Residential System Sizing Calculation

Summary

Project Title:
Roberts Residence

, FL

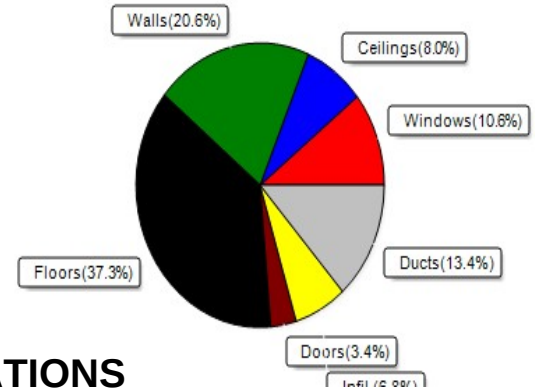
1/3/2023

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	**47470**	**Btuh**	**Total cooling load calculation**	**36499**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	151.7	72000	Sensible (SHR = 0.85)	195.3	61200
Heat Pump + Auxiliary(0.0kW)	151.7	72000	Latent	209.2	10800
			Total (Electric Heat Pump)	197.3	72000

WINTER CALCULATIONS

Winter Heating Load (for 2975 sqft)

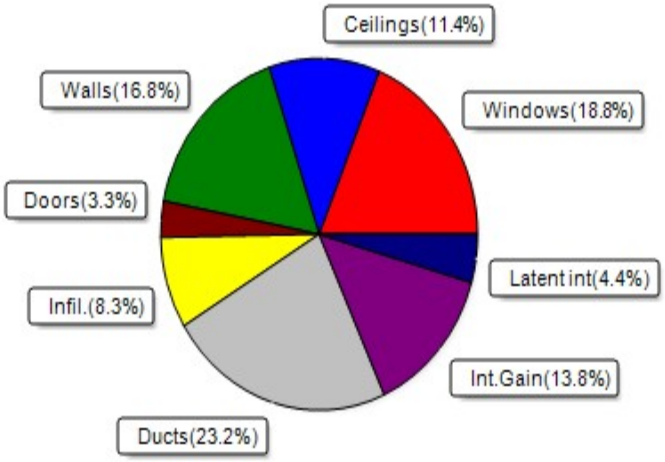
Load component			Load	
Window total	486	sqft	5049	Btuh
Wall total	2754	sqft	9776	Btuh
Door total	100	sqft	1600	Btuh
Ceiling total	2975	sqft	3790	Btuh
Floor total	See detail report		17700	Btuh
Infiltration	73	cfm	3216	Btuh
Duct loss			6338	Btuh
Subtotal			**47470**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**47470**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2975 sqft)

Load component			Load	
Window total	486	sqft	6846	Btuh
Wall total	2754	sqft	6140	Btuh
Door total	100	sqft	1200	Btuh
Ceiling total	2975	sqft	4169	Btuh
Floor total			0	Btuh
Infiltration	55	cfm	1146	Btuh
Internal gain			5040	Btuh
Duct gain			6796	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**31337**	**Btuh**
Latent gain(ducts)			1661	Btuh
Latent gain(infiltration)			1901	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**5162**	**Btuh**
TOTAL HEAT GAIN			**36499**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 1-3-23

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Roberts Residence

, FL

1/3/2023

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	132.0	0.0	132.0	9	9	1207	Btuh
2	2 NFRC	0.20, 0.26		No	No	N	1.5ft	2.3ft	14.0	0.0	14.0	9	9	128	Btuh
3	2 NFRC	0.20, 0.26		No	No	W	1.5ft	2.3ft	12.0	0.0	12.0	9	24	291	Btuh
4	2 NFRC	0.20, 0.26		No	No	W	1.5ft	2.3ft	36.0	0.0	36.0	9	24	872	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	27.0	0.0	27.0	9	24	654	Btuh
7	2 NFRC	0.20, 0.26		No	No	E	1.5ft	2.3ft	54.0	0.0	54.0	9	24	1308	Btuh
8	2 NFRC	0.20, 0.26		No	No	N	1.5ft	2.3ft	28.0	0.0	28.0	9	9	256	Btuh
9	2 NFRC	0.20, 0.26		No	No	S	1.5ft	2.3ft	22.0	18.6	3.4	9	11	207	Btuh
10	2 NFRC	0.20, 0.26		No	No	S	1.5ft	2.3ft	44.0	37.1	6.9	9	11	413	Btuh
11	2 NFRC	0.20, 0.26		No	No	W	1.5ft	2.3ft	22.0	0.0	22.0	9	24	533	Btuh
12	2 NFRC	0.20, 0.26		No	No	N	1.5ft	2.3ft	15.0	0.0	15.0	9	9	137	Btuh
13	2 NFRC	0.20, 0.26		No	No	S	1.5ft	2.3ft	36.0	36.0	0.0	9	11	329	Btuh
14	2 NFRC	0.20, 0.26		No	No	W	1.5ft	2.3ft	7.5	0.0	7.5	9	24	182	Btuh
	Window Total								486 (sqft)					6846	Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load	
1	Frame - Wood - Ext	0.09	13.0/0.0	200.5	2.3	454	Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	374.5	2.3	848	Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	144.0	2.3	326	Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	574.5	2.3	1300	Btuh
5	Frame - Wood - Adj	0.09	13.0/0.0	160.0	1.7	270	Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	77.8	2.3	176	Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	66.0	2.3	149	Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	62.0	2.3	140	Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	46.0	2.3	104	Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	123.3	2.3	279	Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	160.5	2.3	363	Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	204.0	2.3	462	Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	182.5	2.3	413	Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	183.0	2.3	414	Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	195.0	2.3	441	Btuh
	Wall Total			2754 (sqft)		6140	Btuh

