

Residential System Sizing Calculation

Summary

Annamarie & John Forbes

Project Title:
210342 Forbes

Lake City, FL

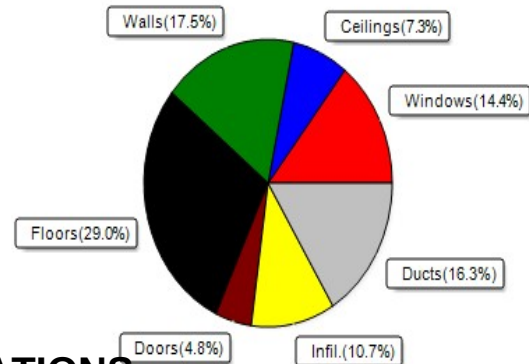
2021-02-27

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	33684 Btuh	Total cooling load calculation	31574 Btuh
Submitted heating capacity	% of calc Btuh	Submitted cooling capacity	% of calc Btuh
Total (Electric Heat Pump)	109.8 37000	Sensible (SHR = 0.75)	103.4 27750
Heat Pump + Auxiliary(0.0kW)	109.8 37000	Latent	195.1 9250
		Total (Electric Heat Pump)	117.2 37000

WINTER CALCULATIONS

Winter Heating Load (for 2311 sqft)

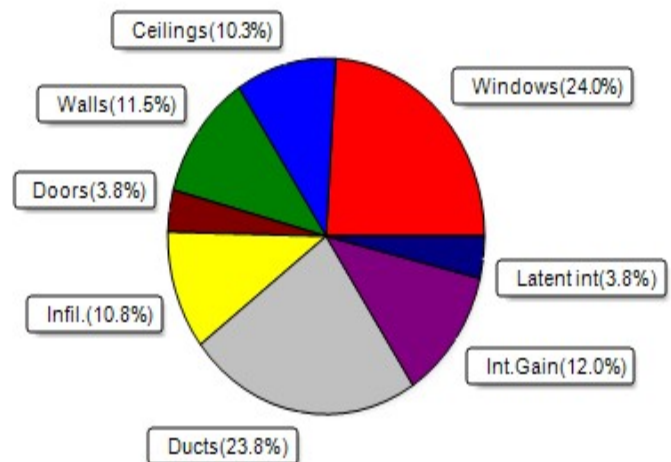
Load component		Load	
Window total	405 sqft	4860	Btuh
Wall total	1661 sqft	5898	Btuh
Door total	100 sqft	1600	Btuh
Ceiling total	2427 sqft	2465	Btuh
Floor total	2311 sqft	9770	Btuh
Infiltration	82 cfm	3601	Btuh
Duct loss		5489	Btuh
Subtotal		33684	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		33684	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 2311 sqft)

Load component		Load	
Window total	405 sqft	7586	Btuh
Wall total	1661 sqft	3633	Btuh
Door total	100 sqft	1200	Btuh
Ceiling total	2427 sqft	3245	Btuh
Floor total		0	Btuh
Infiltration	62 cfm	1283	Btuh
Internal gain		3780	Btuh
Duct gain		6106	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		26833	Btuh
Latent gain(ducts)		1412	Btuh
Latent gain(infiltration)		2129	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1200	Btuh
Total latent gain		4741	Btuh
TOTAL HEAT GAIN		31574	Btuh



8th Edition

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2021-02-27

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Annamarie & John Forbes

Project Title:
210342 Forbes
Building Type: User

Lake City, FL

2021-02-27

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)
This calculation is for Worst Case. The house has been rotated 315 degrees.

