Residential System Sizing Calculation

Summary

Project Title:
Knoll Residence

Lake City, FL

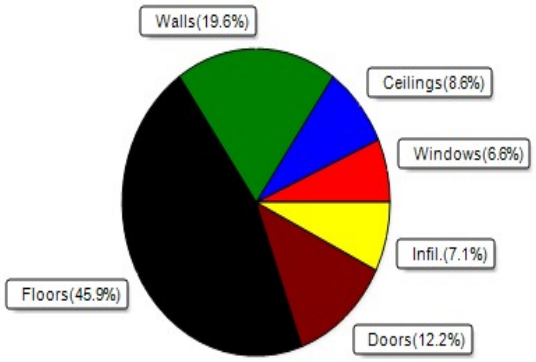
10/10/2022

Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(152 ft.) Temp Range(M) Humidity data: Interior RH (50%) Outdoor wet bulb (77F) Humidity difference(51gr.)					
Winter design temperature(TMY3 99%)	30	F	Summer design temperature(TMY3 99%)	94	F
Winter setpoint	70	F	Summer setpoint	75	F
Winter temperature difference	40	F	Summer temperature difference	19	F
Total heating load calculation	**46964**	**Btuh**	**Total cooling load calculation**	**33927**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	127.8	60000	Sensible (SHR = 0.85)	168.0	51000
Heat Pump + Auxiliary(0.0kW)	127.8	60000	Latent	252.1	9000
			Total (Electric Heat Pump)	176.8	60000

WINTER CALCULATIONS

Winter Heating Load (for 3155 sqft)

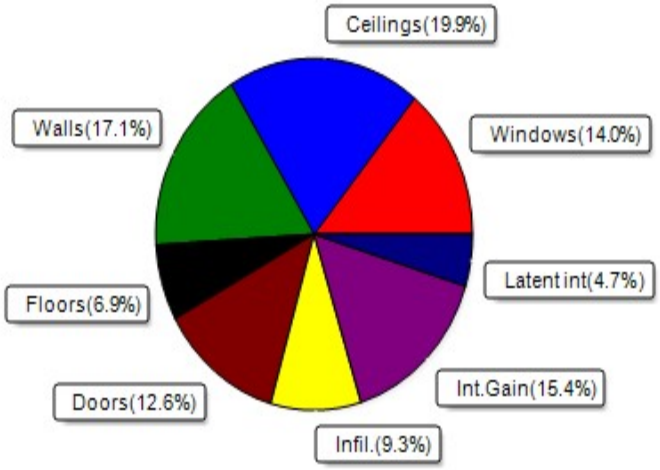
Load component			Load	
Window total	300	sqft	3120	Btuh
Wall total	2663	sqft	9222	Btuh
Door total	357	sqft	5717	Btuh
Ceiling total	3155	sqft	4028	Btuh
Floor total	See detail report		21544	Btuh
Infiltration	76	cfm	3332	Btuh
Duct loss			0	Btuh
Subtotal			**46964**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**46964**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 3155 sqft)

Load component			Load	
Window total	300	sqft	4743	Btuh
Wall total	2663	sqft	5798	Btuh
Door total	357	sqft	4288	Btuh
Ceiling total	3155	sqft	6748	Btuh
Floor total			2353	Btuh
Infiltration	57	cfm	1187	Btuh
Internal gain			5240	Btuh
Duct gain			0	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**30357**	**Btuh**
Latent gain(ducts)			0	Btuh
Latent gain(infiltration)			1970	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**3570**	**Btuh**
TOTAL HEAT GAIN			**33927**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 10-10-22

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Knoll Residence

Lake City, FL

10/10/2022

Reference City: Gainesville, FL Temperature Difference: 19.0F(TMY3 99%) Humidity difference: 51gr.

