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Residential System Sizing Calculation

Summary

Project Title:
Vaughn Residence

, FL

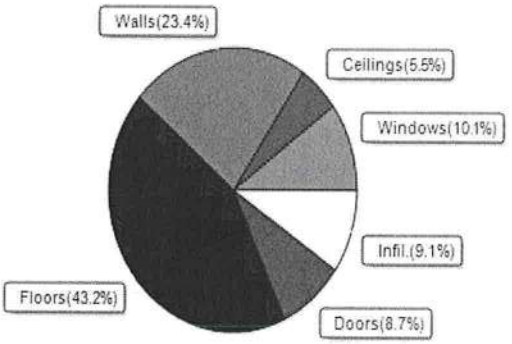
9/21/2023

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	**29363**	**Btuh**	**Total cooling load calculation**	**19858**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	143.0	42000	Sensible (SHR = 0.85)	214.1	35700
Heat Pump + Auxiliary(0.0kW)	143.0	42000	Latent	197.7	6300
			Total (Electric Heat Pump)	211.5	42000

WINTER CALCULATIONS

Winter Heating Load (for 2270 sqft)

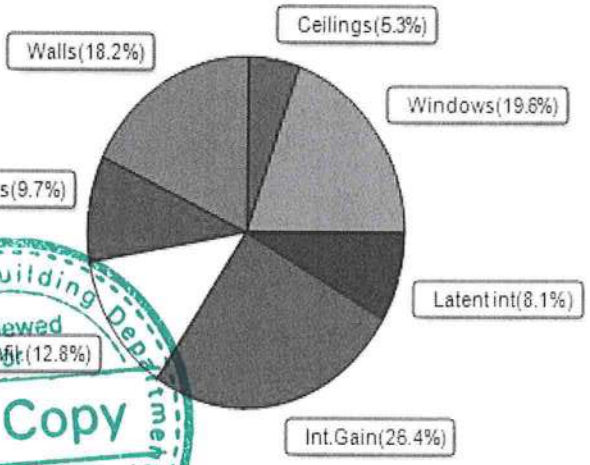
Load component			Load	
Window total	284	sqft	2954	Btuh
Wall total	2183	sqft	6863	Btuh
Door total	160	sqft	2560	Btuh
Ceiling total	2270	sqft	1607	Btuh
Floor total	2270	sqft	12697	Btuh
Infiltration	61	cfm	2683	Btuh
Duct loss			0	Btuh
Subtotal			**29363**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**29363**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2270 sqft)

Load component			Load	
Window total	284	sqft	3894	Btuh
Wall total	2183	sqft	3618	Btuh
Door total	160	sqft	1920	Btuh
Ceiling total	2270	sqft	1045	Btuh
Floor total			0	Btuh
Infiltration	46	cfm	956	Btuh
Internal gain			5240	Btuh
Duct gain			0	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**16672**	**Btuh**
Latent gain(ducts)			0	Btuh
Latent gain(infiltration)			1586	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**3186**	**Btuh**
TOTAL HEAT GAIN			**19858**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY:
DATE: 9-21-23

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Vaughn Residence

, FL

9/21/2023

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

Window	Type*					Overhang		Window Area(sqft)			HTM		Load
	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	12.0	0.0	12.0	9	9	110 Btuh
2	2 NFRC	0.20,	0.26	No	No	N	1.5ft	2.3ft	8.0	0.0	8.0	9	9	73 Btuh
3	2 NFRC	0.20,	0.26	No	No	E	1.5ft	2.3ft	20.0	0.0	20.0	9	24	484 Btuh
4	2 NFRC	0.20,	0.26	No	No	E	1.5ft	2.3ft	30.0	0.0	30.0	9	24	727 Btuh
5	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	36.0	36.0	0.0	9	11	329 Btuh
6	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	8.0	8.0	0.0	9	11	73 Btuh
7	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	90.0	90.0	0.0	9	11	823 Btuh
8	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	8.0	8.0	0.0	9	11	73 Btuh
9	2 NFRC	0.20,	0.26	No	No	S	1.5ft	2.3ft	36.0	36.0	0.0	9	11	329 Btuh
10	2 NFRC	0.20,	0.26	No	No	W	1.5ft	2.3ft	36.0	0.0	36.0	9	24	872 Btuh
	Window Total								284 (sqft)					3894 Btuh

