

Residential System Sizing Calculation

Summary

Thomson Res.

Project Title:
200940 Thomson

Lake City, FL

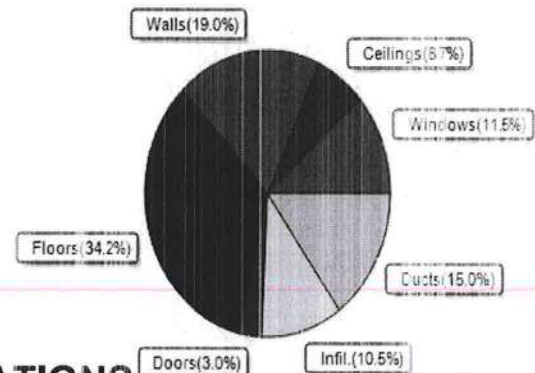
2020-08-26

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	33964	Btuh	Total cooling load calculation	31528	Btuh
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	108.9	37000	Sensible (SHR = 0.75)	104.7	27750
Heat Pump + Auxiliary(0.0kW)	108.9	37000	Latent	184.5	9250
			Total (Electric Heat Pump)	117.4	37000

WINTER CALCULATIONS

Winter Heating Load (for 2156 sqft)

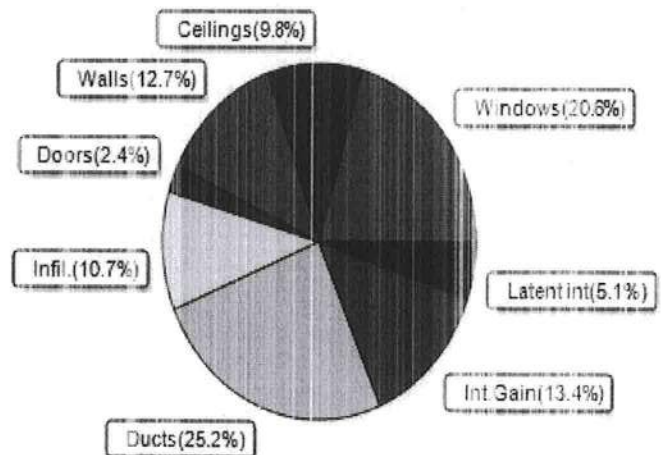
Load component		Load	
Window total	325 sqft	3896	Btuh
Wall total	1819 sqft	6459	Btuh
Door total	64 sqft	1024	Btuh
Ceiling total	2252 sqft	2286	Btuh
Floor total	2156 sqft	11611	Btuh
Infiltration	82 cfm	3577	Btuh
Duct loss		5110	Btuh
Subtotal		33964	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		33964	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 2156 sqft)

Load component		Load	
Window total	325 sqft	6496	Btuh
Wall total	1819 sqft	3999	Btuh
Door total	64 sqft	768	Btuh
Ceiling total	2252 sqft	3086	Btuh
Floor total		0	Btuh
Infiltration	61 cfm	1274	Btuh
Internal gain		4240	Btuh
Duct gain		6650	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		26514	Btuh
Latent gain(ducts)		1300	Btuh
Latent gain(infiltration)		2115	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1600	Btuh
Total latent gain		5014	Btuh
TOTAL HEAT GAIN		31528	Btuh



8th Edition

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2020-08-26

47778

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Thomson Res.