Component Loads for Whole House

	Type*					Overhang		Window Area(sqft)			HTM		Load
Window	Panes	SHGC	U	InSh	IS	Ornt	Len	Hgt	Gross	Shaded	Unshaded	Shaded	Unshaded	
1	2 NFRC	0.20,	0.26	No	No	N	1.5ft.	2.3ft.	30.0	0.0	30.0	9	9	274 Btuh
2	2 NFRC	0.20,	0.26	No	No	N	16.5f	2.3ft.	16.0	0.0	16.0	9	9	146 Btuh
3	2 NFRC	0.20,	0.26	No	No	N	1.5ft.	2.3ft.	30.0	0.0	30.0	9	9	274 Btuh
4	2 NFRC	0.20,	0.26	No	No	E	1.5ft.	2.3ft.	20.0	0.0	20.0	9	24	484 Btuh
5	2 NFRC	0.20,	0.26	No	No	E	1.5ft.	2.3ft.	20.0	0.0	20.0	9	24	484 Btuh
6	2 NFRC	0.20,	0.26	No	No	SW	1.5ft.	2.3ft.	12.0	0.5	11.5	9	19	226 Btuh
7	2 NFRC	0.20,	0.26	No	No	S	9.5ft.	2.3ft.	16.0	16.0	0.0	9	11	146 Btuh
8	2 NFRC	0.20,	0.26	No	No	S	9.5ft.	2.3ft.	36.0	36.0	0.0	9	11	329 Btuh
9	2 NFRC	0.20,	0.26	No	No	S	1.5ft.	2.3ft.	20.0	20.0	0.0	9	11	183 Btuh
10	2 NFRC	0.20,	0.26	No	No	W	1.5ft.	2.3ft.	30.0	0.0	30.0	9	24	727 Btuh
11	2 NFRC	0.20,	0.26	No	No	W	1.5ft.	2.3ft.	6.0	0.0	6.0	9	24	145 Btuh
12	2 NFRC	0.20,	0.26	No	No	W	1.5ft.	2.3ft.	10.0	0.0	10.0	9	24	242 Btuh
13	2 NFRC	0.20,	0.26	No	No	W	1.5ft.	2.3ft.	9.0	0.0	9.0	9	24	218 Btuh
14	2 NFRC	0.20,	0.26	No	No	NE	1.5ft.	2.3ft.	15.0	0.0	15.0	9	18	276 Btuh
15	2 NFRC	0.20,	0.26	No	No	SE	1.5ft.	2.3ft.	15.0	0.4	14.6	9	19	285 Btuh
16	2 NFRC	0.20,	0.26	No	No	SW	1.5ft.	2.3ft.	15.0	0.4	14.6	9	19	285 Btuh
	Excursion													17 Btuh
	Window Total								300 (sqft)					4743 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Knoll Residence

Lake City, FL

10/10/2022

Walls	Type	U-Value	R-Value	Area(sqft)	HTM	Load
			Cav/Sheath			
1	Frame - Wood - Ext	0.09	13.0/0.6	78.0	2.2	171 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.6	71.3	2.2	157 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.6	40.5	2.2	89 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.6	27.2	2.2	60 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.6	21.3	2.2	47 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.6	125.7	2.2	276 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.6	102.0	2.2	224 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.6	93.0	2.2	204 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.6	116.5	2.2	256 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.6	18.0	2.2	40 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.6	130.0	2.2	286 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.6	18.0	2.2	40 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.6	89.3	2.2	196 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.6	36.8	2.2	81 Btuh
15	Frame - Wood - Adj	0.09	13.0/0.6	144.0	1.6	236 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.6	75.0	2.2	165 Btuh
17	Frame - Wood - Ext	0.09	13.0/0.6	141.8	2.2	312 Btuh
18	Frame - Wood - Ext	0.09	13.0/0.6	220.0	2.2	484 Btuh
19	Frame - Wood - Ext	0.09	13.0/0.6	127.5	2.2	280 Btuh
20	Frame - Wood - Ext	0.09	13.0/0.6	94.0	2.2	207 Btuh
21	Frame - Wood - Ext	0.09	13.0/0.6	291.0	2.2	640 Btuh
22	Frame - Wood - Ext	0.09	13.0/0.6	18.0	2.2	40 Btuh
23	Frame - Wood - Ext	0.09	13.0/0.6	213.5	2.2	469 Btuh
24	Frame - Wood - Ext	0.09	13.0/0.0	64.0	2.3	145 Btuh
25	Frame - Wood - Ext	0.09	13.0/0.0	27.7	2.3	63 Btuh
26	Frame - Wood - Ext	0.09	13.0/0.0	64.0	2.3	145 Btuh
27	Frame - Wood - Ext	0.09	13.0/0.0	59.7	2.3	135 Btuh
28	Frame - Wood - Ext	0.09	13.0/0.0	64.0	2.3	145 Btuh
29	Frame - Wood - Ext	0.09	13.0/0.0	27.7	2.3	63 Btuh
30	Frame - Wood - Ext	0.09	13.0/0.0	64.0	2.3	145 Btuh
	Wall Total			2663 (sqft)		5798 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	24.0	12.0	288 Btuh
2	Insulated - Exterior	72.0	12.0	864 Btuh
3	Insulated - Exterior	72.0	12.0	864 Btuh
4	Insulated - Exterior	72.0	12.0	864 Btuh
5	Insulated - Exterior	21.3	12.0	256 Btuh
6	Insulated - Exterior	24.0	12.0	288 Btuh
7	Insulated - Garage	24.0	12.0	288 Btuh
8	Insulated - Exterior	48.0	12.0	576 Btuh
	Door Total	357 (sqft)		4288 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Unvented Attic/Light/Shingle	0.032	30.0/0.0	2718.0	2.36	6405 Btuh
2	Cath/Sngl Assem/Light/Shingle	0.032	30.0/0.0	437.0	0.78	342 Btuh
	Ceiling Total			3155 (sqft)		6748 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2718 (ft-perimeter)	0.0	0 Btuh
2	Raised Wood - Adj	0.0	437 (sqft)	5.4	2353 Btuh
	Floor Total		3155.0 (sqft)		2353 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Knoll Residence

