Residential System Sizing Calculation

Summary

Project Title:
Royster Residence

, FL

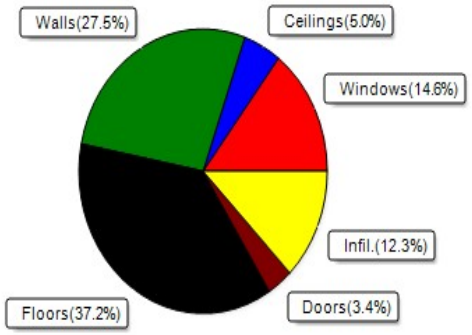
3/9/2023

Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(100 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	**36038**	**Btuh**	**Total cooling load calculation**	**24384**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	133.2	48000	Sensible (SHR = 0.85)	202.4	40800
Heat Pump + Auxiliary(0.0kW)	133.2	48000	Latent	170.3	7200
			Total (Electric Heat Pump)	196.8	48000

WINTER CALCULATIONS

Winter Heating Load (for 2897 sqft)

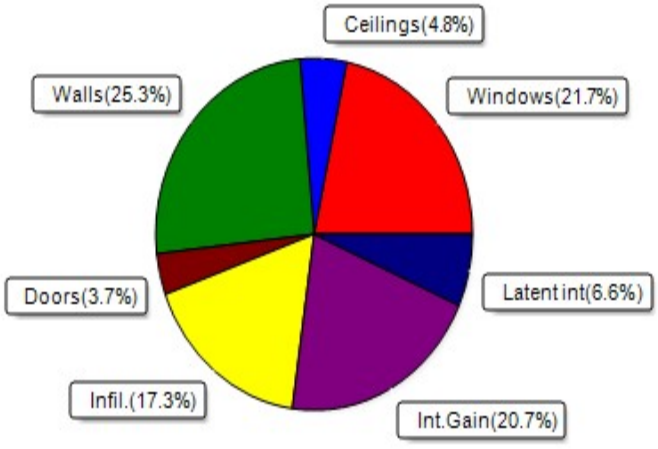
Load component			Load	
Window total	505	sqft	5252	Btuh
Wall total	2795	sqft	9922	Btuh
Door total	76	sqft	1216	Btuh
Ceiling total	2897	sqft	1797	Btuh
Floor total	See detail report		13405	Btuh
Infiltration	101	cfm	4446	Btuh
Duct loss			0	Btuh
Subtotal			**36038**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**36038**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2897 sqft)

Load component			Load	
Window total	505	sqft	5283	Btuh
Wall total	2795	sqft	6169	Btuh
Door total	76	sqft	912	Btuh
Ceiling total	2897	sqft	1168	Btuh
Floor total			0	Btuh
Infiltration	76	cfm	1584	Btuh
Internal gain			5040	Btuh
Duct gain			0	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**20156**	**Btuh**
Latent gain(ducts)			0	Btuh
Latent gain(infiltration)			2628	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**4228**	**Btuh**
TOTAL HEAT GAIN			**24384**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 3-9-23

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Royster Residence

, FL

3/9/2023

Reference City: Gainesville, FL (Defaults)
Humidity difference: 51gr.

Temperature Difference: 19.0F(TMY3 99%)
Summer Setpoint: 75 °F (Required Manual J default)

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	36.0	0.0	36.0	9	9	329	Btuh
2	2 NFRC	0.20,	0.26	No	No	N	17.5f	2.3ft	112.0	0.0	112.0	9	9	1024	Btuh
3	2 NFRC	0.20,	0.26	No	No	N	1.5ft	2.3ft	60.0	0.0	60.0	9	9	549	Btuh
4	2 NFRC	0.20,	0.26	No	No	N	1.5ft	2.3ft	18.0	0.0	18.0	9	9	165	Btuh
5	2 NFRC	0.20,	0.26	No	No	N	1.5ft	2.3ft	36.0	0.0	36.0	9	9	329	Btuh
6	2 NFRC	0.20,	0.26	No	No	E	1.5ft	2.3ft	24.0	0.0	24.0	9	24	581	Btuh
7	2 NFRC	0.20,	0.26	No	No	E	1.5ft	2.3ft	12.0	0.0	12.0	9	24	291	Btuh
8	2 NFRC	0.20,	0.26	No	No	E	1.5ft	2.3ft	8.0	0.0	8.0	9	24	194	Btuh
9	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	21.0	21.0	0.0	9	11	192	Btuh
10	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	36.0	36.0	0.0	9	11	329	Btuh
11	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	24.0	24.0	0.0	9	11	220	Btuh
12	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	18.0	18.0	0.0	9	11	165	Btuh
13	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	30.0	30.0	0.0	9	11	274	Btuh
14	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	10.0	10.0	0.0	9	11	91	Btuh
15	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	25.0	25.0	0.0	9	11	229	Btuh
16	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	25.0	25.0	0.0	9	11	229	Btuh
17	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	10.0	10.0	0.0	9	11	91	Btuh
	Window Total								505 (sqft)					5283	Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Royster Residence

