Residential System Sizing Calculation

Summary

Project Title:
Foote Renovation

Lake City, FL

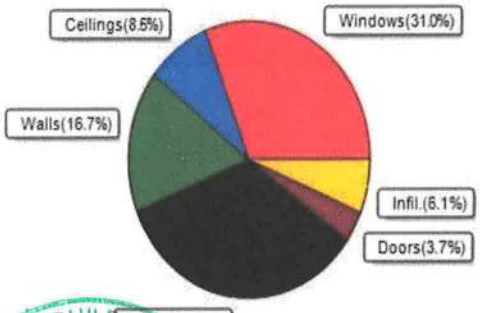
8/23/2021

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	**40867**	**Btuh**	**Total cooling load calculation**	**30440**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	117.5	48000	Sensible (SHR = 0.85)	146.9	40800
Heat Pump + Auxiliary(0.0kW)	117.5	48000	Latent	269.5	7200
			Total (Electric Heat Pump)	157.7	48000

WINTER CALCULATIONS

Winter Heating Load (for 2720 sqft)

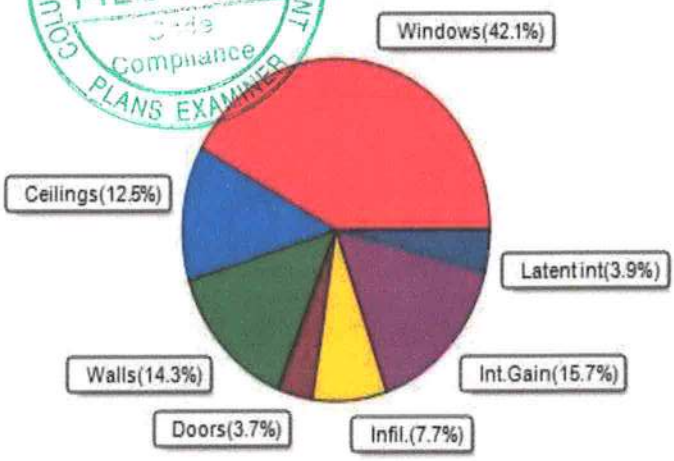
Load component			Load	
Window total	528	sqft	12666	Btuh
Wall total	1975	sqft	6811	Btuh
Door total	94	sqft	1511	Btuh
Ceiling total	2720	sqft	3465	Btuh
Floor total	2720	sqft	13924	Btuh
Infiltration	57	cfm	2490	Btuh
Duct loss			0	Btuh
Subtotal			**40867**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**40867**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2720 sqft)

Load component			Load	
Window total	528	sqft	12815	Btuh
Wall total	1975	sqft	4342	Btuh
Door total	94	sqft	1133	Btuh
Ceiling total	2720	sqft	3811	Btuh
Floor total			0	Btuh
Infiltration	43	cfm	887	Btuh
Internal gain			4780	Btuh
Duct gain			0	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**27769**	**Btuh**
Latent gain(ducts)			0	Btuh
Latent gain(infiltration)			1472	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1200	Btuh
Total latent gain			**2672**	**Btuh**
TOTAL HEAT GAIN			**30440**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 8-19-21