Component Loads for Whole House

Window	Panes/Type	Frame	U	Orientation	Area(sqft)	X	HTM=	Load
1	2, NFRC 0.20	Metal	0.30	NW	32.0		12.0	384 Btuh
2	2, NFRC 0.20	Metal	0.30	NW	72.0		12.0	864 Btuh
3	2, NFRC 0.20	Metal	0.30	SW	48.0		12.0	576 Btuh
4	2, NFRC 0.20	Metal	0.30	NW	54.0		12.0	648 Btuh
5	2, NFRC 0.20	Metal	0.30	W	13.3		12.0	160 Btuh
6	2, NFRC 0.20	Metal	0.30	NW	36.0		12.0	432 Btuh
7	2, NFRC 0.20	Metal	0.30	NE	8.0		12.0	96 Btuh
8	2, NFRC 0.20	Metal	0.30	NE	30.0		12.0	360 Btuh
9	2, NFRC 0.20	Metal	0.30	SE	15.0		12.0	180 Btuh
10	2, NFRC 0.20	Metal	0.30	SE	32.0		12.0	384 Btuh
11	2, NFRC 0.20	Metal	0.30	SE	30.0		12.0	360 Btuh
12	2, NFRC 0.20	Metal	0.30	SW	8.0		12.0	96 Btuh
13	2, NFRC 0.20	Metal	0.30	SW	26.7		12.0	320 Btuh
Window Total					405.0(sqft)			4860 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	87		3.55	309 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	24		3.55	85 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	24		3.55	85 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	20		3.55	71 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	62		3.55	221 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	13		3.55	47 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	91		3.55	322 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	87		3.55	309 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	451		3.55	1601 Btuh
10	Frame - Wood	- Adj	(0.089)	13.0/0.0	144		3.55	511 Btuh
11	Frame - Wood	- Adj	(0.089)	13.0/0.0	33		3.55	117 Btuh
12	Frame - Wood	- Adj	(0.089)	13.0/0.0	43		3.55	153 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	63		3.55	224 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	44		3.55	155 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	53		3.55	186 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	122		3.55	431 Btuh
17	Frame - Wood	- Ext	(0.089)	13.0/0.0	301		3.55	1070 Btuh
Wall Total					1661(sqft)			5898 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
1	Insulated - Exterior, n		(0.400)		16		16.0	256 Btuh
2	Insulated - Exterior, n		(0.400)		24		16.0	384 Btuh
3	Insulated - Exterior, n		(0.400)		16		16.0	256 Btuh
4	Insulated - Exterior, n		(0.400)		8		16.0	128 Btuh
5	Insulated - Garage, n		(0.400)		20		16.0	320 Btuh
6	Insulated - Exterior, n		(0.400)		16		16.0	256 Btuh
Door Total					100(sqft)			1600Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Annamarie & John Forbes

Project Title:
210342 Forbes
Building Type: User

Lake City, FL

2021-02-27

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/D/Shing	(0.025)	38.0/0.0	2311	1.0	2346 Btuh
2	Cathedral/D/Shing	(0.026)	38.0/0.0	116	1.0	119 Btuh
	Ceiling Total			2427(sqft)		2465Btuh
Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	207.0 ft(perim.)	47.2	9770 Btuh
	Floor Total			2311 sqft		9770 Btuh
	Envelope Subtotal:					24594 Btuh
Infiltration	Type	Wholehouse ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural	0.23	21261	1.00	82.2	3601 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.195)					5489 Btuh
All Zones	Sensible Subtotal All Zones					33684 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	33684 Btuh
	Ventilation Sensible Heat Loss	0 Btuh
	Total Heat Loss	33684 Btuh

EQUIPMENT

1. Electric Heat Pump	#	37000 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

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Annamarie & John Forbes

Project Title:
210342 Forbes

Lake City, FL

2021-02-27

Reference City: Gainesville, FL

Temperature Difference: 19.0F(TMY3 99%)

Humidity difference: 51gr.

This calculation is for Worst Case. The house has been rotated 315 degrees.