, FL

3/9/2023

Walls	Type	U-Value	R-Value	Area(sqft)	HTM	Load
			Cav/Sheath			
1	Frame - Wood - Ext	0.09	13.0/0.0	80.7	2.3	183 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	158.3	2.3	358 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	51.3	2.3	116 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	61.7	2.3	140 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	133.7	2.3	303 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	72.7	2.3	164 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	110.7	2.3	250 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	127.7	2.3	289 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	128.0	2.3	290 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	85.3	2.3	193 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	26.7	2.3	60 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	25.0	2.3	57 Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	26.7	2.3	60 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68 Btuh
17	Frame - Wood - Ext	0.09	13.0/0.0	45.7	2.3	103 Btuh
18	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68 Btuh
19	Frame - Wood - Ext	0.09	13.0/0.0	26.7	2.3	60 Btuh
20	Frame - Wood - Ext	0.09	13.0/0.0	20.0	2.3	45 Btuh
21	Frame - Wood - Ext	0.09	13.0/0.0	37.0	2.3	84 Btuh
22	Frame - Wood - Ext	0.09	13.0/0.0	68.7	2.3	155 Btuh
23	Frame - Wood - Ext	0.09	13.0/0.0	51.7	2.3	117 Btuh
24	Frame - Wood - Ext	0.09	13.0/0.0	136.7	2.3	309 Btuh
25	Frame - Wood - Ext	0.09	13.0/0.0	16.7	2.3	38 Btuh
26	Frame - Wood - Ext	0.09	13.0/0.0	70.0	2.3	158 Btuh
27	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68 Btuh
28	Frame - Wood - Adj	0.09	13.0/0.0	270.0	1.7	455 Btuh
29	Frame - Wood - Ext	0.09	13.0/0.0	116.0	2.3	263 Btuh
30	Frame - Wood - Ext	0.09	13.0/0.0	114.7	2.3	260 Btuh
31	Frame - Wood - Ext	0.09	13.0/0.0	92.0	2.3	208 Btuh
32	Frame - Wood - Ext	0.09	13.0/0.0	12.0	2.3	27 Btuh
33	Frame - Wood - Ext	0.09	13.0/0.0	52.3	2.3	118 Btuh
34	Frame - Wood - Ext	0.09	13.0/0.0	41.3	2.3	94 Btuh
35	Frame - Wood - Ext	0.09	13.0/0.0	108.3	2.3	245 Btuh
36	Frame - Wood - Ext	0.09	13.0/0.0	213.3	2.3	483 Btuh
37	Frame - Wood - Ext	0.09	13.0/0.0	63.3	2.3	143 Btuh
	Wall Total			2795 (sqft)		6169 Btuh
Doors	Type			Area (sqft)	HTM	Load
1	Insulated - Exterior			24.0	12.0	288 Btuh
2	Insulated - Exterior			28.0	12.0	336 Btuh
3	Insulated - Exterior			24.0	12.0	288 Btuh
	Door Total			76 (sqft)		912 Btuh
Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	SnglAsmb no airsp/DarkShingle	0.016	30.0/38.0	2330.0	0.40	939 Btuh
2	SnglAsmb no airsp/DarkShingle	0.016	30.0/38.0	567.0	0.40	229 Btuh
	Ceiling Total			2897 (sqft)		1168 Btuh
Floors	Type		R-Value	Size	HTM	Load
1	Slab On Grade		0.0	2330 (ft-perimeter)	0.0	0 Btuh
2	Interior		0.0	567 (sqft)	0.0	0 Btuh
	Floor Total			2897.0 (sqft)		0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Royster Residence

Climate:FL_GAINESVILLE_REGIONAL_A

, FL

3/9/2023

					Envelope Subtotal:		13532	Btuh
Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio		CFM=	Load	
	Natural	0.16	27836	1		76.0	1584	Btuh
Internal gain		Occupants	Btuh/occupant			Appliance	Load	
		8	X 230	+		3200	5040	Btuh
					Sensible Envelope Load:		20156	Btuh
Duct load	Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Condi)				(DGM of 0.000)		0	Btuh
					Sensible Load All Zones		**20156**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Royster Residence

, FL

3/9/2023

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**20156 Btuh**
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	**20156 Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**20156 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	2628 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	**4228 Btuh**
	TOTAL GAIN	**24384 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)

Version 8

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Project Title:
Royster Residence
, FL Building Type: User

3/9/2023

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 °F (TMY3 99%)
Winter Setpoint: 70 °F (Required Manual J default)