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Foote Renovation

Lake City, FL

8/23/2021

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

Component Loads for Whole House

Window	Type* Panes	SHGC	U	InSh	IS	Ornt	Overhang Len	Hgt	Window Area(sqft) Gross	Shaded	Unshaded	HTM Shaded	Unshaded	Load
1	2 NFRC	0.27, 0.60		No	No	E	1.5ft.	2.3ft.	72.5	0.0	72.5	17	37	2714 Btuh
2	2 NFRC	0.27, 0.60		No	No	W	4.5ft.	2.3ft.	32.0	11.2	20.8	17	37	970 Btuh
3	2 NFRC	0.27, 0.60		No	No	W	16.5f	2.3ft.	48.3	48.3	0.0	17	37	826 Btuh
4	2 NFRC	0.27, 0.60		No	No	S	1.5ft.	2.3ft.	24.0	24.0	0.0	17	19	410 Btuh
5	2 NFRC	0.27, 0.60		No	No	W	1.5ft.	2.3ft.	12.0	0.0	12.0	17	37	449 Btuh
6	2 NFRC	0.27, 0.60		No	No	N	1.5ft.	2.3ft.	24.0	0.0	24.0	17	17	410 Btuh
7	2 NFRC	0.27, 0.60		No	No	E	1.5ft.	2.3ft.	9.0	0.0	9.0	17	37	337 Btuh
8	2 NFRC	0.27, 0.60		No	No	N	11.5f	2.3ft.	48.3	0.0	48.3	17	17	826 Btuh
9	2 NFRC	0.27, 0.60		No	No	E	11.5f	2.3ft.	48.3	48.3	0.0	17	37	826 Btuh
10	2 NFRC	0.27, 0.60		No	No	N	1.5ft.	2.3ft.	20.0	0.0	20.0	17	17	342 Btuh
11	2 NFRC	0.27, 0.60		No	No	E	1.5ft.	2.3ft.	72.5	0.0	72.5	17	37	2714 Btuh
12	2 NFRC	0.27, 0.60		No	No	S	1.5ft.	2.3ft.	108.7	108.7	0.0	17	19	1857 Btuh
13	2 NFRC	0.27, 0.60		No	No	S	1.5ft.	2.3ft.	8.0	8.0	0.0	17	19	137 Btuh
	Window Total								528 (sqft)					12815 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.6	149.5	2.2	329 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.6	288.0	2.2	633 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.6	72.0	2.2	158 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.6	46.2	2.2	102 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.6	71.7	2.2	158 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.6	96.0	2.2	211 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.6	148.0	2.2	325 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.6	185.3	2.2	407 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.6	153.7	2.2	338 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.6	64.0	2.2	141 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.6	80.0	2.2	176 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.6	107.0	2.2	235 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.6	96.3	2.2	212 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.6	20.0	2.2	44 Btuh
15	Frame - Wood - Ext	0.09	13.0/0.6	130.2	2.2	286 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.6	267.3	2.2	588 Btuh
	Wall Total			1975 (sqft)		4342 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	17.8	12.0	213 Btuh
2	Insulated - Exterior	20.0	12.0	240 Btuh
3	Insulated - Exterior	33.3	12.0	400 Btuh
4	Insulated - Exterior	23.3	12.0	280 Btuh
	Door Total	94 (sqft)		1133 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Vented Attic/Light/Metal	0.032	30.0/0.0	2720.0	1.40	3811 Btuh
	Ceiling Total			2720 (sqft)		3811 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2720 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2720.0 (sqft)		0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Foote Renovation

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

8/23/2021

				Envelope Subtotal:				22102 Btuh
Infiltration	Type Natural	Average ACH 0.12	Volume(cuft) 21760	Wall Ratio 1		CFM= 42.6	Load 887	Btuh
Internal gain		Occupants 6	Btuh/occupant X 230		+	Appliance 3400	Load 4780	Btuh
				Sensible Envelope Load:			27769	Btuh
Duct load	Averagesealed, Supply(R6.0-Condi), Return(R6.0-Condi)			(DGM of 0.000)			0	Btuh
				Sensible Load All Zones			**27769**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Foote Renovation
Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

8/23/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**27769 Btuh**
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	**27769 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**27769 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1472 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	0 Btuh
	Latent occupant gain (6.0 people @ 200 Btuh per person)	1200 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**2672 Btuh**
	TOTAL GAIN	**30440 Btuh**

EQUIPMENT

1. Central Unit	#	48000 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)

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System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Project Title:
Foote Renovation
Building Type: User