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, 0.30	No	No	NW		12.5f	0.0ft	32.0	0.0	32.0	10	19	612	Btuh
2	2 NFRC	0.20, 0.30	No	No	NW		15.2f	0.0ft	72.0	0.0	72.0	10	19	1378	Btuh
3	2 NFRC	0.20, 0.30	No	No	SW		29.8f	0.0ft	48.0	48.0	0.0	10	20	476	Btuh
4	2 NFRC	0.20, 0.30	No	No	NW		14.3f	0.0ft	54.0	0.0	54.0	10	19	1034	Btuh
5	2 NFRC	0.20, 0.30	No	No	W		17.5f	0.0ft	13.3	13.3	0.0	10	25	132	Btuh
6	2 NFRC	0.20, 0.30	No	No	NW		1.5ft	1.5ft	36.0	0.0	36.0	10	19	689	Btuh
7	2 NFRC	0.20, 0.30	No	No	NE		1.5ft	1.5ft	8.0	0.0	8.0	10	19	153	Btuh
8	2 NFRC	0.20, 0.30	No	No	NE		1.5ft	1.5ft	30.0	0.0	30.0	10	19	574	Btuh
9	2 NFRC	0.20, 0.30	No	No	SE		7.3ft	0.0ft	15.0	15.0	0.0	10	20	149	Btuh
10	2 NFRC	0.20, 0.30	No	No	SE		9.0ft	0.8ft	32.0	32.0	0.0	10	20	317	Btuh
11	2 NFRC	0.20, 0.30	No	No	SE		1.5ft	1.5ft	30.0	4.8	25.2	10	20	552	Btuh
12	2 NFRC	0.20, 0.30	No	No	SW		1.5ft	1.5ft	8.0	1.9	6.1	10	20	141	Btuh
13	2 NFRC	0.20, 0.30	No	No	SW		1.5ft	1.5ft	26.7	5.2	21.5	10	20	482	Btuh
	Excursion													898	Btuh
	Window Total								405 (sqft)					7586 Btuh	
Walls	Type	U-Value		R-Value		Area(sqft)		HTM		Load					
					Cav/Sheath										
1	Frame - Wood - Ext		0.09		13.0/0.0		87.0		2.3		197 Btuh				
2	Frame - Wood - Ext		0.09		13.0/0.0		24.0		2.3		54 Btuh				
3	Frame - Wood - Ext		0.09		13.0/0.0		24.0		2.3		54 Btuh				
4	Frame - Wood - Ext		0.09		13.0/0.0		20.0		2.3		45 Btuh				
5	Frame - Wood - Ext		0.09		13.0/0.0		62.3		2.3		141 Btuh				
6	Frame - Wood - Ext		0.09		13.0/0.0		13.2		2.3		30 Btuh				
7	Frame - Wood - Ext		0.09		13.0/0.0		90.8		2.3		205 Btuh				
8	Frame - Wood - Ext		0.09		13.0/0.0		87.0		2.3		197 Btuh				
9	Frame - Wood - Ext		0.09		13.0/0.0		451.0		2.3		1021 Btuh				
10	Frame - Wood - Adj		0.09		13.0/0.0		144.0		1.7		243 Btuh				
11	Frame - Wood - Adj		0.09		13.0/0.0		33.0		1.7		56 Btuh				
12	Frame - Wood - Adj		0.09		13.0/0.0		43.0		1.7		73 Btuh				
13	Frame - Wood - Ext		0.09		13.0/0.0		63.0		2.3		143 Btuh				
14	Frame - Wood - Ext		0.09		13.0/0.0		43.7		2.3		99 Btuh				
15	Frame - Wood - Ext		0.09		13.0/0.0		52.5		2.3		119 Btuh				
16	Frame - Wood - Ext		0.09		13.0/0.0		121.5		2.3		275 Btuh				
17	Frame - Wood - Ext		0.09		13.0/0.0		301.3		2.3		682 Btuh				
	Wall Total							1661 (sqft)				3633 Btuh			
Doors	Type	Area (sqft)		HTM		Load									
1	Insulated - Exterior		16.0		12.0	192 Btuh									
2	Insulated - Exterior		24.0		12.0	288 Btuh									
3	Insulated - Exterior		16.0		12.0	192 Btuh									
4	Insulated - Exterior		8.0		12.0	96 Btuh									
5	Insulated - Garage		20.0		12.0	240 Btuh									
6	Insulated - Exterior		16.0		12.0	192 Btuh									
	Door Total							100 (sqft)				1200 Btuh			
Ceilings	Type/Color/Surface	U-Value		R-Value		Area(sqft)		HTM		Load					
1	Vented Attic/DarkShingle		0.025		38.0/0.0		2311.0		1.37		3167 Btuh				
2	Cath/Sngl Assem/DarkShingle		0.026		38.0/0.0		116.0		0.67		78 Btuh				
	Ceiling Total							2427 (sqft)				3245 Btuh			

Manual J Summer Calculations

Residential Load - Component Details (continued)

Annamarie & John Forbes

Project Title:
210342 Forbes

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-02-27

Floors 1	Type Slab On Grade Floor Total	R-Value 0.0	Size 2311 (ft-perimeter) 2311.0 (sqft)	HTM 0.0	Load 0 Btuh 0 Btuh
	Envelope Subtotal:				15664 Btuh
Infiltration	Type Natural	Average ACH 0.17	Volume(cuft) 21261	Wall Ratio 1	CFM= 61.7
Internal gain		Occupants 6	Btuh/occupant X 230	Appliance + 2400	Load 1283 Btuh 3780 Btuh
	Sensible Envelope Load:				20727 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.295)				6106 Btuh
	Sensible Load All Zones				26833 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Annamarie & John Forbes

Project Title:
210342 Forbes

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-02-27

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	Sensible Envelope Load All Zones	20727 Btuh
	Sensible Duct Load	6106 Btuh
	Total Sensible Zone Loads	26833 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	26833 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	2129 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1412 Btuh
	Latent occupant gain (6.0 people @ 200 Btuh per person)	1200 Btuh
	Latent other gain	0 Btuh
	Latent total gain	4741 Btuh
	TOTAL GAIN	31574 Btuh

EQUIPMENT

1. Central Unit	#	37000 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