CP-AB-Van Duys
HVAC Load Calculations

for

Amira Builders
14901 N Main St
Alachua, FL 32615

Prepared By:

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Friday, November 20, 2020

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

Project Report

General Project Information

Project Title:	CP-AB-Van Duys
Designed By:	Ken Fonorow
Project Date:	11/20/2020
Client Name:	Amira Builders
Client Address:	14901 N Main St
Client City:	Alachua, FL 32615
Client Phone:	386 462-9071
Client E-Mail Address:	amirabuilders@aol.com
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 East
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:	1,400	CFM Per Square ft.:	0.427
Square ft. of Room Area:	3,278	Square ft. Per Ton:	1,038
Volume (ft³):	32,786		

Building Loads

Total Heating Required Including Ventilation Air:	49,982	Btuh	49.982	MBH
Total Sensible Gain:	30,410	Btuh	80	%
Total Latent Gain:	7,498	Btuh	20	%
Total Cooling Required Including Ventilation Air:	37,908	Btuh	3.16	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, 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:	0.190	AC/hr	0.100	AC/hr
	104	CFM	55	CFM
Infiltration Actual:	0.204	AC/hr	0.068	AC/hr
Above Grade Volume:	X 32,786	Cu.ft.	X 32,786	Cu.ft.
	6,676	Cu.ft./hr	2,234	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	111	CFM	37	CFM
Total Building Ventilation:	25	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: 0.190 AC/hr (104 CFM), Construction: Semi-Tight
Summer Infiltration Specified: 0.100 AC/hr (55 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	16A	0.06	6	885	No
1	Return	Main	Attic	16A	0.06	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-Master Suite	Built-In	450	750	0.15	0.1		453.6		175	178	178	2--6	
2-Master Bath	Built-In	450	750	0.15	0.1		434.9		106	85	85	1--6	
3-MBR WIC	Built-In	450	750	0.15	0.1		386.3		59	34	34	1--4	
4-Great Room/Dining/Kitcl	Built-In	450	750	0.15	0.1		390.4		432	460	460	6--6	
5-Pantry	Built-In	450	750	0.15	0.1		20		2	2	2	1--4	
6-Laundry	Built-In	450	750	0.15	0.1		664.9		27	58	58	1--4	
7-Pool Bath	Built-In	450	750	0.15	0.1		298.6		49	26	26	1--4	
8-Bedroom #3	Built-In	450	750	0.15	0.1		352.9		89	69	69	1--6	
9-BR 3 WIC	Built-In	450	750	0.15	0.1		39.9		3	3	3	1--4	
10-J&J Bath	Built-In	450	750	0.15	0.1		478.9		83	42	42	1--4	
11-Bedroom #2	Built-In	450	750	0.15	0.1		411.8		75	81	81	1--6	
12-BR 2 WIC	Built-In	450	750	0.15	0.1		87.7		16	8	8	1--4	
13-Storage	Built-In	450	750	0.15	0.1		34.2		3	3	3	1--4	
14-Clutter Area	Built-In	450	750	0.15	0.1		382.9		54	75	75	1--6	
15-Family Room	Built-In	450	750	0.15	0.1		516		227	276	276	2--7	
Other Ducts in System 1													
Supply Main Trunk	Built-In	650	900	0.15	0.1		787.5		1,400	1,400	1,400	16x16	

Summary

System 1

Heating Flow:	1400
Cooling Flow:	1400

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	234	3,107	0	2,854	2,854
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, U-value 0.34, SHGC 0.23	25	331	0	438	438
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 50% coverage, U-value 0.34, SHGC 0.23	126	1,673	0	1,964	1,964
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	126	1,672	0	1,034	1,034
FG 34 23: Glazing-Fr Dr Dbl Pn Vyn U .34 SHGC .23, ground reflectance = 0.32, medium color blinds at 45° with 50% coverage, U-value 0.34, SHGC 0.23	120	1,590	0	1,040	1,040
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	24	318	0	228	228
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	18	239	0	530	530
FG 34 23: Glazing-Fr Dr Dbl Pn Vyn U .34 SHGC .23, ground reflectance = 0.32, medium color blinds at 45° with 100% coverage, U-value 0.34, SHGC 0.23	42.7	566	0	919	919
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, medium color blinds at 45° with 25% coverage, U-value 0.34, SHGC 0.23	24	318	0	203	203
VYN 34 23: Glazing-Dbl Pn Vyn Fr U .34 SHGC .23, ground reflectance = 0.23, medium color blinds at 45° with 50% coverage, U-value 0.34, SHGC 0.23	24	318	0	567	567
11P: Door-Metal - Polyurethane Core, U-value 0.29	41.8	472	0	340	340
12E-0sw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, siding finish, wood studs, U-value 0.068	2645.7	7,017	0	3,493	3,493
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091	78.6	279	0	168	168
18B1-21o: Roof/Ceiling-Roof Joists Between Roof Deck and Ceiling or Foam Encapsulated Roof Joists, Spray Foam Insulation, White or Light Color Asphalt Shingle, Any Wood Shake, Dark or Medium Color Tile, Slate or Concrete, Light or Unpainted Metal, Light or Silver Membrane, Light Tar and Gravel, R-21 open cell 1/2 lb. spray foam, 5.5 inches in 2 x 6 joist cavity, 1 inch on joist, U-value 0.047	2834.4	5,195	0	3,065	3,065
18B1-21o: Partition Roof/Ceiling (STD=24, WTD=0)-Roof Joists Between Roof Deck and Ceiling or Foam Encapsulated Roof Joists, Spray Foam Insulation, White or Light Color Asphalt Shingle, Any Wood Shake, Dark or Medium Color Tile, Slate or Concrete, Light or Unpainted Metal, Light or Silver Membrane, Light Tar and Gravel, R-21 open cell 1/2 lb. spray foam, 5.5 inches in 2 x 6 joist cavity, 1 inch on joist, U-value 0.047	444	0	0	501	501