Lake City, FL

8/23/2021

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 0.27	Wood	0.60	E	72.5	24.0	1740 Btuh
2	2, NFRC 0.27	Wood	0.60	W	32.0	24.0	768 Btuh
3	2, NFRC 0.27	Wood	0.60	W	48.3	24.0	1160 Btuh
4	2, NFRC 0.27	Wood	0.60	S	24.0	24.0	576 Btuh
5	2, NFRC 0.27	Wood	0.60	W	12.0	24.0	288 Btuh
6	2, NFRC 0.27	Wood	0.60	N	24.0	24.0	576 Btuh
7	2, NFRC 0.27	Wood	0.60	E	9.0	24.0	216 Btuh
8	2, NFRC 0.27	Wood	0.60	N	48.3	24.0	1160 Btuh
9	2, NFRC 0.27	Wood	0.60	E	48.3	24.0	1160 Btuh
10	2, NFRC 0.27	Wood	0.60	N	20.0	24.0	480 Btuh
11	2, NFRC 0.27	Wood	0.60	E	72.5	24.0	1740 Btuh
12	2, NFRC 0.27	Wood	0.60	S	108.7	24.0	2610 Btuh
13	2, NFRC 0.27	Wood	0.60	S	8.0	24.0	192 Btuh
	Window Total				527.8(sqft)		12666 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.086)	13.0/0.6	150	3.45	516 Btuh
2	Frame - Wood	- Ext	(0.086)	13.0/0.6	288	3.45	993 Btuh
3	Frame - Wood	- Ext	(0.086)	13.0/0.6	72	3.45	248 Btuh
4	Frame - Wood	- Ext	(0.086)	13.0/0.6	46	3.45	159 Btuh
5	Frame - Wood	- Ext	(0.086)	13.0/0.6	72	3.45	247 Btuh
6	Frame - Wood	- Ext	(0.086)	13.0/0.6	96	3.45	331 Btuh
7	Frame - Wood	- Ext	(0.086)	13.0/0.6	148	3.45	510 Btuh
8	Frame - Wood	- Ext	(0.086)	13.0/0.6	185	3.45	639 Btuh
9	Frame - Wood	- Ext	(0.086)	13.0/0.6	154	3.45	530 Btuh
10	Frame - Wood	- Ext	(0.086)	13.0/0.6	64	3.45	221 Btuh
11	Frame - Wood	- Ext	(0.086)	13.0/0.6	80	3.45	276 Btuh
12	Frame - Wood	- Ext	(0.086)	13.0/0.6	107	3.45	369 Btuh
13	Frame - Wood	- Ext	(0.086)	13.0/0.6	96	3.45	332 Btuh
14	Frame - Wood	- Ext	(0.086)	13.0/0.6	20	3.45	69 Btuh
15	Frame - Wood	- Ext	(0.086)	13.0/0.6	130	3.45	449 Btuh
16	Frame - Wood	- Ext	(0.086)	13.0/0.6	267	3.45	922 Btuh
	Wall Total				1975(sqft)		6811 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)	18	16.0	284 Btuh
2	Insulated - Exterior,	n	(0.400)	20	16.0	320 Btuh
3	Insulated - Exterior,	n	(0.400)	33	16.0	533 Btuh
4	Insulated - Exterior,	n	(0.400)	23	16.0	373 Btuh
	Door Total			94(sqft)		1511Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/L/Metal	(0.032)	30.0/0.0	2720	1.3	3465 Btuh
	Ceiling Total			2720(sqft)		3465Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Foote Renovation
Building Type: User

Lake City, FL

8/23/2021

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	295.0 ft(perim.)	47.2	13924 Btuh
	Floor Total			2720 sqft		13924 Btuh
				Envelope Subtotal:		38377 Btuh
Infiltration	Type	Wholehouse ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural	0.16	21760	1.00	56.9	2490 Btuh
Duct load	Average sealed, R6.0, Supply(Con), Return(Con)			(DLM of 0.000)		0 Btuh
All Zones			**Sensible Subtotal All Zones**			**40867 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	40867 Btuh
	Ventilation Sensible Heat Loss	0 Btuh
	Total Heat Loss	40867 Btuh

EQUIPMENT

1. Electric Heat Pump	#	48000 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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