Walls	Type	U-Value	R-Value	Area(sqft)	HTM	Load
			Cav/Sheath			
1	Frame - Wood - Ext	0.08	19.0/0.0	156.7	1.7	259 Btuh
2	Frame - Wood - Ext	0.08	19.0/0.0	130.0	1.7	215 Btuh
3	Frame - Wood - Ext	0.08	19.0/0.0	180.7	1.7	299 Btuh
4	Frame - Wood - Adj	0.09	13.0/0.0	252.7	1.7	426 Btuh
5	Frame - Wood - Ext	0.08	19.0/0.0	241.7	1.7	400 Btuh
6	Frame - Wood - Ext	0.08	19.0/0.0	112.3	1.7	186 Btuh
7	Frame - Wood - Ext	0.08	19.0/0.0	20.0	1.7	33 Btuh
8	Frame - Wood - Ext	0.08	19.0/0.0	75.3	1.7	125 Btuh
9	Frame - Wood - Ext	0.08	19.0/0.0	70.0	1.7	116 Btuh
10	Frame - Wood - Ext	0.08	19.0/0.0	180.0	1.7	298 Btuh
11	Frame - Wood - Ext	0.08	19.0/0.0	30.0	1.7	50 Btuh
12	Frame - Wood - Ext	0.08	19.0/0.0	80.3	1.7	133 Btuh
13	Frame - Wood - Ext	0.08	19.0/0.0	78.3	1.7	130 Btuh
14	Frame - Wood - Ext	0.08	19.0/0.0	87.3	1.7	144 Btuh
15	Frame - Wood - Ext	0.08	19.0/0.0	146.7	1.7	243 Btuh
16	Frame - Wood - Ext	0.08	19.0/0.0	60.0	1.7	99 Btuh
17	Frame - Wood - Ext	0.08	19.0/0.0	280.7	1.7	464 Btuh
	Wall Total			2183 (sqft)		3618 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	96.0	12.0	1152 Btuh
2	Wood - Garage	24.0	12.0	288 Btuh
3	Insulated - Exterior	40.0	12.0	480 Btuh
	Door Total	160 (sqft)		1920 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	SnglAsmb no airsp/DarkShingle	0.018	30.0/30.0	2270.0	0.46	1045 Btuh
	Ceiling Total			2270 (sqft)		1045 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2270 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2270.0 (sqft)		0 Btuh

	Envelope Subtotal:	10476 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Vaughn Residence

Climate:FL_GAINESVILLE_REGIONAL_A

, FL

9/21/2023

Infiltration	Type	Average ACH	Volume(cuft)		Wall Ratio		CFM=	Load	
	Natural	0.12	22700		1		45.9	956	Btuh
Internal gain		Occupants	Btuh/occupant				Appliance	Load	
		8	X	230	+		3400	5240	Btuh
						Sensible Envelope Load:		16672	Btuh
Duct load	Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Condi)					(DGM of 0.000)		0	Btuh
						Sensible Load All Zones		**16672**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Vaughn Residence
Climate:FL_GAINESVILLE_REGIONAL_A

, FL

9/21/2023

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**16672 Btuh**
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	**16672 Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**16672 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1586 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	**3186 Btuh**
	TOTAL GAIN	**19858 Btuh**