Lake City, FL

10/10/2022

					Envelope Subtotal:			23930 Btuh
Infiltration	Type Natural	Average ACH 0.12	Volume(cuft) 27958	Wall Ratio 1	CFM= 57.1		Load 1187	Btuh
Internal gain		Occupants 8	Btuh/occupant X 230		+	Appliance 3400	Load 5240	Btuh
					Sensible Envelope Load:		30357	Btuh
Duct load	Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Condi)				(DGM of 0.000)		0	Btuh
					Sensible Load All Zones		**30357**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Knoll Residence

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

10/10/2022

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**30357 Btuh**
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	**30357 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**30357 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1970 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	0 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**3570 Btuh**
	TOTAL GAIN	**33927 Btuh**

EQUIPMENT

1. Central Unit	#	60000 Btuh

*Key: Window types (Panes - Number and type of panes of glass)
(SHGC - Shading coefficient of glass as SHGC numerical value)
(U - Window U-Factor)
(InSh - Interior shading device: none(No), Blinds(B), Draperies(D) or Roller Shades(R))
- For Blinds: Assume medium color, half closed
For Draperies: Assume medium weave, half closed
For Roller shades: Assume translucent, half closed
(IS - Insect screen: none(N), Full(F) or Half(½))
(Ornt - compass orientation)

Version 8

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Project Title:
Knoll Residence
Lake City, FL Building Type: User

10/10/2022

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)

Component Loads for Whole House

Window	Panes/Type	Frame	U	Orientation	Area(sqft) X	HTM=	Load
1	2, NFRC 0.20	Vinyl	0.26	N	30.0	10.4	312 Btuh
2	2, NFRC 0.20	Vinyl	0.26	N	16.0	10.4	166 Btuh
3	2, NFRC 0.20	Vinyl	0.26	N	30.0	10.4	312 Btuh
4	2, NFRC 0.20	Vinyl	0.26	E	20.0	10.4	208 Btuh
5	2, NFRC 0.20	Vinyl	0.26	E	20.0	10.4	208 Btuh
6	2, NFRC 0.20	Vinyl	0.26	SW	12.0	10.4	125 Btuh
7	2, NFRC 0.20	Vinyl	0.26	S	16.0	10.4	166 Btuh
8	2, NFRC 0.20	Vinyl	0.26	S	36.0	10.4	374 Btuh
9	2, NFRC 0.20	Vinyl	0.26	S	20.0	10.4	208 Btuh
10	2, NFRC 0.20	Vinyl	0.26	W	30.0	10.4	312 Btuh
11	2, NFRC 0.20	Vinyl	0.26	W	6.0	10.4	62 Btuh
12	2, NFRC 0.20	Vinyl	0.26	W	10.0	10.4	104 Btuh
13	2, NFRC 0.20	Vinyl	0.26	W	9.0	10.4	94 Btuh
14	2, NFRC 0.20	Vinyl	0.26	NE	15.0	10.4	156 Btuh
15	2, NFRC 0.20	Vinyl	0.26	SE	15.0	10.4	156 Btuh
16	2, NFRC 0.20	Vinyl	0.26	SW	15.0	10.4	156 Btuh
	Window Total				300.0(sqft)		3120 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.086)	13.0/0.6	78	3.45	269 Btuh
2	Frame - Wood	- Ext	(0.086)	13.0/0.6	71	3.45	246 Btuh
3	Frame - Wood	- Ext	(0.086)	13.0/0.6	41	3.45	140 Btuh
4	Frame - Wood	- Ext	(0.086)	13.0/0.6	27	3.45	94 Btuh
5	Frame - Wood	- Ext	(0.086)	13.0/0.6	21	3.45	74 Btuh
6	Frame - Wood	- Ext	(0.086)	13.0/0.6	126	3.45	433 Btuh
7	Frame - Wood	- Ext	(0.086)	13.0/0.6	102	3.45	352 Btuh
8	Frame - Wood	- Ext	(0.086)	13.0/0.6	93	3.45	321 Btuh
9	Frame - Wood	- Ext	(0.086)	13.0/0.6	117	3.45	402 Btuh
10	Frame - Wood	- Ext	(0.086)	13.0/0.6	18	3.45	62 Btuh
11	Frame - Wood	- Ext	(0.086)	13.0/0.6	130	3.45	448 Btuh
12	Frame - Wood	- Ext	(0.086)	13.0/0.6	18	3.45	62 Btuh
13	Frame - Wood	- Ext	(0.086)	13.0/0.6	89	3.45	308 Btuh
14	Frame - Wood	- Ext	(0.086)	13.0/0.6	37	3.45	127 Btuh
15	Frame - Wood	- Adj	(0.086)	13.0/0.6	144	3.45	497 Btuh
16	Frame - Wood	- Ext	(0.086)	13.0/0.6	75	3.45	259 Btuh
17	Frame - Wood	- Ext	(0.086)	13.0/0.6	142	3.45	489 Btuh
18	Frame - Wood	- Ext	(0.086)	13.0/0.6	220	3.45	759 Btuh
19	Frame - Wood	- Ext	(0.086)	13.0/0.6	128	3.45	440 Btuh
20	Frame - Wood	- Ext	(0.086)	13.0/0.6	94	3.45	324 Btuh
21	Frame - Wood	- Ext	(0.086)	13.0/0.6	291	3.45	1004 Btuh
22	Frame - Wood	- Ext	(0.086)	13.0/0.6	18	3.45	62 Btuh
23	Frame - Wood	- Ext	(0.086)	13.0/0.6	214	3.45	736 Btuh
24	Frame - Wood	- Ext	(0.089)	13.0/0.0	64	3.55	227 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Knoll Residence
Lake City, FL Building Type: User