Doors	Type	Area (sqft)	HTM	Load	
1	Insulated - Exterior	20.0	12.0	240	Btuh
2	Insulated - Garage	20.0	12.0	240	Btuh
3	Insulated - Exterior	20.0	12.0	240	Btuh
4	Insulated - Exterior	20.0	12.0	240	Btuh
5	Insulated - Exterior	20.0	12.0	240	Btuh
	Door Total	100 (sqft)		1200	Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load	
1	Vented Attic/Med/Shingle	0.032	30.0/0.0	2427.0	1.40	3401	Btuh
2	Vented Attic/Med/Shingle	0.032	30.0/0.0	548.0	1.40	768	Btuh
	Ceiling Total			2975 (sqft)		4169	Btuh

Floors	Type	R-Value	Size	HTM	Load	
1	Slab On Grade	0.0	2427 (ft-perimeter)	0.0	0	Btuh
2	Slab On Grade	0.0	548 (ft-perimeter)	0.0	0	Btuh
	Floor Total		2975.0 (sqft)		0	Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Roberts Residence
Climate:FL_GAINESVILLE_REGIONAL_A

, FL

1/3/2023

						Envelope Subtotal:		18355 Btuh
Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio		CFM=	Load	
	Natural	0.12	26775	1		55.0	1146	Btuh
Internal gain		Occupants	Btuh/occupant			Appliance	Load	
		8	X 230	+		3200	5040	Btuh
						Sensible Envelope Load:	24541	Btuh
Duct load						(DGMs vary for Mixed ducts)	6796	Btuh
						Sensible Load All Zones	**31337**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Roberts Residence
Climate:FL_GAINESVILLE_REGIONAL_A

, FL

1/3/2023

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**24541**	**Btuh**
	Sensible Duct Load	6796	Btuh
	Total Sensible Zone Loads	**31337**	**Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0	Btuh
	Blower	0	Btuh
	Total sensible gain	**31337**	**Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1901	Btuh
	Latent ventilation gain	0	Btuh
	Latent duct gain	1661	Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600	Btuh
	Latent other gain	0	Btuh
	Latent total gain	**5162**	**Btuh**
	TOTAL GAIN	**36499**	**Btuh**

EQUIPMENT

1. Central Unit	#	48000 Btuh
2. Central Unit	#	24000 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:
Roberts Residence
, FL Building Type: User

1/3/2023

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	132.0	10.4	1373 Btuh
2	2, NFRC 0.20	Vinyl	0.26	N	14.0	10.4	146 Btuh
3	2, NFRC 0.20	Vinyl	0.26	W	12.0	10.4	125 Btuh
4	2, NFRC 0.20	Vinyl	0.26	W	36.0	10.4	374 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	27.0	10.4	281 Btuh
7	2, NFRC 0.20	Vinyl	0.26	E	54.0	10.4	562 Btuh
8	2, NFRC 0.20	Vinyl	0.26	N	28.0	10.4	291 Btuh
9	2, NFRC 0.20	Vinyl	0.26	S	22.0	10.4	229 Btuh
10	2, NFRC 0.20	Vinyl	0.26	S	44.0	10.4	458 Btuh
11	2, NFRC 0.20	Vinyl	0.26	W	22.0	10.4	229 Btuh
12	2, NFRC 0.20	Vinyl	0.26	N	15.0	10.4	156 Btuh
13	2, NFRC 0.20	Vinyl	0.26	S	36.0	10.4	374 Btuh
14	2, NFRC 0.20	Vinyl	0.26	W	7.5	10.4	78 Btuh
	Window Total				485.5(sqft)		5049 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	201	3.55	712 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	375	3.55	1330 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	144	3.55	511 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	575	3.55	2040 Btuh
5	Frame - Wood	- Adj	(0.089)	13.0/0.0	160	3.55	568 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	78	3.55	276 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	66	3.55	234 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	62	3.55	220 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	46	3.55	163 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	123	3.55	438 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	161	3.55	570 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	204	3.55	724 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	183	3.55	648 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	183	3.55	650 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	195	3.55	692 Btuh
	Wall Total				2754(sqft)		9776 Btuh
Doors	Type	Storm	Ueff.		Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)		20	16.0	320 Btuh
2	Insulated - Garage,	n	(0.400)		20	16.0	320 Btuh
3	Insulated - Exterior,	n	(0.400)		20	16.0	320 Btuh
4	Insulated - Exterior,	n	(0.400)		20	16.0	320 Btuh
5	Insulated - Exterior,	n	(0.400)		20	16.0	320 Btuh
	Door Total				100(sqft)		1600Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Roberts Residence
, FL Building Type: User

1/3/2023

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Flat ceil/M/Shing	(0.032)	30.0/0.0	2427	1.3	3092 Btuh
2	Flat ceil/M/Shing	(0.032)	30.0/0.0	548	1.3	698 Btuh
	Ceiling Total			2975(sqft)		3790Btuh
Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	281.0 ft(perim.)	47.2	13263 Btuh
2	Slab On Grade	(1.180)	0.0	94.0 ft(perim.)	47.2	4437 Btuh
	Floor Total			2975 sqft		17700 Btuh
				Envelope Subtotal:		37915 Btuh
Infiltration	Type	Wholehouse ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural	0.16	26775	1.00	73.3	3216 Btuh
Duct load				(DLM of 0.154)		6338 Btuh
All Zones			**Sensible Subtotal All Zones**			**47470 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss		47470 Btuh
	Ventilation Sens. Heat Loss	(Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Total Heat Loss		47470 Btuh

EQUIPMENT

1. Electric Heat Pump	#	48000 Btuh
2. Electric Heat Pump	#	24000 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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