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	36.0	10.4	374 Btuh
2	2, NFRC 0.20	Vinyl	0.26	N	112.0	10.4	1165 Btuh
3	2, NFRC 0.20	Vinyl	0.26	N	60.0	10.4	624 Btuh
4	2, NFRC 0.20	Vinyl	0.26	N	18.0	10.4	187 Btuh
5	2, NFRC 0.20	Vinyl	0.26	N	36.0	10.4	374 Btuh
6	2, NFRC 0.20	Vinyl	0.26	E	24.0	10.4	250 Btuh
7	2, NFRC 0.20	Vinyl	0.26	E	12.0	10.4	125 Btuh
8	2, NFRC 0.20	Vinyl	0.26	E	8.0	10.4	83 Btuh
9	2, NFRC 0.20	Vinyl	0.26	S	21.0	10.4	218 Btuh
10	2, NFRC 0.20	Vinyl	0.26	S	36.0	10.4	374 Btuh
11	2, NFRC 0.20	Vinyl	0.26	S	24.0	10.4	250 Btuh
12	2, NFRC 0.20	Vinyl	0.26	S	18.0	10.4	187 Btuh
13	2, NFRC 0.20	Vinyl	0.26	S	30.0	10.4	312 Btuh
14	2, NFRC 0.20	Vinyl	0.26	S	10.0	10.4	104 Btuh
15	2, NFRC 0.20	Vinyl	0.26	S	25.0	10.4	260 Btuh
16	2, NFRC 0.20	Vinyl	0.26	S	25.0	10.4	260 Btuh
17	2, NFRC 0.20	Vinyl	0.26	S	10.0	10.4	104 Btuh
	Window Total				505.0(sqft)		5252 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	81	3.55	286 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	158	3.55	562 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	51	3.55	182 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	62	3.55	219 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	134	3.55	475 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	73	3.55	258 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	111	3.55	393 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	128	3.55	453 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	128	3.55	454 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	85	3.55	303 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	27	3.55	95 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	25	3.55	89 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	27	3.55	95 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
17	Frame - Wood	- Ext	(0.089)	13.0/0.0	46	3.55	162 Btuh
18	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
19	Frame - Wood	- Ext	(0.089)	13.0/0.0	27	3.55	95 Btuh
20	Frame - Wood	- Ext	(0.089)	13.0/0.0	20	3.55	71 Btuh
21	Frame - Wood	- Ext	(0.089)	13.0/0.0	37	3.55	131 Btuh
22	Frame - Wood	- Ext	(0.089)	13.0/0.0	69	3.55	244 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Royster Residence
, FL Building Type: User

3/9/2023

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
23	Frame - Wood	- Ext	(0.089)	13.0/0.0	52	3.55	183 Btuh
24	Frame - Wood	- Ext	(0.089)	13.0/0.0	137	3.55	485 Btuh
25	Frame - Wood	- Ext	(0.089)	13.0/0.0	17	3.55	59 Btuh
26	Frame - Wood	- Ext	(0.089)	13.0/0.0	70	3.55	249 Btuh
27	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
28	Frame - Wood	- Adj	(0.089)	13.0/0.0	270	3.55	959 Btuh
29	Frame - Wood	- Ext	(0.089)	13.0/0.0	116	3.55	412 Btuh
30	Frame - Wood	- Ext	(0.089)	13.0/0.0	115	3.55	407 Btuh
31	Frame - Wood	- Ext	(0.089)	13.0/0.0	92	3.55	327 Btuh
32	Frame - Wood	- Ext	(0.089)	13.0/0.0	12	3.55	43 Btuh
33	Frame - Wood	- Ext	(0.089)	13.0/0.0	52	3.55	186 Btuh
34	Frame - Wood	- Ext	(0.089)	13.0/0.0	41	3.55	147 Btuh
35	Frame - Wood	- Ext	(0.089)	13.0/0.0	108	3.55	385 Btuh
36	Frame - Wood	- Ext	(0.089)	13.0/0.0	213	3.55	757 Btuh
37	Frame - Wood	- Ext	(0.089)	13.0/0.0	63	3.55	225 Btuh
	Wall Total				2795(sqft)		9922 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)	28	16.0	448 Btuh
3	Insulated - Exterior,	n	(0.400)	24	16.0	384 Btuh
	Door Total			76(sqft)		1216Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Single as/D/Shing	(0.016)	30.0/38.0	2330	0.62	1445 Btuh
2	Single as/D/Shing	(0.016)	30.0/38.0	567	0.62	352 Btuh
	Ceiling Total			2897(sqft)		1797Btuh

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	284.0 ft(perim.)	47.2	13405 Btuh
2	Interior	(1.180)	0.0	567.0 sqft	0.0	0 Btuh
	Floor Total			2897 sqft		13405 Btuh

	Envelope Subtotal:	31591 Btuh

Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.22	27836	1.00	101.4	4446 Btuh

Duct load	Extremely sealed, R6.0, Supply(Con), Return(Con)	(DLM of 0.000)	0 Btuh

All Zones	**Sensible Subtotal All Zones**	**36038 Btuh**

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Royster Residence
, FL Building Type: User

3/9/2023

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	36038 Btuh
	Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Total Heat Loss	36038 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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