

Residential System Sizing Calculation

Summary

Neal, Brad Detached Garage

Project Title:
211710 Neal Garage

Lake City, FL

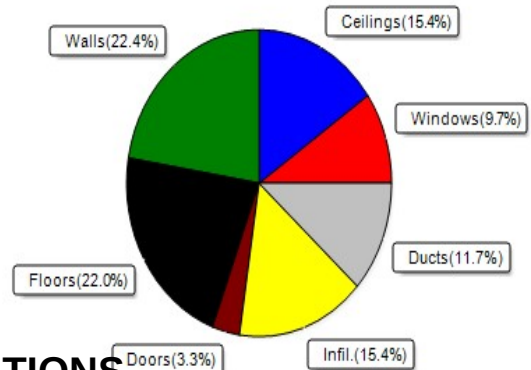
2023-02-22

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	22301 Btuh	Total cooling load calculation	22757 Btuh
Submitted heating capacity	% of calc Btuh	Submitted cooling capacity	% of calc Btuh
Total (Electric Heat Pump)	125.6 28000	Sensible (SHR = 0.75)	108.3 21000
Heat Pump + Auxiliary(0.0kW)	125.6 28000	Latent	208.2 7000
		Total (Electric Heat Pump)	123.0 28000

WINTER CALCULATIONS

Winter Heating Load (for 1717 sqft)

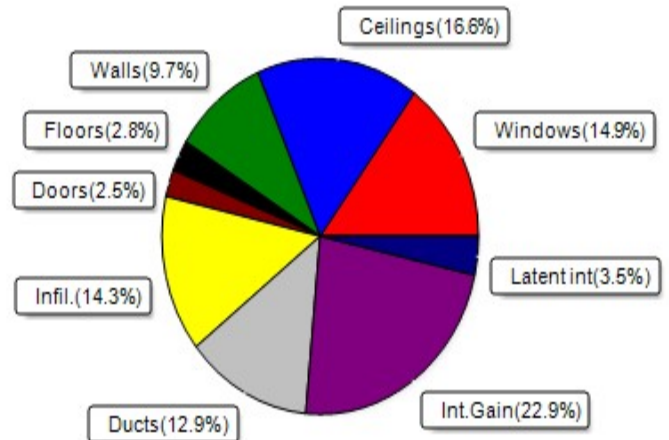
Load component	Load
Window total 170 sqft	2170 Btuh
Wall total 1577 sqft	5005 Btuh
Door total 47 sqft	747 Btuh
Ceiling total 2442 sqft	3425 Btuh
Floor total See detail report	4907 Btuh
Infiltration 78 cfm	3428 Btuh
Duct loss	2620 Btuh
Subtotal	22301 Btuh
Ventilation 0 cfm	0 Btuh
TOTAL HEAT LOSS	22301 Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 1717 sqft)

Load component	Load
Window total 170 sqft	3388 Btuh
Wall total 1577 sqft	2200 Btuh
Door total 47 sqft	560 Btuh
Ceiling total 2442 sqft	3767 Btuh
Floor total	644 Btuh
Infiltration 59 cfm	1221 Btuh
Internal gain	5220 Btuh
Duct gain	2395 Btuh
Sens. Ventilation 0 cfm	0 Btuh
Blower Load	0 Btuh
Total sensible gain	19394 Btuh
Latent gain(ducts)	536 Btuh
Latent gain(infiltration)	2027 Btuh
Latent gain(ventilation)	0 Btuh
Latent gain(internal/occupants/other)	800 Btuh
Total latent gain	3363 Btuh
TOTAL HEAT GAIN	22757 Btuh



8th Edition

EnergyGauge® System Sizing
PREPARED BY: **Evan Beamsley**
DATE: **2023-02-22**

System Sizing Calculations - Winter

Residential Load - Room by Room Component Details

Neal, Brad Detached Garage

Project Title:
211710 Neal Garage
Building Type: User

Lake City, FL

2023-02-22

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)

Component Loads for Room #1: 2nd FL living

Window	Panes/Type	Frame	U	Orientation	Area(sqft)	X	HTM=	Load
1	2, NFRC 0.22	Vinyl	0.32	N	15.0		12.8	192 Btuh
2	2, NFRC 0.22	Vinyl	0.32	E	15.0		12.8	192 Btuh
3	2, NFRC 0.22	Vinyl	0.32	E	15.0		12.8	192 Btuh
4	2, NFRC 0.22	Vinyl	0.32	S	15.0		12.8	192 Btuh
5	2, NFRC 0.22	Vinyl	0.32	W	15.0		12.8	192 Btuh
6	2, NFRC 0.22	Vinyl	0.32	W	15.0		12.8	192 Btuh
	Window Total				90.0(sqft)			1152 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Face Br - Wood	- Ext	(0.067)	19.0/0.0	134		2.66	358 Btuh
2	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
3	Frame - Wood	- Ext	(0.077)	19.0/0.0	17		3.09	53 Btuh
4	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
5	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
6	Frame - Wood	- Ext	(0.077)	19.0/0.0	17		3.09	53 Btuh
7	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
8	Face Br - Wood	- Ext	(0.067)	19.0/0.0	134		2.66	358 Btuh
9	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
10	Frame - Wood	- Ext	(0.077)	19.0/0.0	17		3.09	53 Btuh
11	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
12	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
13	Frame - Wood	- Ext	(0.077)	19.0/0.0	17		3.09	53 Btuh
14	Frame - Wood	- Ext	(0.077)	19.0/0.0	20		3.09	62 Btuh
15	Frame - Wood	- Adj	(0.089)	13.0/0.0	178		3.55	632 Btuh
16	Face Br - Wood	- Adj	(0.080)	13.0/0.0	44		3.19	140 Btuh
17	Frame - Wood	- Adj	(0.089)	13.0/0.0	44		3.55	156 Btuh
	Wall Total				763(sqft)			2348 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
1	Insulated - Garage, n		(0.400)		20		16.0	320 Btuh
	Door Total				20(sqft)			320Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area	X	HTM=	Load
1	Vented Attic/L/Shing		(0.025)	38.0/0.0	1192		1.0	1210 Btuh
2	Knee Wall/L/Shing		(0.049)	19.0/0.0	1000		2.0	1961 Btuh
	Ceiling Total				2192(sqft)			3171Btuh
Floors	Type		Ueff.	R-Value	Size	X	HTM=	Load
1	Raised Wood - Adj		(0.050)	19.0	917.0 sqft		2.0	1839 Btuh
2	Interior		(0.050)	0.0	275.0 sqft		0.0	0 Btuh
	Floor Total				1192 sqft			1839 Btuh
	Room Envelope Subtotal:							8831 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title:
211710 Neal Garage
Building Type: User

Lake City, FL

2023-02-22

Infiltration	Type Natural	Wholehouse ACH 0.30	Room Volume 9536	Wall Ratio 0.48	CFM= 37.9	1658 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DLM of 0.250)					2620 Btuh
Room #1	Sensible Room Subtotal					13109 Btuh

Component Loads for Room #2: 1ST FL living

Window	Panes/Type	Frame	U	Orientation	Area(sqft)	X	HTM=	Load
7	2, NFRC 0.22	Vinyl	0.32	E	22.0		12.8	282 Btuh
8	2, NFRC 0.22	Vinyl	0.32	E	4.5		12.8	58 Btuh
9	2, NFRC 0.22	Vinyl	0.32	S	44.0		12.8	563 Btuh
10	2, NFRC 0.22	Vinyl	0.32	S	9.0		12.8	115 Btuh
	Window Total					79.5(sqft)		1018 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
18	Frame - Wood	- Adj	(0.089)	13.0/0.0	164		3.55	581 Btuh
19	Face Br - Wood	- Ext	(0.080)	13.0/0.0	137		3.19	437 Btuh
20	Face Br - Wood	- Ext	(0.080)	13.0/0.0	344		3.19	1096 Btuh
21	Face Br - Wood	- Ext	(0.080)	13.0/0.0	170		3.19	542 Btuh
	Wall Total					814(sqft)		2656 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
2	Insulated - Garage,	n	(0.400)		20		16.0	320 Btuh
3	Insulated - Exterior,	n	(0.400)		7		16.0	107 Btuh
	Door Total					27(sqft)		427Btuh
Ceilings	Type/Color/Surface	Ueff.	R-Value	Area	X	HTM=	Load	
3	Vented Attic/L/Shing	(0.025)	38.0/0.0	250		1.0	254 Btuh	
	Ceiling Total					250(sqft)		254Btuh
Floors	Type	Ueff.	R-Value	Size	X	HTM=	Load	
3	Slab On Grade	(1.180)	0.0	65.0 ft(perim.)		47.2	3068 Btuh	
	Floor Total					525 sqft		3068 Btuh
	Room Envelope Subtotal:							7423 Btuh
Infiltration	Type	Wholehouse	ACH	Room Volume	Wall Ratio	CFM=	Load	
	Natural		0.30	5933	0.52	40.4	1770 Btuh	
Duct load	No ducts assigned to this zone. (DLM of 0.000)						0 Btuh	

Manual J Winter Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title:
211710 Neal Garage
Building Type: User

Lake City, FL

2023-02-22

Room #2	Sensible Room Subtotal	9193 Btuh
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SYSTEM GROUPS (BLOCK LOADS)

Heating Loads For System(s):1 Serving Rooms: 1	Block load	13109 Btuh
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Heating Loads For System(s):2 Serving Rooms: 2	Block load	9193 Btuh
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WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	22301 Btuh 0 Btuh 22301 Btuh
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EQUIPMENT

1. Electric Heat Pump	#	18000 Btuh
2. Electric Heat Pump	#	10000 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 - Room by Room Component Details

Neal, Brad Detached Garage

Project Title:
211710 Neal Garage

Lake City, FL

2023-02-22

Reference City: Gainesville, FL

Temperature Difference: 19.0F(TMY3 99%)

Humidity difference: 51gr.

Component Loads for Room #1: 2nd FL living

Window	Type*						Overhang		Window Area(sqft)			HTM		Load	
	Panes	SHGC	U	InSh	IS	Ornt	Len	Hgt	Gross	Shaded	Unshaded	Shaded	Unshaded		
1	2 NFRC	0.22, 0.32	No	No	N		1.5ft	6.5ft	15.0	0.0	15.0	11	11	161	Btuh
2	2 NFRC	0.22, 0.32	No	No	E		1.5ft	2.0ft	15.0	0.0	15.0	11	27	409	Btuh
3	2 NFRC	0.22, 0.32	No	No	E		1.5ft	2.5ft	15.0	0.0	15.0	11	27	409	Btuh
4	2 NFRC	0.22, 0.32	No	No	S		1.5ft	6.5ft	15.0	6.1	8.9	11	12	176	Btuh
5	2 NFRC	0.22, 0.32	No	No	W		1.5ft	2.0ft	15.0	0.0	15.0	11	27	409	Btuh
6	2 NFRC	0.22, 0.32	No	No	W		1.5ft	2.0ft	15.0	0.0	15.0	11	27	409	Btuh
Window Total									90 (sqft)					1974 Btuh	
Walls	Type					U-Value	R-Value		Area(sqft)		HTM		Load		
							Cav/Sheath								
1	Face Brick - Wood - Ext						0.07	19.0/0.0		134.3		1.0		138 Btuh	
2	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
3	Frame - Wood - Ext						0.08	19.0/0.0		17.0		1.7		28 Btuh	
4	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
5	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
6	Frame - Wood - Ext						0.08	19.0/0.0		17.0		1.7		28 Btuh	
7	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
8	Face Brick - Wood - Ext						0.07	19.0/0.0		134.3		1.0		138 Btuh	
9	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
10	Frame - Wood - Ext						0.08	19.0/0.0		17.0		1.7		28 Btuh	
11	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
12	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
13	Frame - Wood - Ext						0.08	19.0/0.0		17.0		1.7		28 Btuh	
14	Frame - Wood - Ext						0.08	19.0/0.0		20.0		1.7		33 Btuh	
15	Frame - Wood - Adj						0.09	13.0/0.0		178.0		1.7		300 Btuh	
16	Face Brick - Wood - Adj						0.08	13.0/0.0		44.0		1.5		67 Btuh	
17	Frame - Wood - Adj						0.09	13.0/0.0		44.0		1.7		74 Btuh	
Wall Total									763 (sqft)					1093 Btuh	
Doors	Type						Area (sqft)		HTM		Load				
	Insulated - Garage						20.0		12.0		240 Btuh				
Door Total									20 (sqft)					240 Btuh	
Ceilings	Type/Color/Surface					U-Value	R-Value		Area(sqft)		HTM		Load		
	Vented Attic/Light/Shingle						0.025	38.0/0.0		1192.0		1.12		1331 Btuh	
2	Knee Wall/Light/Shingle						0.049	19.0/0.0		1000.0		2.16		2157 Btuh	
Ceiling Total									2192 (sqft)					3488 Btuh	
Floors	Type						R-Value		Size		HTM		Load		
	Raised Wood - Adj						19.0		917 (sqft)		0.7		644 Btuh		
2	Interior						0.0		275 (sqft)		0.0		0 Btuh		
Floor Total									1192.0 (sqft)					644 Btuh	
Zone Envelope Subtotal:													7439 Btuh		

Manual J Summer Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
211710 Neal Garage

Lake City, FL

2023-02-22

Infiltration	Type Natural	Wholehouse ACH 0.23	Volume(cuft) 9536	Wall Ratio 0.48	CFM= 28.4	Load 591 Btuh
Internal gain		Occupants 3	Btuh/occupant X 230	Appliance +	3400	Load 4090 Btuh
	Sensible Envelope Load:					12120 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.198)					2395 Btuh
	Sensible Zone Load					14515 Btuh

