

CP-MRD-FC-5
HVAC Load Calculations

for

Maronda Homes

Prepared By:

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Florida H.E.R.O., Inc.
15220 NW 5th Ave
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Project Report

General Project Information

Project Title: CP-MRD-FC-5
Designed By: Ken Fonorow
Project Date: 2/21/2025
Project Comment: Willow 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
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Design Data

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

	Outdoor <u>Dry Bulb</u>	Outdoor <u>Wet Bulb</u>	Outdoor <u>Rel.Hum</u>	Indoor <u>Rel.Hum</u>	Indoor <u>Dry Bulb</u>	Grains <u>Difference</u>
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.:	0.585
Square ft. of Room Area:	2,052	Square ft. Per Ton:	783
Volume (ft ³):	18,470		

Building Loads

Total Heating Required Including Ventilation Air:	31,740 Btuh	31.740 MBH
Total Sensible Gain:	23,480 Btuh	75 %
Total Latent Gain:	7,969 Btuh	25 %
Total Cooling Required Including Ventilation Air:	31,450 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 99 CFM	0.160 AC/hr 49 CFM
Infiltration Actual:	0.335 AC/hr	0.127 AC/hr
Above Grade Volume:	X 18,470 Cu.ft. 6,178 Cu.ft./hr X 0.0167	X 18,470 Cu.ft. 2,344 Cu.ft./hr X 0.0167
Total Building Infiltration:	103 CFM	39 CFM
Total Building Ventilation:	35 CFM	65 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 (99 CFM),	Construction: Average
Summer Infiltration Specified:	0.160 AC/hr (49 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	554	No
1	Return	Main	Attic	16B	0.24	6	205	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		523.5		103	140	140	1--7	
2-Master WIC	Built-In	450	750	0.15	0.1		646.1		124	56	56	1--4	
3-Master Bath	Built-In	450	750	0.15	0.1		372.2		113	73	73	1--6	
4-Pantry	Built-In	450	750	0.15	0.1		157.6		28	14	14	1--4	
5-Laundry	Built-In	450	750	0.15	0.1		426.3		115	84	84	1--6	
6-Kitchen	Built-In	450	750	0.15	0.1		660.1		13	176	176	1--7	
7-Great Room	Built-In	450	750	0.15	0.1		540.4		153	212	212	2--6	
8-Foyer	Built-In	450	750	0.15	0.1		359.7		46	31	31	1--4	
9-Bedroom 5	Built-In	450	750	0.15	0.1		422.8		66	83	83	1--6	
10-Bedroom 4	Built-In	450	750	0.15	0.1		528.5		154	104	104	1--6	
11-Bedroom 3	Built-In	450	750	0.15	0.1		509.6		87	100	100	1--6	
12-Bath 2	Built-In	450	750	0.15	0.1		200.2		30	17	17	1--4	
13-Bedroom 2	Built-In	450	750	0.15	0.1		554.5		166	109	109	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	342	342
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	26.7	354	0	226	226
FrDr FG 36 21: Glazing-FrDr FG 36 21, ground reflectance = 0.32, medium color blinds at 45° with 100% coverage, U-value 0.36, SHGC 0.21	20	281	0	175	175
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	835	835
12C-Osw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091	1576.3	5,595	0	3,368	3,368
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	2052	2,079	0	2,774	2,774
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989	192	7,405	0	0	0
Subtotals for structure:		17,107	0	7,720	7,720
People:	6		1,200	1,380	2,580
Equipment:			1,200	4,050	5,250
Lighting:	0			0	0
Ductwork:		8,749	1,929	8,395	10,324
Infiltration: Winter CFM: 103, Summer CFM: 39		4,391	1,368	727	2,095
Ventilation: Winter CFM: 35, Summer CFM: 65		1,493	2,272	1,209	3,481
Exhaust: Winter CFM: 65, Summer CFM: 35					
Total Building Load Totals:		31,740	7,969	23,480	31,450

Check Figures

Total Building Supply CFM:	1,200	CFM Per Square ft.:	0.585
Square ft. of Room Area:	2,052	Square ft. Per Ton:	783
Volume (ft³):	18,470		

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Total Heating Required Including Ventilation Air:	31,740 Btuh	31.740 MBH
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System 1 Room Load Summary

Room No 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	238	2,443	45	1-7	524	2,221	500	102	140
2 Master WIC	96	2,958	54	1-4	646	895	161	41	56
3 Master Bath	91	2,689	49	1-6	372	1,160	496	53	73
4 Pantry	33	664	12	1-4	158	218	36	10	14
5 Laundry	97	2,745	50	1-6	426	1,329	401	61	84
6 Kitchen	229	308	6	1-7	660	2,800	550	128	176
7 Great Room	440	3,632	66	2-6	540	3,369	745	154	212
8 Foyer	77	1,090	20	1-4	360	498	39	23	31
9 Bedroom 5	133	1,576	29	1-6	423	1,318	68	60	83
10 Bedroom 4	173	3,673	67	1-6	529	1,647	187	75	104
11 Bedroom 3	187	2,080	38	1-6	510	1,588	95	73	100
12 Bath 2	59	722	13	1-4	200	277	288	13	17
13 Bedroom 2	201	3,959	72	1-6	554	1,728	202	79	109
Ventilation		1,493				1,209	2,272		
Duct Latent							551		
Return Duct		1,708				3,221	1,378		
System 1 total	2,052	31,740	522			23,480	7,969	871	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%	23,480	7,969	31,450
Actual:	2.85	77% / 23%	26,334	7,876	34,210

Equipment Data

	Heating System	Cooling System
Type:	Air Source Heat Pump	Air Source Heat Pump
Model:	4TWR5036N1	4TWR5036H1
Indoor Model:		TEM6A0C36N31+TDR
Brand:		
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	26,334 Btuh
Latent Capacity:	n/a	7,876 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: 23,480 Btuh, Lat. gain: 7,969 Btuh, Sen. loss: 31,740 Btuh, Entering clg. coil DB: 78.4F, Entering clg. coil WB: 64.2F, Entering htg. coil DB: 69.6F, Clg. coil TD: 20F, Htg. coil TD: 50F, Req. clg. airflow: 871 CFM, Req. htg. airflow: 522 CFM