bedroom 2 | Built-In | 450 | 750 | 0.15 | 0.1 | | 579.1 | | 197 | 114 | 114 | 1--6 | |
| 7-Foyer | Built-In | 450 | 750 | 0.15 | 0.1 | | 617.7 | | 91 | 54 | 54 | 1--4 | |
| 8-Laundry | Built-In | 450 | 750 | 0.15 | 0.1 | | 478.8 | | 54 | 42 | 42 | 1--4 | |
| 9-Kitchen | Built-In | 450 | 750 | 0.15 | 0.1 | | 419.3 | | 45 | 165 | 165 | 2--6 | |
| 10-Great Room | Built-In | 450 | 750 | 0.15 | 0.1 | | 574.8 | | 162 | 226 | 226 | 2--6 | |
| 11-Bedroom 3 | Built-In | 450 | 750 | 0.15 | 0.1 | | 450.6 | | 117 | 88 | 88 | 1--6 | |
| 12-Bath 3 | Built-In | 450 | 750 | 0.15 | 0.1 | | 236.8 | | 39 | 21 | 21 | 1--4 | |
| 13-Bedroom 4 | Built-In | 450 | 750 | 0.15 | 0.1 | | 440.3 | | 117 | 86 | 86 | 1--6 | |
| **Other Ducts in System 1** | | | | | | | | | | | | | |
| Supply Main Trunk | Built-In | 650 | 900 | 0.15 | 0.1 | | 675 | | 1,200 | 1,200 | 1,200 | 16x16 | |

## Summary

System 1

Heating Flow: 1200

Cooling Flow: 1200

# Total Building Summary Loads

| Component Description | Area Quan | Sen Loss | Lat Gain | Sen Gain | Total Gain |
|---|---|---|---|---|---|
| VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, outdoor insect screen with 50% coverage, medium color blinds at 45° with 25% coverage, U-value 0.34, SHGC 0.23 | 45 | 597 | 0 | 1,023 | 1,023 |
| VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, U-value 0.34, SHGC 0.23 | 16 | 212 | 0 | 169 | 169 |
| VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, outdoor insect screen with 50% coverage, U-value 0.34, SHGC 0.23 | 60 | 796 | 0 | 572 | 572 |
| SGD U 34 SHGC 23: Glazing-SGD DbPnVyFr U 34 SHGC 23, ground reflectance = 0.32, medium color blinds at 45° with 25% coverage, U-value 0.34, SHGC 0.23 | 80 | 1,060 | 0 | 676 | 676 |
| 11P: Door-Metal - Polyurethane Core, U-value 0.29 | 37.8 | 427 | 0 | 307 | 307 |
| 12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091 | 1913.3 | 6,789 | 0 | 4,089 | 4,089 |
| 16B-38: 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-38 insulation, U-value 0.026 | 2285.7 | 2,317 | 0 | 3,091 | 3,091 |
| 22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989 | 240 | 9,255 | 0 | 0 | 0 |
| Subtotals for structure: | | 21,453 | 0 | 9,927 | 9,927 |
| People: | 6 | | 1,200 | 1,380 | 2,580 |
| Equipment: | | | 1,450 | 3,290 | 4,740 |
| Lighting: | 0 | | | 0 | 0 |
| Ductwork: | | 8,688 | 1,762 | 6,212 | 7,974 |
| Infiltration: Winter CFM: 114, Summer CFM: 46 | | 4,851 | 1,604 | 853 | 2,457 |
| Ventilation: Winter CFM: 25, Summer CFM: 55 | | 1,067 | 1,923 | 1,023 | 2,946 |
| Exhaust: Winter CFM: 55, Summer CFM: 25 | | | | | |
| AED Excursion: | | 0 | 0 | 865 | 865 |
| Total Building Load Totals: | | 36,058 | 7,939 | 23,550 | 31,489 |

## Check Figures

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|---|---|---|---|
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# System 1 Room Load Summary

| 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 | Master Bedroom | 261 | 2,913 | 53 | 2-6 | 433 | 3,195 | 521 | 146 | 170 |
| 2 | Master Bath | 141 | 4,479 | 82 | 1-6 | 531 | 1,958 | 576 | 89 | 104 |
| 3 | Master WIC | 67 | 935 | 17 | 1-4 | 223 | 365 | 47 | 17 | 19 |
| 4 | Den | 208 | 2,045 | 37 | 1-6 | 495 | 1,824 | 87 | 83 | 97 |
| 5 | Bath 2 | 45 | 665 | 12 | 1-4 | 156 | 255 | 284 | 12 | 14 |
| 6 | Bedroom 2 | 210 | 5,744 | 105 | 1-6 | 579 | 2,135 | 282 | 98 | 114 |
| 7 | Foyer | 104 | 2,641 | 48 | 1-4 | 618 | 1,012 | 127 | 46 | 54 |
| 8 | Laundry | 84 | 1,562 | 29 | 1-4 | 479 | 784 | 330 | 36 | 42 |
| 9 | Kitchen | 294 | 1,304 | 24 | 2-6 | 419 | 3,091 | 590 | 141 | 165 |
| 10 | Great Room | 519 | 4,716 | 86 | 2-6 | 575 | 4,237 | 764 | 194 | 226 |
| 11 | Bedroom 3 | 154 | 3,420 | 63 | 1-6 | 451 | 1,661 | 168 | 76 | 88 |
| 12 | Bath 3 | 45 | 1,148 | 21 | 1-4 | 237 | 388 | 310 | 18 | 21 |
| 13 | Bedroom 4 | 154 | 3,420 | 63 | 1-6 | 440 | 1,623 | 168 | 74 | 86 |
| | Ventilation | | 1,067 | | | | 1,023 | 1,923 | | |
| | Duct Latent | | | | | | | 1,762 | | |
| | System 1 total | 2,286 | 36,058 | 640 | | | 23,550 | 7,939 | 1,030 | 1,200 |

| | | |
|---|---|---|
| System 1 Main Trunk Size: | 16x16 | in. |
| Velocity: | 675 | ft./min |
| Loss per 100 ft.: | 0.237 | in.wg |

## Cooling System Summary

| | Cooling Tons | Sensible/Latent Split | Sensible Btuh | Latent Btuh | Total Btuh |
|---|---|---|---|---|---|
| Net Required: | 2.62 | 75% / 25% | 23,550 | 7,939 | 31,489 |
| Actual: | 2.85 | 77% / 23% | 26,500 | 7,700 | 34,200 |

## Equipment Data

| | Heating System | Cooling System |
|---|---|---|
| Type: | Air Source Heat Pump | Air Source Heat Pump |
| Model: | 4TWR5036N1 | 4TWR5036H1 |
| Indoor Model: | | TEM6A0C36N31+TDR |
| Brand: | XR16 | |
| Description: | Air Source Heat Pump | Air Source Heat Pump |
| Efficiency: | 7.5 HSPF2 | 14.3 SEER2 |
| Sound: | 0 | 0 |
| Capacity: | 32,400 Btuh | 34,200 Btuh |
| Sensible Capacity: | n/a | 26,500 Btuh |
| Latent Capacity: | n/a | 7,700 Btuh |
| AHRI Reference No.: | n/a | 209323532 |

This system's equipment was selected in accordance with ACCA Manual S.
Manual S equipment sizing data: SODB: 92F, SOWB: 77F, WODB: 33F, SIDB: 75F, SIRH: 50%, WIDB: 72F, Sen. gain: 23,550 Btuh, Lat. gain: 7,939 Btuh, Sen. loss: 36,058 Btuh, Entering clg. coil DB: 75.8F, Entering clg. coil WB: 63.3F, Entering htg. coil DB: 71.2F, Clg. coil TD: 20F, Htg. coil TD: 50F, Req. clg. airflow: 1030 CFM, Req. htg. airflow: 640 CFM