CP-MRD-FC-9
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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(352) 472-5661
Thursday, January 23, 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-9
Designed By:	Ken Fonorow
Project Date:	1/23/2025
Project Comment:	Livorno 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
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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:	1,600	CFM Per Square ft.:	0.488
Square ft. of Room Area:	3,282	Square ft. Per Ton:	894
Volume (ft³):	32,348		

Building Loads

Total Heating Required Including Ventilation Air:	51,396	Btuh	51.396	MBH
Total Sensible Gain:	34,229	Btuh	78	%
Total Latent Gain:	9,822	Btuh	22	%
Total Cooling Required Including Ventilation Air:	44,051	Btuh	3.67	Tons (Based On Sensible + Latent)

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.

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:	0.190	AC/hr	0.100	AC/hr
	102	CFM	54	CFM
Infiltration Actual:	0.204	AC/hr	0.067	AC/hr
Above Grade Volume:	X 32,348	Cu.ft.	X 32,348	Cu.ft.
	6,598	Cu.ft./hr	2,169	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	110	CFM	36	CFM
Total Building Ventilation:	45	CFM	85	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: 0.190 AC/hr (102 CFM), Construction: Semi-Tight
Summer Infiltration Specified: 0.100 AC/hr (54 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	Main	Attic	16B	0.12	6	886	No
1	Return	Main	Attic	16B	0.24	6	328	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-MSTR Sitting	Built-In	450	750	0.15	0.1		492.4		192	132	132	1--7	
2-Master Bedroom	Built-In	450	750	0.15	0.1		508.1		131	200	200	2--6	
3-Master WIC 1	Built-In	450	750	0.15	0.1		208.2		31	18	18	1--4	
4-Master WIC 2	Built-In	450	750	0.15	0.1		63		2	6	6	1--4	
5-Master Bath	Built-In	450	750	0.15	0.1		611.2		129	120	120	1--6	
6-Great Room	Built-In	450	750	0.15	0.1		559.1		214	299	299	2--7	
7-Kitchen	Built-In	450	750	0.15	0.1		683.9		43	183	183	1--7	
8-Laundry	Built-In	450	750	0.15	0.1		392.5		14	34	34	1--4	
9-Bath 3	Built-In	450	750	0.15	0.1		115.6		10	10	10	1--4	
10-Bedroom 4	Built-In	450	750	0.15	0.1		452.5		150	89	89	1--6	
11-Hall	Built-In	450	750	0.15	0.1		0		1	3	3	0--0	
12-Foyer	Built-In	450	750	0.15	0.1		404.9		43	35	35	1--4	
13-Den	Built-In	450	750	0.15	0.1		522.9		180	103	103	1--6	
14-Dining Room	Built-In	450	750	0.15	0.1		533.1		90	105	105	1--6	
15-Bedroom 3	Built-In	450	750	0.15	0.1		570.5		109	112	112	1--6	
16-Bedroom 2	Built-In	450	750	0.15	0.1		539.5		175	106	106	1--6	
17-Bath 2	Built-In	450	750	0.15	0.1		538.6		85	47	47	1--4	
Other Ducts in System 1													
Supply Main Trunk	Built-In	650	900	0.15	0.1		711.1		1,600	1,600	1,600	18x18	

Summary

System 1

Heating Flow: 1600

Cooling Flow: 1600

Tabular Manual D Ductsize Grid

Ducts	Room(s)	Feeds Zones	Flow	Diam	Wid	Hei	Vel
CP-MRD-FC-9							
CP-MRD-FC-9							
System 2							
Supply							
Return							
System 4							
Supply							
Return							
System 6							
Supply							
Return							
System 8							
Supply							
Return							
System 10							
Supply							
Return							
System 12							
Supply							
Return							
System 14							
Supply							
Return							