Project Title:
200940 Thomson
Building Type: User

Lake City, FL

2020-08-26

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)
This calculation is for Worst Case. The house has been rotated 270 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	W	30.0		12.0	360 Btuh
2	2, NFRC 0.20	Metal	0.30	W	36.0		12.0	432 Btuh
3	2, NFRC 0.20	Metal	0.30	W	32.0		12.0	384 Btuh
4	2, NFRC 0.20	Metal	0.30	S	16.0		12.0	192 Btuh
5	2, NFRC 0.20	Metal	0.30	W	36.0		12.0	432 Btuh
6	2, NFRC 0.20	Metal	0.30	W	36.0		12.0	432 Btuh
7	2, NFRC 0.20	Metal	0.30	N	12.0		12.0	144 Btuh
8	2, NFRC 0.20	Metal	0.30	N	6.0		12.0	72 Btuh
9	2, NFRC 0.20	Metal	0.30	E	54.0		12.0	648 Btuh
10	2, NFRC 0.20	Metal	0.30	E	6.7		12.0	80 Btuh
11	2, NFRC 0.20	Metal	0.30	E	36.0		12.0	432 Btuh
12	2, NFRC 0.20	Metal	0.30	E	9.0		12.0	108 Btuh
13	2, NFRC 0.20	Metal	0.30	S	15.0		12.0	180 Btuh
Window Total					324.7(sqft)			3896 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	84		3.55	298 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	68		3.55	240 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	87		3.55	309 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	44		3.55	154 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	55		3.55	194 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	62		3.55	218 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	102		3.55	362 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	341		3.55	1209 Btuh
9	Frame - Wood	- Adj	(0.089)	13.0/0.0	187		3.55	664 Btuh
10	Frame - Wood	- Adj	(0.089)	13.0/0.0	18		3.55	64 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	90		3.55	321 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	63		3.55	224 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	22		3.55	77 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	54		3.55	192 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	69		3.55	245 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	117		3.55	415 Btuh
17	Frame - Wood	- Ext	(0.089)	13.0/0.0	29		3.55	104 Btuh
18	Frame - Wood	- Ext	(0.089)	13.0/0.0	150		3.55	533 Btuh
19	Frame - Wood	- Ext	(0.089)	13.0/0.0	29		3.55	104 Btuh
20	Frame - Wood	- Ext	(0.089)	13.0/0.0	150		3.55	533 Btuh
Wall Total					1819(sqft)			6459 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)		8		16.0	128 Btuh
3	Insulated - Garage, n		(0.400)		20		16.0	320 Btuh
4	Insulated - Exterior, n		(0.400)		20		16.0	320 Btuh
Door Total					64(saft)			1024Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Thomson Res.
Lake City, FL

Project Title:
200940 Thomson
Building Type: User

2020-08-26

Ceilings 1	Type/Color/Surface Vented Attic/D/Shing Ceiling Total	Ueff. (0.025)	R-Value 38.0/0.0	Area X 2252 2252(sqft)	HTM= 1.0	Load 2286 Btuh 2286Btuh
Floors 1	Type Slab On Grade Floor Total	Ueff. (1.180)	R-Value 0.0	Size X 246.0 ft(perim.) 2156 sqft	HTM= 47.2	Load 11611 Btuh 11611 Btuh
Envelope Subtotal:						25277 Btuh
Infiltration	Type Natural	Wholehouse ACH 0.25	Volume(cuft) 19404	Wall Ratio 1.00	CFM= 81.7	3577 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.177)					5110 Btuh
All Zones	Sensible Subtotal All Zones					33964 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	33964 Btuh 0 Btuh 33964 Btuh
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EQUIPMENT

1. Electric Heat Pump	#	37000 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

Thomson Res.