Component Loads for Room #2: 1ST FL living

Window	Type*						Overhang		Window Area(sqft)			HTM		Load					
	Panes	SHGC	U	InSh	IS	Ornt	Len	Hgt	Gross	Shaded	Unshaded	Shaded	Unshaded						
7	2 NFRC	0.22, 0.32	No	No	E		1.5ft	3.0ft	22.0	0.0	22.0	11	27	600	Btuh				
8	2 NFRC	0.22, 0.32	No	No	E		1.5ft	1.0ft	4.5	0.7	3.8	11	27	111	Btuh				
9	2 NFRC	0.22, 0.32	No	No	S		1.5ft	18.0f	44.0	0.0	44.0	11	12	547	Btuh				
10	2 NFRC	0.22, 0.32	No	No	S		1.5ft	15.0f	9.0	0.0	9.0	11	12	112	Btuh				
	Window Total								80 (sqft)					1370 Btuh					
Walls	Type						U-Value	R-Value	Area(sqft)			HTM		Load					
								Cav/Sheath											
18	Frame - Wood - Adj						0.09	13.0/0.0	163.8			1.7		276 Btuh					
19	Face Brick - Wood - Ext						0.08	13.0/0.0	136.8			1.3		175 Btuh					
20	Face Brick - Wood - Ext						0.08	13.0/0.0	343.7			1.3		439 Btuh					
21	Face Brick - Wood - Ext						0.08	13.0/0.0	170.0			1.3		217 Btuh					
	Wall Total								814 (sqft)					1106 Btuh					
Doors	Type									Area (sqft)			HTM		Load				
2	Insulated - Garage									20.0			12.0		240 Btuh				
3	Insulated - Exterior									6.7			12.0		80 Btuh				
	Door Total								27 (sqft)					320 Btuh					
Ceilings	Type/Color/Surface						U-Value	R-Value	Area(sqft)			HTM		Load					
3	Vented Attic/Light/Shingle						0.025	38.0/0.0	250.0			1.12		279 Btuh					
	Ceiling Total								250 (sqft)					279 Btuh					
Floors	Type									R-Value			Size			HTM		Load	
3	Slab On Grade									0.0			525 (ft-perimeter)			0.0		0 Btuh	
	Floor Total								525.0 (sqft)					0 Btuh					
	Zone Envelope Subtotal:													3075 Btuh					

Manual J Summer Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title: 211710 Neal Garage

Climate: FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2023-02-22

Infiltration	Type Natural	Wholehouse ACH 0.23	Volume(cuft) 5933	Wall Ratio 0.52	CFM= 30.3	Load 631 Btuh
Internal gain		Occupants 1	Btuh/occupant X 230	Appliance +	900	Load 1130 Btuh
					Sensible Envelope Load:	4836 Btuh
Duct load	No ducts assigned to this zone. (DGM of 0.000)					0 Btuh
					Sensible Zone Load	4836 Btuh

The following window Excursion will be assigned to the system loads.

Windows	July excursion for System 1	0 Btuh
	July excursion for System 2	44 Btuh
	Excursion Subtotal:	44 Btuh
Duct load		0 Btuh
	Sensible Excursion Load	44 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title: 211710 Neal Garage

Climate: FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2023-02-22

SYSTEM GROUPS (BLOCK LOADS)

Cooling Loads For System(s): 1 Serving Zones: 1	Sensible Envelope Load	12120 Btuh
	Window Excursion	0 Btuh
	Sensible Duct Load (duct gain multiplier of 0.198)	2395 Btuh
	Sensible ventilation	0 Btuh
	Zone Sensible gain	14515 Btuh
	Latent infiltration/ventilation gain	980 Btuh
	Latent duct gain	536 Btuh
	Latent occupant gain	600 Btuh
	Latent other gain	0 Btuh
	Total block load	16631 Btuh

Cooling Loads For System(s): 2 Serving Zones: 2	Sensible Envelope Load	4836 Btuh
	Window Excursion	44 Btuh
	Sensible Duct Load (duct gain multiplier of 0.000) (Includes 0 Btuh due to window excursion)	0 Btuh
	Sensible ventilation	0 Btuh
	Zone Sensible gain	4880 Btuh
	Latent infiltration/ventilation gain	1046 Btuh
	Latent duct gain	0 Btuh
	Latent occupant gain	200 Btuh
	Latent other gain	0 Btuh
	Total block load	6126 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Neal, Brad Detached Garage

Project Title: 211710 Neal Garage

Climate: FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2023-02-22

WHOLE HOUSE TOTALS		
Whole House Totals for Cooling	Sensible Envelope Load All Zones	17000 Btuh
	Sensible Duct Load	2395 Btuh
	Total Sensible Zone Loads	19394 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	19394 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	2027 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	536 Btuh
	Latent occupant gain (4.0 people @ 200 Btuh per person)	800 Btuh
	Latent other gain	0 Btuh
	Latent total gain	3363 Btuh
	TOTAL GAIN	22757 Btuh

EQUIPMENT		
1. Central Unit	#	18000 Btuh
2. Central Unit	#	10000 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