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	115	1,525	0	1,569	1,569
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, U-value 0.34, SHGC 0.23	6.3	84	0	131	131
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.32, outdoor insect screen with 50% coverage, medium color blinds at 45° with 25% coverage, U-value 0.34, SHGC 0.23	40	530	0	304	304
10C-f: Glazing-French door, double pane low-e glass (e = 0.40), insulated fiberglass frame, ground reflectance = 0.32, medium color blinds at 45° with 25% coverage, U-value 0.45, SHGC 0.43	64	1,124	0	836	836
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.32, outdoor insect screen with 50% coverage, U-value 0.34, SHGC 0.23	30	398	0	1,052	1,052
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.32, outdoor insect screen with 50% coverage, medium color blinds at 45° with 50% coverage, U-value 0.34, SHGC 0.23	15	199	0	134	134
11P: Door-Metal - Polyurethane Core, U-value 0.29	41.8	472	0	340	340
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish, U-value 0.143	2005.3	11,182	0	4,962	4,962
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091	334.9	1,188	0	717	717
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	3218.9	3,263	0	4,351	4,351
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989	282	10,877	0	0	0
Subtotals for structure:		30,842	0	14,396	14,396
People:	6		1,200	1,380	2,580
Equipment:			1,200	2,750	3,950
Lighting:	0			0	0
Ductwork:		13,944	3,187	13,449	16,637
Infiltration: Winter CFM: 110, Summer CFM: 36		4,691	1,263	673	1,936
Ventilation: Winter CFM: 45, Summer CFM: 85		1,920	2,971	1,581	4,552
Exhaust: Winter CFM: 85, Summer CFM: 45					
Total Building Load Totals:		51,396	9,822	34,229	44,051

Check Figures

Total Building Supply CFM:	1,600	CFM Per Square ft.:	0.488
Square ft. of Room Area:	3,282	Square ft. Per Ton:	894
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Total Cooling Required Including Ventilation Air:	44,051	Btuh	3.67	Tons (Based On Sensible + Latent)

Notes

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

Total Building Summary Loads (cont'd)

Notes

Calculations are performed per ACCA Manual J 8th Edition, Version 2.50, and ACCA Manual D.
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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 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	MSTR Sitting	153	5,621	103	1-7	492	2,262	157	103	132
2	Master Bedroom	308	3,814	70	2-6	508	3,430	498	157	200
3	Master WIC 1	49	911	17	1-4	208	312	27	14	18
4	Master WIC 2	49	66	1	1-4	63	95	0	4	6
5	Master Bath	180	3,772	69	1-6	611	2,063	374	94	120
6	Great Room	675	6,239	114	2-7	559	5,138	731	235	299
7	Kitchen	360	1,262	23	1-7	684	3,142	574	144	183
8	Laundry	78	420	8	1-4	393	589	361	27	34
9	Bath 3	56	307	6	1-4	116	173	259	8	10
10	Bedroom 4	177	4,388	80	1-6	452	1,527	132	70	89
11	Hall	88	33	1	0-0	0	49	0	2	3
12	Foyer	91	1,242	23	1-4	405	608	29	28	35
13	Den	196	5,254	96	1-6	523	1,765	151	81	103
14	Dining Room	202	2,630	48	1-6	533	1,800	69	82	105
15	Bedroom 3	276	3,197	58	1-6	570	1,926	84	88	112
16	Bedroom 2	257	5,100	93	1-6	539	1,821	144	83	106
17	Bath 2	88	2,497	46	1-4	539	808	73	37	47
	Ventilation		1,920				1,581	2,971		
	Duct Latent							977		
	Return Duct		2,723				5,140	2,210		
	System 1 total	3,282	51,396	855			34,229	9,822	1,257	1,600

System 1 Main Trunk Size:	18x18	in.
Velocity:	711	ft./min
Loss per 100 ft.:	0.219	in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	3.67	78% / 22%	34,229	9,822	44,051
Actual:	3.83	77% / 23%	35,400	10,600	46,000

Equipment Data

	Heating System	Cooling System
Type:	Air Source Heat Pump	Air Source Heat Pump
Model:	TEM6A0D48H41S	TWR5048N
Indoor Model:		TEM6A0D48H41S
Brand:	TRANE	TRANE
Description:	Air Source Heat Pump	Air Source Heat Pump
Efficiency:	7.5 HSPF2	14.3 SEER2
Sound:	0	0
Capacity:	45,000 Btuh	46,000 Btuh
Sensible Capacity:	n/a	35,400 Btuh
Latent Capacity:	n/a	10,600 Btuh
AHRI Reference No.:	n/a	209323534

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: 34,229 Btuh, Lat. gain: 9,822 Btuh, Sen. loss: 51,396 Btuh, Entering clg. coil DB: 78.8F, Entering clg. coil WB: 64.4F, Entering htg. coil DB: 69.4F, Clg. coil TD: 20F, Htg. coil TD: 50F, Req. clg. airflow: 1257 CFM, Req. htg. airflow: 855 CFM