10/10/2022

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
25	Frame - Wood	- Ext	(0.089)	13.0/0.0	28	3.55	98 Btuh
26	Frame - Wood	- Ext	(0.089)	13.0/0.0	64	3.55	227 Btuh
27	Frame - Wood	- Ext	(0.089)	13.0/0.0	60	3.55	212 Btuh
28	Frame - Wood	- Ext	(0.089)	13.0/0.0	64	3.55	227 Btuh
29	Frame - Wood	- Ext	(0.089)	13.0/0.0	28	3.55	98 Btuh
30	Frame - Wood	- Ext	(0.089)	13.0/0.0	64	3.55	227 Btuh
	Wall Total				2663(sqft)		9222 Btuh
Doors	Type	Storm	Ueff.		Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)		24	16.0	384 Btuh
2	Insulated - Exterior,	n	(0.400)		72	16.0	1152 Btuh
3	Insulated - Exterior,	n	(0.400)		72	16.0	1152 Btuh
4	Insulated - Exterior,	n	(0.400)		72	16.0	1152 Btuh
5	Insulated - Exterior,	n	(0.400)		21	16.0	341 Btuh
6	Insulated - Exterior,	n	(0.400)		24	16.0	384 Btuh
7	Insulated - Garage,	n	(0.400)		24	16.0	384 Btuh
8	Insulated - Exterior,	n	(0.400)		48	16.0	768 Btuh
	Door Total				357(sqft)		5717Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area X	HTM=	Load
1	Unvent Attic/L/Shing		(0.032)	30.0/0.0	2718	1.3	3462 Btuh
2	Cathedral/L/Shing		(0.032)	30.0/0.0	437	1.3	566 Btuh
	Ceiling Total				3155(sqft)		4028Btuh
Floors	Type		Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	314.0 ft(perim.)	47.2	14821 Btuh
2	Raised Wood - Adj		(0.385)	0.0	437.0 sqft	15.4	6724 Btuh
	Floor Total				3155 sqft		21544 Btuh
					Envelope Subtotal:		43632 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.16	27958	1.00	76.1	3332 Btuh
Duct load	Extremely sealed, R6.0, Supply(Con), Return(Con)					(DLM of 0.000)	0 Btuh
All Zones					**Sensible Subtotal All Zones**		**46964 Btuh**

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Knoll Residence
Lake City, FL Building Type: User

10/10/2022

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	46964 Btuh 0 Btuh 46964 Btuh

EQUIPMENT

1. Electric Heat Pump	#	60000 Btuh

Key: Window types - NFRC (Requires U-Factor and Shading coefficient(SHGC) of glass as numerical values)
or - Glass as 'Clear' or 'Tint' (Uses U-Factor and SHGC defaults)
U - (Window U-Factor)
HTM - (ManualJ Heat Transfer Multiplier)

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