

Residential System Sizing Calculation

Summary

Project Title:
Barrs Residence

, FL

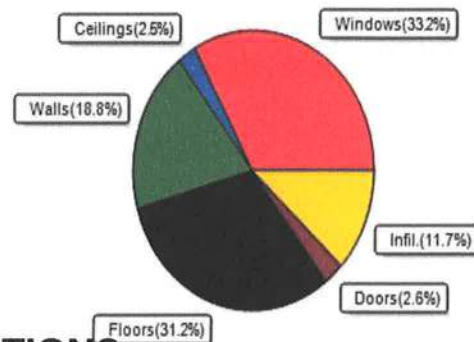
2/5/2021

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	35726 Btuh	Total cooling load calculation	29127 Btuh
Submitted heating capacity	% of calc Btuh	Submitted cooling capacity	% of calc Btuh
Total (Electric Heat Pump)	184.7 66000	Sensible (SHR = 0.85)	227.5 56100
Heat Pump + Auxiliary(0.0kW)	184.7 66000	Latent	221.7 9900
		Total (Electric Heat Pump)	226.6 66000

WINTER CALCULATIONS

Winter Heating Load (for 3575 sqft)

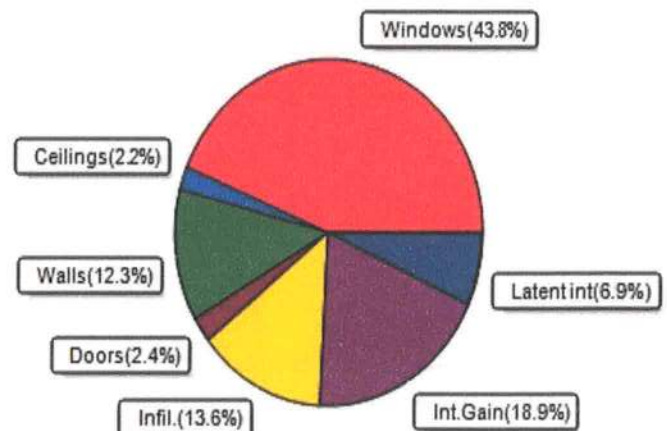
Load component		Load	
Window total	494 sqft	11856	Btuh
Wall total	2229 sqft	6709	Btuh
Door total	112 sqft	941	Btuh
Ceiling total	2575 sqft	911	Btuh
Floor total	2569 sqft	11139	Btuh
Infiltration	95 cfm	4170	Btuh
Duct loss		0	Btuh
Subtotal		35726	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		35726	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 3575 sqft)

Load component		Load	
Window total	494 sqft	12769	Btuh
Wall total	2229 sqft	3572	Btuh
Door total	112 sqft	706	Btuh
Ceiling total	2575 sqft	629	Btuh
Floor total		0	Btuh
Infiltration	71 cfm	1486	Btuh
Internal gain		5500	Btuh
Duct gain		0	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		24662	Btuh
Latent gain(ducts)		0	Btuh
Latent gain(infiltration)		2465	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		2000	Btuh
Total latent gain		4465	Btuh
TOTAL HEAT GAIN		29127	Btuh



8th Edition

EnergyGauge® System Sizing

PREPARED BY:

DATE:

[Signature]
2-5-21

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Barrs Residence

, FL

2/5/2021

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	0.27	0.60	No	No	N	7.5ft	2.3ft	70.0	0.0	70.0	17	17	1196 Btuh			
2	2 NFRC	0.27	0.60	No	No	N	17.5f	2.3ft	64.0	0.0	64.0	17	17	1093 Btuh			
3	2 NFRC	0.27	0.60	No	No	N	15.5f	2.3ft	16.0	0.0	16.0	17	17	273 Btuh			
4	2 NFRC	0.27	0.60	No	No	N	1.5ft	2.3ft	36.0	0.0	36.0	17	17	615 Btuh			
5	2 NFRC	0.27	0.60	No	No	E	1.5ft	2.3ft	20.0	0.0	20.0	17	37	749 Btuh			
6	2 NFRC	0.27	0.60	No	No	E	1.5ft	2.3ft	8.0	0.0	8.0	17	37	299 Btuh			
7	2 NFRC	0.27	0.60	No	No	S	1.5ft	2.3ft	30.0	30.0	0.0	17	19	512 Btuh			
8	2 NFRC	0.27	0.60	No	No	S	7.3ft	2.3ft	48.0	48.0	0.0	17	19	820 Btuh			
9	2 NFRC	0.27	0.60	No	No	W	1.5ft	2.3ft	8.0	0.0	8.0	17	37	299 Btuh			
10	2 NFRC	0.27	0.60	No	No	W	1.5ft	2.3ft	70.0	0.0	70.0	17	37	2620 Btuh			
11	2 NFRC	0.27	0.60	No	No	W	1.5ft	2.3ft	70.0	0.0	70.0	17	37	2620 Btuh			
12	2 NFRC	0.27	0.60	No	No	E	1.5ft	2.3ft	36.0	0.0	36.0	17	37	1347 Btuh			
13	2 NFRC	0.27	0.60	No	No	S	1.5ft	2.3ft	18.0	18.0	0.0	17	19	307 Btuh			
Excursion														18 Btuh			
Window Total									494 (sqft)					12769 Btuh			
Walls	Type					U-Value	R-Value	Area(sqft)			HTM		Load				
							Cav/Sheath										
1	Frame - Wood - Ext					0.08	19.0/0.6	169.3			1.6		272 Btuh				
2	Frame - Wood - Ext					0.08	19.0/0.6	21.7			1.6		35 Btuh				
3	Frame - Wood - Ext					0.08	19.0/0.6	102.3			1.6		165 Btuh				
4	Frame - Wood - Ext					0.08	19.0/0.6	40.0			1.6		64 Btuh				
5	Frame - Wood - Ext					0.08	19.0/0.6	181.0			1.6		291 Btuh				
6	Frame - Wood - Ext					0.08	19.0/0.6	405.3			1.6		652 Btuh				
7	Frame - Wood - Ext					0.08	19.0/0.6	103.3			1.6		166 Btuh				
8	Frame - Wood - Ext					0.08	19.0/0.6	40.0			1.6		64 Btuh				
9	Frame - Wood - Ext					0.08	19.0/0.6	343.7			1.6		553 Btuh				
10	Frame - Wood - Ext					0.08	19.0/0.6	46.7			1.6		75 Btuh				
11	Frame - Wood - Ext					0.08	19.0/0.6	30.0			1.6		48 Btuh				
12	Frame - Wood - Ext					0.08	19.0/0.6	213.7			1.6		344 Btuh				
13	Frame - Wood - Ext					0.08	19.0/0.6	198.0			1.6		318 Btuh				
14	Frame - Wood - Ext					0.08	19.0/0.6	54.0			1.6		87 Btuh				
15	Frame - Wood - Ext					0.08	19.0/0.6	184.5			1.6		297 Btuh				
16	Frame - Wood - Adj					0.08	19.0/0.0	96.0			1.5		141 Btuh				
Wall Total									2229 (sqft)					3572 Btuh			
Doors	Type								Area (sqft)			HTM		Load			
1	Insulated - Exterior								48.0			6.3		302 Btuh			
2	Insulated - Exterior								40.0			6.3		252 Btuh			
3	Insulated - Garage								24.0			6.3		151 Btuh			
Door Total									112 (sqft)					706 Btuh			
Ceilings	Type/Color/Surface					U-Value	R-Value	Area(sqft)			HTM		Load				
1	Cath/Sngl Assem/DarkShingle					0.016	30.0/30.0	1006.0			0.43		429 Btuh				
2	Unvented Attic/DarkShingle					0.032	30.0/30.0	1569.0			0.13		200 Btuh				
Ceiling Total									2575 (sqft)					629 Btuh			
Floors	Type							R-Value			Size			HTM		Load	
1	Slab On Grade							0.0			2569 (ft-perimeter)			0.0		0 Btuh	
Floor Total									2569.0 (sqft)					0 Btuh			

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Barrs Residence

, FL

2/5/2021

	Envelope Subtotal:					17676 Btuh
Infiltration	Type Natural	Average ACH 0.12	Volume(cuft) 34744	Wall Ratio 1	CFM= 71.4	Load 1486 Btuh
Internal gain		Occupants 10	Btuh/occupant X 230	Appliance +	3200	Load 5500 Btuh
	Sensible Envelope Load:					24662 Btuh
Duct load	Extremely sealed, Supply(R6.0-Condi), Return(R6.0-Condi) (DGM of 0.000)					0 Btuh
	Sensible Load All Zones					24662 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Barrs Residence

, FL

2/5/2021

WHOLE HOUSE TOTALS		
Whole House Totals for Cooling	Sensible Envelope Load All Zones	24662 Btuh
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	24662 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	24662 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	2465 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	0 Btuh
	Latent occupant gain (10.0 people @ 200 Btuh per person)	2000 Btuh
	Latent other gain	0 Btuh
	Latent total gain	4465 Btuh
	TOTAL GAIN	29127 Btuh

