

Residential System Sizing Calculation

Summary

David & Pam Senn

Project Title:
Senn Residence

Lake City, FL 32055

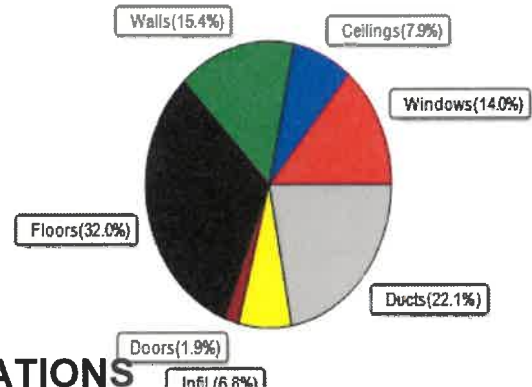
2/15/2021

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	41949	Btuh	Total cooling load calculation	32982	Btuh
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	100.0	41949	Sensible (SHR = 0.70)	84.8	23087
Heat Pump + Auxiliary(0.0kW)	100.0	41949	Latent	172.2	9895
			Total (Electric Heat Pump)	100.0	32982

WINTER CALCULATIONS

Winter Heating Load (for 3101 sqft)

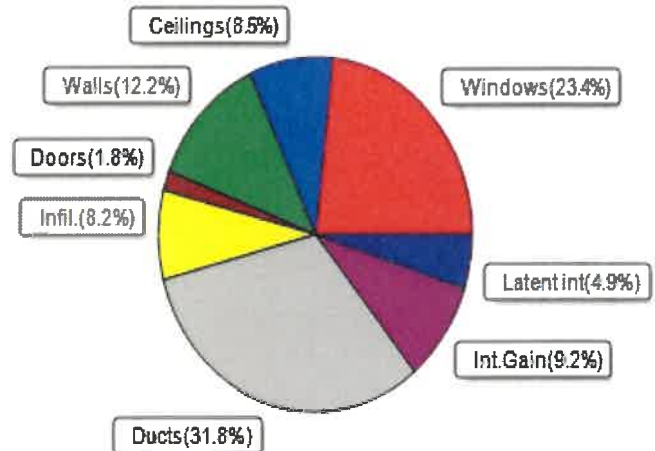
Load component		Load	
Window total	407 sqft	5861	Btuh
Wall total	1820 sqft	6463	Btuh
Door total	43 sqft	797	Btuh
Ceiling total	3256 sqft	3306	Btuh
Floor total	3101 sqft	13405	Btuh
Infiltration	65 cfm	2838	Btuh
Duct loss		9279	Btuh
Subtotal		41949	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		41949	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 3101 sqft)

Load component		Load	
Window total	407 sqft	7711	Btuh
Wall total	1820 sqft	4039	Btuh
Door total	43 sqft	598	Btuh
Ceiling total	3256 sqft	2810	Btuh
Floor total		0	Btuh
Infiltration	49 cfm	1011	Btuh
Internal gain		3040	Btuh
Duct gain		8026	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		27236	Btuh
Latent gain(ducts)		2468	Btuh
Latent gain(infiltration)		1678	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1600	Btuh
Total latent gain		5746	Btuh
TOTAL HEAT GAIN		32982	Btuh



8th Edition

EnergyGauge® System Sizing

PREPARED BY: _____

DATE: _____

2/15/2021

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

David & Pam Senn

Project Title:

Senn Residence

Lake City, FL 32055

Building Type: User

2/15/2021

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 0.25	Vinyl	0.36	W	15.0		14.4	216 Btuh
2	2, NFRC 0.25	Vinyl	0.36	N	11.0		14.4	158 Btuh
3	2, NFRC 0.25	Vinyl	0.36	S	11.0		14.4	158 Btuh
4	2, NFRC 0.25	Vinyl	0.36	W	49.5		14.4	713 Btuh
5	2, NFRC 0.25	Vinyl	0.36	S	15.0		14.4	216 Btuh
6	2, NFRC 0.25	Vinyl	0.36	S	30.0		14.4	432 Btuh
7	2, NFRC 0.25	Vinyl	0.36	S	6.0		14.4	86 Btuh
8	2, NFRC 0.25	Vinyl	0.36	E	30.0		14.4	432 Btuh
9	2, NFRC 0.25	Vinyl	0.36	E	15.0		14.4	216 Btuh
10	2, NFRC 0.25	Vinyl	0.36	N	33.0		14.4	475 Btuh
11	2, NFRC 0.25	TIM	0.36	NE	40.0		14.4	576 Btuh
12	2, NFRC 0.25	Vinyl	0.36	E	49.5		14.4	713 Btuh
13	2, NFRC 0.25	TIM	0.36	S	40.0		14.4	576 Btuh
14	2, NFRC 0.25	Vinyl	0.36	E	21.0		14.4	302 Btuh
15	2, NFRC 0.25	Vinyl	0.36	N	21.0		14.4	302 Btuh
16	2, NFRC 0.25	Vinyl	0.36	N	12.0		14.4	173 Btuh
17	2, NFRC 0.25	Vinyl	0.36	N	8.0		14.4	115 Btuh
Window Total					407.0(sqft)			5861 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	113		3.55	401 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	21		3.55	75 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	105		3.55	372 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	21		3.55	75 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	140		3.55	496 Btuh
6	Frame - Wood	- Adj	(0.089)	13.0/0.0	140		3.55	497 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	306		3.55	1088 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	262		3.55	929 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	75		3.55	266 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	23		3.55	80 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	43		3.55	151 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	32		3.55	114 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	32		3.55	114 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	80		3.55	284 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	110		3.55	389 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	319		3.55	1133 Btuh
Wall Total					1820(sqft)			6463 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
1	Insulated - Exterior, n		(0.460)		23		18.4	429 Btuh
2	Insulated - Garage, n		(0.460)		20		18.4	368 Btuh
Door Total					43(sqft)			797Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

David & Pam Senn
Lake City, FL 32055

Project Title:
Senn Residence
Building Type: User

2/15/2021

Ceilings 1	Type/Color/Surface Vented Attic/L/Shing Ceiling Total	Ueff. (0.025)	R-Value 38.0/0.0	Area X 3256 3256(sqft)	HTM= 1.0	Load 3306 Btuh 3306Btuh
Floors 1	Type Slab On Grade Floor Total	Ueff. (1.180)	R-Value 0.0	Size X 284.0 ft(perim.) 3101 sqft	HTM= 47.2	Load 13405 Btuh 13405 Btuh
	Envelope Subtotal:					29831 Btuh
Infiltration	Type Natural	Wholehouse ACH 0.16	Volume(cuft) 24808	Wall Ratio 1.00	CFM= 64.8	2838 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.284)					9279 Btuh
All Zones	Sensible Subtotal All Zones					41949 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	41949 Btuh 0 Btuh 41949 Btuh
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EQUIPMENT

1. Electric Heat Pump	#	41949 Btuh
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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)



Version 8

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

David & Pam Senn

Project Title:
Senn Residence

Lake City, FL 32055

2/15/2021

Reference City: Gainesville, FL

Temperature Difference: 19.0F(TMY3 99%) Humidity difference: 51gr.

