

Residential System Sizing Calculation

Summary

Arata Res

Project Title:
211518 Arata Res

lake City, FL

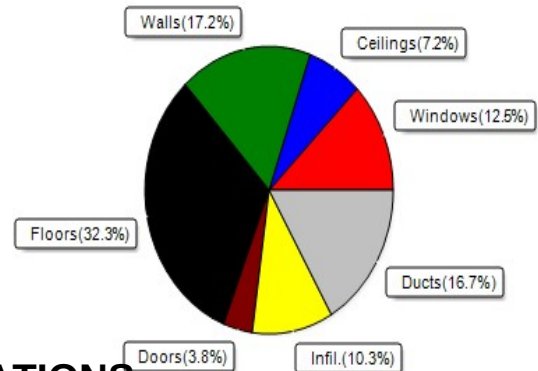
2021-11-10

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 28667 Btuh			Total cooling load calculation 28797 Btuh		
Submitted heating capacity % of calc Btuh			Submitted cooling capacity % of calc Btuh		
Total (Electric Heat Pump) 108.1 31000			Sensible (SHR = 0.75) 94.3 23250		
Heat Pump + Auxiliary(0.0kW) 108.1 31000			Latent 187.7 7750		
			Total (Electric Heat Pump) 107.6 31000		

WINTER CALCULATIONS

Winter Heating Load (for 1930 sqft)

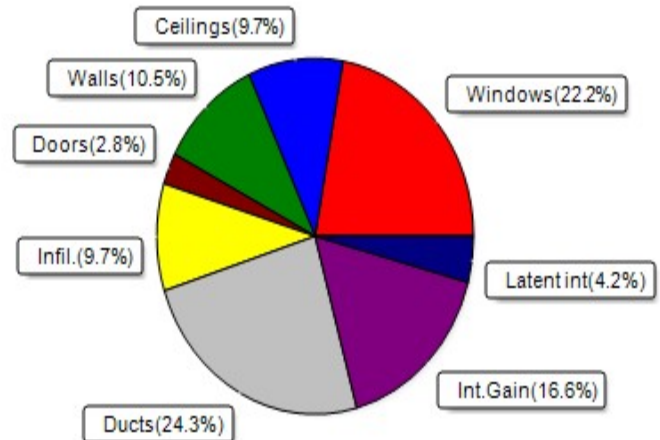
Load component		Load	
Window total	299 sqft	3582	Btuh
Wall total	1392 sqft	4940	Btuh
Door total	68 sqft	1088	Btuh
Ceiling total	2034 sqft	2065	Btuh
Floor total	1930 sqft	9251	Btuh
Infiltration	68 cfm	2962	Btuh
Duct loss		4779	Btuh
Subtotal		28667	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		28667	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 1930 sqft)

Load component		Load	
Window total	299 sqft	6387	Btuh
Wall total	1392 sqft	3029	Btuh
Door total	68 sqft	816	Btuh
Ceiling total	2034 sqft	2788	Btuh
Floor total		0	Btuh
Infiltration	51 cfm	1055	Btuh
Internal gain		4780	Btuh
Duct gain		5813	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		24668	Btuh
Latent gain(ducts)		1178	Btuh
Latent gain(infiltration)		1751	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1200	Btuh
Total latent gain		4129	Btuh
TOTAL HEAT GAIN		28797	Btuh



8th Edition

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2021-11-10

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Arata Res

lake City, FL

Project Title:
211518 Arata Res
Building Type: User

2021-11-10

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 0.22	Metal	0.30	N	15.0		12.0	180 Btuh
2	2, NFRC 0.22	Metal	0.30	N	54.0		12.0	648 Btuh
3	2, NFRC 0.22	Metal	0.30	E	36.0		12.0	432 Btuh
4	2, NFRC 0.22	Metal	0.30	N	72.0		12.0	864 Btuh
5	2, NFRC 0.22	Metal	0.30	N	32.0		12.0	384 Btuh
6	2, NFRC 0.22	Metal	0.30	E	12.5		12.0	150 Btuh
7	2, NFRC 0.22	Metal	0.30	E	6.0		12.0	72 Btuh
8	2, NFRC 0.22	Metal	0.30	S	4.0		12.0	48 Btuh
9	2, NFRC 0.22	Metal	0.30	S	12.0		12.0	144 Btuh
10	2, NFRC 0.22	Metal	0.30	S	24.0		12.0	288 Btuh
11	2, NFRC 0.22	Metal	0.30	S	10.0		12.0	120 Btuh
12	2, NFRC 0.22	Metal	0.30	W	15.0		12.0	180 Btuh
13	2, NFRC 0.22	Metal	0.30	W	6.0		12.0	72 Btuh
Window Total					298.5(sqft)			3582 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	176		3.55	626 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	48		3.55	170 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	52		3.55	184 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	61		3.55	217 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	291		3.55	1031 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	116		3.55	412 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	18		3.55	64 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	42		3.55	149 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	71		3.55	252 Btuh
10	Frame - Wood	- Adj	(0.089)	13.0/0.0	45		3.55	160 Btuh
11	Frame - Wood	- Adj	(0.089)	13.0/0.0	163		3.55	579 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	309		3.55	1097 Btuh
Wall Total					1392(sqft)			4940 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load
1	Insulated - Exterior, n		(0.400)		24		16.0	384 Btuh
2	Insulated - Exterior, n		(0.400)		24		16.0	384 Btuh
3	Insulated - Garage, n		(0.400)		20		16.0	320 Btuh
Door Total					68(sqft)			1088Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area	X	HTM=	Load
1	Vented Attic/D/Shing		(0.025)	38.0/0.0	2034		1.0	2065 Btuh
Ceiling Total					2034(sqft)			2065Btuh
Floors	Type		Ueff.	R-Value	Size	X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	196.0 ft(perim.)		47.2	9251 Btuh
Floor Total					1930 sqft			9251 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Arata Res
lake City, FL

Project Title:
211518 Arata Res
Building Type: User

2021-11-10

	Envelope Subtotal:	20926 Btuh
Infiltration	Type Wholehouse ACH Volume(cuft) Wall Ratio CFM= Natural 0.23 17563 1.00 67.6	2962 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.200)	4779 Btuh
All Zones	Sensible Subtotal All Zones	28667 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	28667 Btuh 0 Btuh 28667 Btuh
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EQUIPMENT

1. Electric Heat Pump	#	31000 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

Arata Res

Project Title:
211518 Arata Res

lake City, FL

2021-11-10

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	0.22, 0.30	No	No	N		1.5ft	1.0ft	15.0	0.0	15.0	10	20	307	Btuh
2	2 NFRC	0.22, 0.30	No	No	N		1.5ft	1.0ft	54.0	0.0	54.0	10	20	1106	Btuh
3	2 NFRC	0.22, 0.30	No	No	E		16.4f	0.5ft	36.0	0.0	36.0	10	20	737	Btuh
4	2 NFRC	0.22, 0.30	No	No	N		9.3ft	0.0ft	72.0	0.0	72.0	10	20	1475	Btuh
5	2 NFRC	0.22, 0.30	No	No	N		1.5ft	1.0ft	32.0	0.0	32.0	10	20	655	Btuh
6	2 NFRC	0.22, 0.30	No	No	E		1.5ft	1.0ft	12.5	0.0	12.5	10	20	256	Btuh
7	2 NFRC	0.22, 0.30	No	No	E		1.5ft	1.0ft	6.0	0.0	6.0	10	20	123	Btuh
8	2 NFRC	0.22, 0.30	No	No	S		1.5ft	1.0ft	4.0	2.9	1.1	10	21	53	Btuh
9	2 NFRC	0.22, 0.30	No	No	S		1.5ft	1.0ft	12.0	2.9	9.1	10	21	225	Btuh
10	2 NFRC	0.22, 0.30	No	No	S		6.0ft	0.7ft	24.0	24.0	0.0	10	21	248	Btuh
11	2 NFRC	0.22, 0.30	No	No	S		1.5ft	1.0ft	10.0	3.7	6.3	10	21	174	Btuh
12	2 NFRC	0.22, 0.30	No	No	W		1.5ft	1.0ft	15.0	4.4	10.6	10	21	273	Btuh
13	2 NFRC	0.22, 0.30	No	No	W		1.5ft	1.0ft	6.0	2.9	3.1	10	21	96	Btuh
	Excursion													658	Btuh
	Window Total								299 (sqft)					6387 Btuh	
Walls	Type					U-Value	R-Value		Area(sqft)			HTM		Load	
							Cav/Sheath								
1	Frame - Wood - Ext					0.09	13.0/0.0		176.3			2.3		399 Btuh	
2	Frame - Wood - Ext					0.09	13.0/0.0		48.0			2.3		109 Btuh	
3	Frame - Wood - Ext					0.09	13.0/0.0		51.8			2.3		117 Btuh	
4	Frame - Wood - Ext					0.09	13.0/0.0		61.0			2.3		138 Btuh	
5	Frame - Wood - Ext					0.09	13.0/0.0		290.5			2.3		657 Btuh	
6	Frame - Wood - Ext					0.09	13.0/0.0		116.0			2.3		263 Btuh	
7	Frame - Wood - Ext					0.09	13.0/0.0		18.0			2.3		41 Btuh	
8	Frame - Wood - Ext					0.09	13.0/0.0		42.0			2.3		95 Btuh	
9	Frame - Wood - Ext					0.09	13.0/0.0		71.0			2.3		161 Btuh	
10	Frame - Wood - Adj					0.09	13.0/0.0		45.0			1.7		76 Btuh	
11	Frame - Wood - Adj					0.09	13.0/0.0		163.0			1.7		275 Btuh	
12	Frame - Wood - Ext					0.09	13.0/0.0		309.0			2.3		699 Btuh	
	Wall Total							1392 (sqft)					3029 Btuh		
Doors	Type						Area (sqft)		HTM			Load			
1	Insulated - