#31

Residential System Sizing Calculation

Summary

Alvin & Patricia Barnett

Lake City, FL 32055

Project Title:
Barnett Res

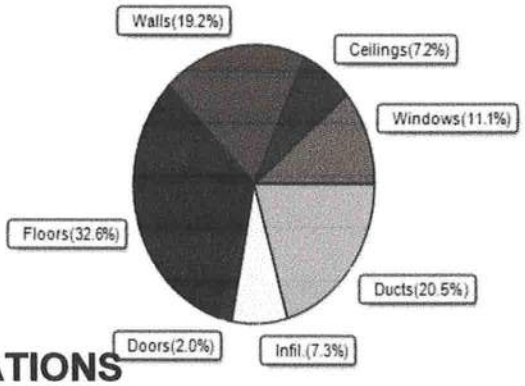
6/22/2021

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	**40647**	**Btuh**	**Total cooling load calculation**	**29046**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	100.0	40647	Sensible (SHR = 0.70)	86.3	20332
Heat Pump + Auxiliary(0.0kW)	100.0	40647	Latent	158.8	8714
			Total (Electric Heat Pump)	100.0	29046

WINTER CALCULATIONS

Winter Heating Load (for 2742 sqft)

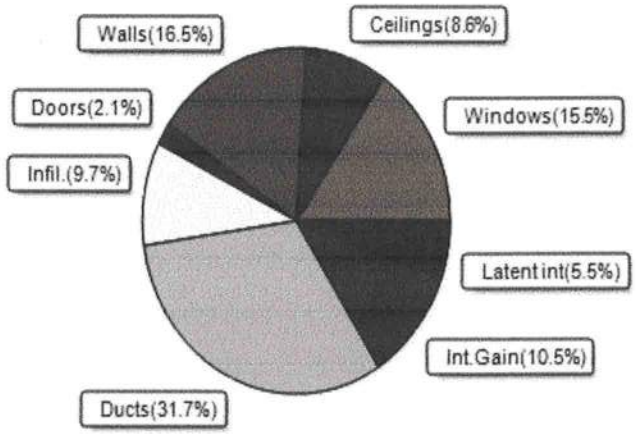
Load component			Load	
Window total	314	sqft	4522	Btuh
Wall total	2203	sqft	7821	Btuh
Door total	44	sqft	810	Btuh
Ceiling total	2879	sqft	2923	Btuh
Floor total	2742	sqft	13263	Btuh
Infiltration	68	cfm	2960	Btuh
Duct loss			8349	Btuh
Subtotal			**40647**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**40647**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2742 sqft)

Load component			Load	
Window total	314	sqft	4497	Btuh
Wall total	2203	sqft	4803	Btuh
Door total	44	sqft	607	Btuh
Ceiling total	2879	sqft	2484	Btuh
Floor total			0	Btuh
Infiltration	51	cfm	1054	Btuh
Internal gain			3040	Btuh
Duct gain			7072	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**23558**	**Btuh**
Latent gain(ducts)			2139	Btuh
Latent gain(infiltration)			1750	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**5488**	**Btuh**
TOTAL HEAT GAIN			**29046**	**Btuh**



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8th Edition

EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 10/16/2021

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Alvin & Patricia Barnett
Lake City, FL 32055

Project Title:
Barnett Res
Building Type: User

6/22/2021

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	S	6.0	14.4	86 Btuh
2	2, NFRC 0.25	Vinyl	0.36	S	36.0	14.4	518 Btuh
3	2, NFRC 0.25	TIM	0.36	S	16.0	14.4	230 Btuh
4	2, NFRC 0.25	Vinyl	0.36	S	15.0	14.4	216 Btuh
5	2, NFRC 0.25	Vinyl	0.36	E	6.0	14.4	86 Btuh
6	2, NFRC 0.25	Vinyl	0.36	E	15.0	14.4	216 Btuh
7	2, NFRC 0.25	Vinyl	0.36	N	15.0	14.4	216 Btuh
8	2, NFRC 0.25	Metal	0.36	N	84.0	14.4	1210 Btuh
9	2, NFRC 0.25	TIM	0.36	E	24.0	14.4	346 Btuh
10	2, NFRC 0.25	Vinyl	0.36	N	72.0	14.4	1037 Btuh
11	2, NFRC 0.25	Vinyl	0.36	N	6.0	14.4	86 Btuh
12	2, NFRC 0.25	Vinyl	0.36	W	16.0	14.4	230 Btuh
13	2, NFRC 0.25	Vinyl	0.36	W	3.0	14.4	43 Btuh
	Window Total				314.0(sqft)		4522 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	80	3.55	282 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	159	3.55	563 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	131	3.55	463 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	501	3.55	1779 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	131	3.55	463 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	213	3.55	756 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	101	3.55	359 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	56	3.55	199 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	299	3.55	1060 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	217	3.55	769 Btuh
11	Frame - Wood	- Adj	(0.089)	13.0/0.0	208	3.55	738 Btuh
12	Frame - Wood	- Adj	(0.089)	13.0/0.0	110	3.55	389 Btuh
	Wall Total				2203(sqft)		7821 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.460)	24	18.4	442 Btuh
2	Insulated - Garage,	n	(0.460)	20	18.4	368 Btuh
	Door Total			44(sqft)		810Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/L/Shing	(0.025)	38.0/0.0	2879	1.0	2923 Btuh
	Ceiling Total			2879(sqft)		2923Btuh

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
	Floor Total			2742 sqft		13263 Btuh

	Envelope Subtotal:	29338 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Alvin & Patricia Barnett
Lake City, FL 32055

Project Title:
Barnett Res
Building Type: User

6/22/2021

Infiltration	Type Natural	Wholehouse	ACH 0.16	Volume(cuft) 24678	Wall Ratio 1.00	CFM= 67.6	2960 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)				(DLM of 0.259)		8349 Btuh
All Zones	**Sensible Subtotal All Zones**						**40647 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	40647 Btuh 0 Btuh 40647 Btuh

EQUIPMENT

1. Electric Heat Pump	#	40647 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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Version 8

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Alvin & Patricia Barnett

Lake City, FL 32055

Project Title:
Barnett Res

6/22/2021

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	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	6.0	6.0	0.0	12	14	73 Btuh
2	2 NFRC	0.25, 0.36		No	No	S	7.5ft.	1.0ft.	36.0	36.0	0.0	12	14	436 Btuh
3	2 NFRC	0.25, 0.36		No	No	S	7.5ft.	1.0ft.	16.0	16.0	0.0	12	14	194 Btuh
4	2 NFRC	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	15.0	15.0	0.0	12	14	181 Btuh
5	2 NFRC	0.25, 0.36		No	No	E	1.5ft.	1.0ft.	6.0	0.5	5.5	12	31	176 Btuh
6	2 NFRC	0.25, 0.36		No	No	E	1.5ft.	1.0ft.	15.0	0.7	14.3	12	31	450 Btuh
7	2 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	15.0	0.0	15.0	12	12	181 Btuh
8	2 NFRC	0.25, 0.36		No	No	N	14.5f	1.0ft.	84.0	0.0	84.0	12	12	1016 Btuh
9	2 NFRC	0.25, 0.36		No	No	E	12.0f	1.0ft.	24.0	24.0	0.0	12	31	290 Btuh
10	2 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	72.0	0.0	72.0	12	12	871 Btuh
11	2 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	6.0	0.0	6.0	12	12	73 Btuh
12	2 NFRC	0.25, 0.36		No	No	W	1.5ft.	1.0ft.	16.0	1.0	15.0	12	31	477 Btuh
13	2 NFRC	0.25, 0.36		No	No	W	1.5ft.	1.0ft.	3.0	0.7	2.3	12	31	79 Btuh
	Window Total								314 (sqft)					4497 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	79.5	2.3	180 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	158.7	2.3	359 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	130.5	2.3	295 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	501.0	2.3	1134 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	130.5	2.3	295 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	213.0	2.3	482 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	101.0	2.3	229 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	56.0	2.3	127 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	298.7	2.3	676 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	216.5	2.3	490 Btuh
11	Frame - Wood - Adj	0.09	13.0/0.0	208.0	1.7	351 Btuh
12	Frame - Wood - Adj	0.09	13.0/0.0	109.5	1.7	185 Btuh
	Wall Total			2203 (sqft)		4803 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	24.0	13.8	331 Btuh
2	Insulated - Garage	20.0	13.8	276 Btuh
	Door Total	44 (sqft)		607 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Vented Attic/Light/Shingle/RB	0.025	38.0/0.0	2879.0	0.86	2484 Btuh
	Ceiling Total			2879 (sqft)		2484 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2742 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2742.0 (sqft)		0 Btuh

		Envelope Subtotal:	12392 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Alvin & Patricia Barnett

Project Title: Barnett Res

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL 32055

6/22/2021

Infiltration	Type Natural	Average ACH 0.12	Volume(cuft) 24678		Wall Ratio 1		CFM= 50.7	Load 1054	Btuh
Internal gain		Occupants 8	Btuh/occupant X 230			+	Appliance 1200	Load 3040	Btuh
					Sensible Envelope Load:			16486	Btuh
Duct load	Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic)				(DGM of 0.429)			7072	Btuh
					Sensible Load All Zones			**23558**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Alvin & Patricia Barnett
Lake City, FL 32055

Project Title: Barnett Res
Climate:FL_GAINESVILLE_REGIONAL_A

6/22/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**16486 Btuh**
	Sensible Duct Load	7072 Btuh
	Total Sensible Zone Loads	**23558 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**23558 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1750 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	2139 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**5488 Btuh**
	TOTAL GAIN	**29046 Btuh**

EQUIPMENT

1. Central Unit	#	29046 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