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	0.25, 0.36	No	No	W		1.5ft.	1.0ft.	15.0	0.7	14.3	12	31	450 Btuh
2	2 NFRC	0.25, 0.36	No	No	N		1.5ft.	1.0ft.	11.0	0.0	11.0	12	12	133 Btuh
3	2 NFRC	0.25, 0.36	No	No	S		1.5ft.	1.0ft.	11.0	11.0	0.0	12	14	133 Btuh
4	2 NFRC	0.25, 0.36	No	No	W		1.5ft.	1.0ft.	49.5	2.2	47.3	12	31	1490 Btuh
5	2 NFRC	0.25, 0.36	No	No	S		1.5ft.	1.0ft.	15.0	15.0	0.0	12	14	181 Btuh
6	2 NFRC	0.25, 0.36	No	No	S		1.5ft.	1.0ft.	30.0	30.0	0.0	12	14	363 Btuh
7	2 NFRC	0.25, 0.36	No	No	S		1.5ft.	1.0ft.	6.0	6.0	0.0	12	14	73 Btuh
8	2 NFRC	0.25, 0.36	No	No	E		1.5ft.	1.0ft.	30.0	1.5	28.5	12	31	901 Btuh
9	2 NFRC	0.25, 0.36	No	No	E		1.5ft.	1.0ft.	15.0	1.2	13.8	12	31	441 Btuh
10	2 NFRC	0.25, 0.36	No	No	N		10.0f	1.0ft.	33.0	0.0	33.0	12	12	399 Btuh
11	2 NFRC	0.25, 0.36	No	No	NE		12.0f	1.0ft.	40.0	0.0	40.0	12	24	946 Btuh
12	2 NFRC	0.25, 0.36	No	No	E		15.0f	1.0ft.	49.5	49.5	0.0	12	31	599 Btuh
13	2 NFRC	0.25, 0.36	No	No	S		10.0f	1.0ft.	40.0	40.0	0.0	12	14	484 Btuh
14	2 NFRC	0.25, 0.36	No	No	E		1.5ft.	1.0ft.	21.0	1.5	19.5	12	31	622 Btuh
15	2 NFRC	0.25, 0.36	No	No	N		1.5ft.	1.0ft.	21.0	0.0	21.0	12	12	254 Btuh
16	2 NFRC	0.25, 0.36	No	No	N		1.5ft.	1.0ft.	12.0	0.0	12.0	12	12	145 Btuh
17	2 NFRC	0.25, 0.36	No	No	N		1.5ft.	1.0ft.	8.0	0.0	8.0	12	12	97 Btuh
Window Total									407 (sqft)					7711 Btuh
Walls	Type					U-Value	R-Value	Area(sqft)			HTM		Load	
							Cav/Sheath							
1	Frame - Wood - Ext						0.09	13.0/0.0	113.0			2.3	256 Btuh	
2	Frame - Wood - Ext						0.09	13.0/0.0	21.0			2.3	48 Btuh	
3	Frame - Wood - Ext						0.09	13.0/0.0	104.7			2.3	237 Btuh	
4	Frame - Wood - Ext						0.09	13.0/0.0	21.0			2.3	48 Btuh	
5	Frame - Wood - Ext						0.09	13.0/0.0	139.8			2.3	316 Btuh	
6	Frame - Wood - Adj						0.09	13.0/0.0	140.0			1.7	236 Btuh	
7	Frame - Wood - Ext						0.09	13.0/0.0	306.3			2.3	693 Btuh	
8	Frame - Wood - Ext						0.09	13.0/0.0	261.7			2.3	592 Btuh	
9	Frame - Wood - Ext						0.09	13.0/0.0	75.0			2.3	170 Btuh	
10	Frame - Wood - Ext						0.09	13.0/0.0	22.7			2.3	51 Btuh	
11	Frame - Wood - Ext						0.09	13.0/0.0	42.5			2.3	96 Btuh	
12	Frame - Wood - Ext						0.09	13.0/0.0	32.0			2.3	72 Btuh	
13	Frame - Wood - Ext						0.09	13.0/0.0	32.0			2.3	72 Btuh	
14	Frame - Wood - Ext						0.09	13.0/0.0	80.0			2.3	181 Btuh	
15	Frame - Wood - Ext						0.09	13.0/0.0	109.7			2.3	248 Btuh	
16	Frame - Wood - Ext						0.09	13.0/0.0	319.0			2.3	722 Btuh	
Wall Total									1820 (sqft)					4039 Btuh
Doors	Type					Area (sqft)			HTM		Load			
	1 Insulated - Exterior						23.3			13.8		322 Btuh		
	2 Insulated - Garage						20.0			13.8		276 Btuh		
Door Total									43 (sqft)					598 Btuh
Ceilings	Type/Color/Surface					U-Value	R-Value	Area(sqft)			HTM		Load	
	1 Vented AtticLight/Shingle/RB						0.025	38.0/0.0	3256.0			0.86	2810 Btuh	
Ceiling Total									3256 (sqft)					2810 Btuh
Floors	Type					R-Value		Size			HTM		Load	
	1 Slab On Grade						0.0		3101 (ft-perimeter)			0.0	0 Btuh	
Floor Total									3101.0 (sqft)					0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

David & Pam Senn

Project Title:
Senn Residence

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL 32055

2/15/2021

	Envelope Subtotal:					15158 Btuh
Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio	CFM=	Load
	Natural	0.12	24808	1	48.6	1011 Btuh
Internal gain		Occupants	Btuh/occupant		Appliance	Load
		8	X 230	+	1200	3040 Btuh
	Sensible Envelope Load:					19209 Btuh
Duct load	Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.418)					8026 Btuh
	Sensible Load All Zones					27236 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

David & Pam Senn

Project Title:
Senn Residence

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL 32055

2/15/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	Sensible Envelope Load All Zones	19209 Btuh
	Sensible Duct Load	8026 Btuh
	Total Sensible Zone Loads	27236 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	27236 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	1678 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	2468 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	5746 Btuh
	TOTAL GAIN	32982 Btuh

EQUIPMENT

1. Central Unit	#	32982 Btuh
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*Key: Window types (Panels - 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