Total Building Summary Loads (cont'd)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil, U-value 0.989	352	13,577	0	0	0
Subtotals for structure:		36,672	0	17,344	17,344
People:	5		1,000	1,150	2,150
Equipment:			1,800	3,325	5,125
Lighting:	0			0	0
Ductwork:		7,497	1,125	6,690	7,815
Infiltration: Winter CFM: 111, Summer CFM: 37		4,746	1,301	692	1,993
Ventilation: Winter CFM: 25, Summer CFM: 65		1,067	2,272	1,209	3,481
Exhaust: Winter CFM: 65, Summer CFM: 25					
Total Building Load Totals:		49,982	7,498	30,410	37,908

Check Figures

Total Building Supply CFM:	1,400	CFM Per Square ft.:	0.427
Square ft. of Room Area:	3,278	Square ft. Per Ton:	1,038
Volume (ft³):	32,786		

Building Loads

Total Heating Required Including Ventilation Air:	49,982	Btuh	49.982	MBH
Total Sensible Gain:	30,410	Btuh	80	%
Total Latent Gain:	7,498	Btuh	20	%
Total Cooling Required Including Ventilation Air:	37,908	Btuh	3.16	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.

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 Suite	314	5,866	107	2-6	454	3,485	580	159	178
2	Master Bath	211	3,554	65	1-6	435	1,671	469	76	85
3	MBR WIC	169	1,990	36	1-4	386	660	59	30	34
4	Great Room/Dining/Kitchen	1,072	14,480	265	6-6	390	8,998	1,389	411	460
5	Pantry	26	54	1	1-4	20	34	0	2	2
6	Laundry	80	916	17	1-4	665	1,135	372	52	58
7	Pool Bath	72	1,635	30	1-4	299	510	303	23	26
8	Bedroom #3	240	2,968	54	1-6	353	1,356	84	62	69
9	BR 3 WIC	52	109	2	1-4	40	68	0	3	3
10	J&J Bath	157	2,772	51	1-4	479	818	343	37	42
11	Bedroom #2	210	2,512	46	1-6	412	1,582	68	72	81
12	BR 2 WIC	43	534	10	1-4	88	150	18	7	8
13	Storage	44	92	2	1-4	34	58	0	3	3
14	Clutter Area	144	1,818	33	1-6	383	1,471	41	67	75
15	Family Room	444	7,587	139	2-7	516	5,397	375	247	276
	Ventilation		1,067				1,209	2,272		
	Duct Latent							821		
	Return Duct		2,027				1,809	304		
	System 1 total	3,278	49,982	857			30,410	7,498	1,252	1,400

System 1 Main Trunk Size: 16x16 in.
Velocity: 788 ft./min
Loss per 100 ft.: 0.322 in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	3.16	80% / 20%	30,410	7,498	37,908
Actual:	3.33	77% / 23%	30,800	9,200	40,000

Equipment Data

	Heating System	Cooling System
Type:	Air Source Heat Pump	Air Source Heat Pump
Model:	CH14NB042*0**A*	CH14NB042*0**A*
Indoor Model:		FB4CNP042L
Brand:	14 SEER HP	14 SEER HP
Description:	Air Source Heat Pump	Air Source Heat Pump
Efficiency:	8.2 HSPF	14 SEER
Sound:	0	0
Capacity:	41,000 Btuh	40,000 Btuh
Sensible Capacity:	n/a	30,800 Btuh
Latent Capacity:	n/a	9,200 Btuh
AHRI Reference No.:	n/a	9162578

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: 30,410 Btuh, Lat. gain: 7,498 Btuh, Sen. loss: 49,982 Btuh, Entering clg. coil DB: 77F, Entering clg. coil WB: 63.7F, Entering htg. coil DB: 70F, Clg. coil TD: 20F, Htg. coil TD: 50F, Req. clg. airflow: 1252 CFM, Req. htg. airflow: 857 CFM