Project Title:
200940 Thomson

Lake City, FL

2020-08-26

Reference City: Gainesville, FL Temperature Difference: 19.0F(TMY3 99%) Humidity difference: 51gr.
This calculation is for Worst Case. The house has been rotated 270 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	W	1.5ft	1.0ft	30.0	1.5	28.5	10	25	727 Btuh
2	2 NFRC	0.20, 0.30	No	No	W	9.0ft	1.0ft	36.0	36.0	0.0	10	25	357 Btuh
3	2 NFRC	0.20, 0.30	No	No	W	9.0ft	1.0ft	32.0	25.9	6.1	10	25	409 Btuh
4	2 NFRC	0.20, 0.30	No	No	S	99.0f	1.0ft	16.0	16.0	0.0	10	11	159 Btuh
5	2 NFRC	0.20, 0.30	No	No	W	1.5ft	1.0ft	36.0	1.5	34.5	10	25	877 Btuh
6	2 NFRC	0.20, 0.30	No	No	W	1.5ft	1.0ft	36.0	1.5	34.5	10	25	877 Btuh
7	2 NFRC	0.20, 0.30	No	No	N	1.5ft	1.0ft	12.0	0.0	12.0	10	10	119 Btuh
8	2 NFRC	0.20, 0.30	No	No	N	1.5ft	1.0ft	6.0	0.0	6.0	10	10	59 Btuh
9	2 NFRC	0.20, 0.30	No	No	E	8.5ft	1.0ft	54.0	54.0	0.0	10	25	535 Btuh
10	2 NFRC	0.20, 0.30	No	No	E	8.5ft	1.0ft	6.7	6.1	0.6	10	25	75 Btuh
11	2 NFRC	0.20, 0.30	No	No	E	1.5ft	4.0ft	36.0	0.0	36.0	10	25	899 Btuh
12	2 NFRC	0.20, 0.30	No	No	E	1.5ft	3.0ft	9.0	0.0	9.0	10	25	225 Btuh
13	2 NFRC	0.20, 0.30	No	No	S	1.5ft	1.0ft	15.0	15.0	0.0	10	11	149 Btuh
	Excursion												1028 Btuh
	Window Total							325 (sqft)					6496 Btuh
Walls	Type	U-Value		R-Value		Area(sqft)		HTM		Load			
					Cav/Sheath								
1	Frame - Wood - Ext		0.09		13.0/0.0		84.0		2.3		190 Btuh		
2	Frame - Wood - Ext		0.09		13.0/0.0		67.5		2.3		153 Btuh		
3	Frame - Wood - Ext		0.09		13.0/0.0		87.0		2.3		197 Btuh		
4	Frame - Wood - Ext		0.09		13.0/0.0		43.5		2.3		98 Btuh		
5	Frame - Wood - Ext		0.09		13.0/0.0		54.8		2.3		124 Btuh		
6	Frame - Wood - Ext		0.09		13.0/0.0		61.5		2.3		139 Btuh		
7	Frame - Wood - Ext		0.09		13.0/0.0		102.0		2.3		231 Btuh		
8	Frame - Wood - Ext		0.09		13.0/0.0		340.5		2.3		771 Btuh		
9	Frame - Wood - Adj		0.09		13.0/0.0		187.0		1.7		315 Btuh		
10	Frame - Wood - Adj		0.09		13.0/0.0		18.0		1.7		30 Btuh		
11	Frame - Wood - Ext		0.09		13.0/0.0		90.3		2.3		204 Btuh		
12	Frame - Wood - Ext		0.09		13.0/0.0		63.0		2.3		143 Btuh		
13	Frame - Wood - Ext		0.09		13.0/0.0		21.8		2.3		49 Btuh		
14	Frame - Wood - Ext		0.09		13.0/0.0		54.0		2.3		122 Btuh		
15	Frame - Wood - Ext		0.09		13.0/0.0		69.0		2.3		156 Btuh		
16	Frame - Wood - Ext		0.09		13.0/0.0		117.0		2.3		265 Btuh		
17	Frame - Wood - Ext		0.09		13.0/0.0		29.3		2.3		66 Btuh		
18	Frame - Wood - Ext		0.09		13.0/0.0		150.0		2.3		340 Btuh		
19	Frame - Wood - Ext		0.09		13.0/0.0		29.3		2.3		66 Btuh		
20	Frame - Wood - Ext		0.09		13.0/0.0		150.0		2.3		340 Btuh		
	Wall Total							1819 (sqft)				3999 Btuh	
Doors	Type	Area (sqft)		HTM		Load							
1	Insulated - Exterior		16.0		12.0		192 Btuh						
2	Insulated - Exterior		8.0		12.0		96 Btuh						
3	Insulated - Garage		20.0		12.0		240 Btuh						
4	Insulated - Exterior		20.0		12.0		240 Btuh						
	Door Total						64 (sqft)		768 Btuh				
Ceilings	Type/Color/Surface	U-Value		R-Value		Area(sqft)		HTM		Load			
1	Vented Attic/DarkShingle		0.025		38.0/0.0		2252.0		1.37		3086 Btuh		
	Ceiling Total						2252 (sqft)				3086 Btuh		

Manual J Summer Calculations

Residential Load - Component Details (continued)

Thomson Res.

Project Title:
200940 Thomson

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2020-08-26

Floors 1	Type Slab On Grade Floor Total	R-Value 0.0	Size 2156 (ft-perimeter) 2156.0 (sqft)	HTM 0.0	Load 0 Btuh 0 Btuh	
	Envelope Subtotal:				14350 Btuh	
Infiltration	Type Natural	Average ACH 0.19	Volume(cuft) 19404	Wall Ratio 1	CFM= 61.3	Load 1274 Btuh
Internal gain		Occupants 8	Btuh/occupant X 230	Appliance +	2400	Load 4240 Btuh
	Sensible Envelope Load:				19864 Btuh	
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)			(DGM of 0.335)	6650 Btuh	
	Sensible Load All Zones				26514 Btuh	

Manual J Summer Calculations

Residential Load - Component Details (continued)

Thomson Res.

Project Title:
200940 Thomson

Climate: FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2020-08-26

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	Sensible Envelope Load All Zones	19864 Btuh
	Sensible Duct Load	6650 Btuh
	Total Sensible Zone Loads	26514 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	26514 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	2115 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1300 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	5014 Btuh
	TOTAL GAIN	31528 Btuh

EQUIPMENT

1. Central Unit	#	37000 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