EQUIPMENT

1. Central Unit	#	42000 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:
Vaughn Residence
Building Type: User

, FL

9/21/2023

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	12.0	10.4	125 Btuh
2	2, NFRC 0.20	Vinyl	0.26	N	8.0	10.4	83 Btuh
3	2, NFRC 0.20	Vinyl	0.26	E	20.0	10.4	208 Btuh
4	2, NFRC 0.20	Vinyl	0.26	E	30.0	10.4	312 Btuh
5	2, NFRC 0.20	Vinyl	0.26	S	36.0	10.4	374 Btuh
6	2, NFRC 0.20	Vinyl	0.26	S	8.0	10.4	83 Btuh
7	2, NFRC 0.20	Vinyl	0.26	S	90.0	10.4	936 Btuh
8	2, NFRC 0.20	Vinyl	0.26	S	8.0	10.4	83 Btuh
9	2, NFRC 0.20	Vinyl	0.26	S	36.0	10.4	374 Btuh
10	2, NFRC 0.20	Vinyl	0.26	W	36.0	10.4	374 Btuh
	Window Total				284.0(sqft)		2954 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.077)	19.0/0.0	157	3.09	484 Btuh
2	Frame - Wood	- Ext	(0.077)	19.0/0.0	130	3.09	402 Btuh
3	Frame - Wood	- Ext	(0.077)	19.0/0.0	181	3.09	558 Btuh
4	Frame - Wood	- Adj	(0.089)	13.0/0.0	253	3.55	897 Btuh
5	Frame - Wood	- Ext	(0.077)	19.0/0.0	242	3.09	747 Btuh
6	Frame - Wood	- Ext	(0.077)	19.0/0.0	112	3.09	347 Btuh
7	Frame - Wood	- Ext	(0.077)	19.0/0.0	20	3.09	62 Btuh
8	Frame - Wood	- Ext	(0.077)	19.0/0.0	75	3.09	233 Btuh
9	Frame - Wood	- Ext	(0.077)	19.0/0.0	70	3.09	216 Btuh
10	Frame - Wood	- Ext	(0.077)	19.0/0.0	180	3.09	556 Btuh
11	Frame - Wood	- Ext	(0.077)	19.0/0.0	30	3.09	93 Btuh
12	Frame - Wood	- Ext	(0.077)	19.0/0.0	80	3.09	248 Btuh
13	Frame - Wood	- Ext	(0.077)	19.0/0.0	78	3.09	242 Btuh
14	Frame - Wood	- Ext	(0.077)	19.0/0.0	87	3.09	270 Btuh
15	Frame - Wood	- Ext	(0.077)	19.0/0.0	147	3.09	453 Btuh
16	Frame - Wood	- Ext	(0.077)	19.0/0.0	60	3.09	185 Btuh
17	Frame - Wood	- Ext	(0.077)	19.0/0.0	281	3.09	868 Btuh
	Wall Total				2183(sqft)		6863 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)	96	16.0	1536 Btuh
2	Wood - Garage,	n	(0.400)	24	16.0	384 Btuh
3	Insulated - Exterior,	n	(0.400)	40	16.0	640 Btuh
	Door Total			160(sqft)		2560Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Single as/D/Shing	(0.018)	30.0/30.0	2270	0.71	1607 Btuh
	Ceiling Total			2270(sqft)		1607Btuh

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	269.0 ft(perim.)	47.2	12697 Btuh
	Floor Total			2270 sqft		12697 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Vaughn Residence
Building Type: User

, FL

9/21/2023

				Envelope Subtotal:			26680 Btuh
Infiltration	Type Natural	Wholehouse	ACH 0.16	Volume(cuft) 22700	Wall Ratio 1.00	CFM= 61.2	2683 Btuh
Duct load	Extremely sealed, R6.0, Supply(Con), Return(Con)				(DLM of 0.000)		0 Btuh
All Zones				**Sensible Subtotal All Zones**			**29363 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sens. Heat Loss Total Heat Loss	(Ex:0 cfm; Sup:0 cfm)	29363 Btuh 0 Btuh 29363 Btuh

EQUIPMENT

1. Electric Heat Pump	#	42000 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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