EQUIPMENT		
1. Central Unit	#	42000 Btuh
2. Central Unit	#	24000 Btuh

*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

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Project Title:
Barrs Residence
Building Type: User

, FL

2/5/2021

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 0.27	Vinyl	0.60	N	70.0		24.0	1680 Btuh
2	2, NFRC 0.27	Vinyl	0.60	N	64.0		24.0	1536 Btuh
3	2, NFRC 0.27	Vinyl	0.60	N	16.0		24.0	384 Btuh
4	2, NFRC 0.27	Vinyl	0.60	N	36.0		24.0	864 Btuh
5	2, NFRC 0.27	Vinyl	0.60	E	20.0		24.0	480 Btuh
6	2, NFRC 0.27	Vinyl	0.60	E	8.0		24.0	192 Btuh
7	2, NFRC 0.27	Vinyl	0.60	S	30.0		24.0	720 Btuh
8	2, NFRC 0.27	Vinyl	0.60	S	48.0		24.0	1152 Btuh
9	2, NFRC 0.27	Vinyl	0.60	W	8.0		24.0	192 Btuh
10	2, NFRC 0.27	Vinyl	0.60	W	70.0		24.0	1680 Btuh
11	2, NFRC 0.27	Vinyl	0.60	W	70.0		24.0	1680 Btuh
12	2, NFRC 0.27	Vinyl	0.60	E	36.0		24.0	864 Btuh
13	2, NFRC 0.27	Vinyl	0.60	S	18.0		24.0	432 Btuh
	Window Total					494.0(sqft)		11856 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.075)	19.0/0.6	169		3.01	509 Btuh
2	Frame - Wood	- Ext	(0.075)	19.0/0.6	22		3.01	65 Btuh
3	Frame - Wood	- Ext	(0.075)	19.0/0.6	102		3.01	308 Btuh
4	Frame - Wood	- Ext	(0.075)	19.0/0.6	40		3.01	120 Btuh
5	Frame - Wood	- Ext	(0.075)	19.0/0.6	181		3.01	544 Btuh
6	Frame - Wood	- Ext	(0.075)	19.0/0.6	405		3.01	1218 Btuh
7	Frame - Wood	- Ext	(0.075)	19.0/0.6	103		3.01	311 Btuh
8	Frame - Wood	- Ext	(0.075)	19.0/0.6	40		3.01	120 Btuh
9	Frame - Wood	- Ext	(0.075)	19.0/0.6	344		3.01	1033 Btuh
10	Frame - Wood	- Ext	(0.075)	19.0/0.6	47		3.01	140 Btuh
11	Frame - Wood	- Ext	(0.075)	19.0/0.6	30		3.01	90 Btuh
12	Frame - Wood	- Ext	(0.075)	19.0/0.6	214		3.01	642 Btuh
13	Frame - Wood	- Ext	(0.075)	19.0/0.6	198		3.01	595 Btuh
14	Frame - Wood	- Ext	(0.075)	19.0/0.6	54		3.01	162 Btuh
15	Frame - Wood	- Ext	(0.075)	19.0/0.6	185		3.01	555 Btuh
16	Frame - Wood	- Adj	(0.077)	19.0/0.0	96		3.09	297 Btuh
	Wall Total					2230(sqft)		6709 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
1	Insulated - Exterior, n		(0.210)		48		8.4	403 Btuh
2	Insulated - Exterior, n		(0.210)		40		8.4	336 Btuh
3	Insulated - Garage, n		(0.210)		24		8.4	202 Btuh
	Door Total					112(sqft)		941Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area	X	HTM=	Load
1	Cathedral/D/Shing		(0.016)	30.0/30.0	1006		0.7	661 Btuh
2	Unvent Attic/D/Shing		(0.032)	30.0/30.0	1569		0.2	250 Btuh
	Ceiling Total					2575(sqft)		911Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Barrs Residence
Building Type: User

, FL

2/5/2021

Floors 1	Type Slab On Grade Floor Total	Ueff. (1.180)	R-Value 0.0	Size X 236.0 ft(perim.) 2569 sqft	HTM= 47.2	Load 11139 Btuh 11139 Btuh
	Envelope Subtotal:					31556 Btuh
Infiltration	Type Natural	Wholehouse ACH 0.16	Volume(cuft) 34744	Wall Ratio 1.00	CFM= 95.2	4170 Btuh
Duct load	(DLM of 0.000)					0 Btuh
All Zones	Sensible Subtotal All Zones					35726 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	35726 Btuh 0 Btuh 35726 Btuh
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EQUIPMENT

1. Electric Heat Pump	#	42000 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)



Version 8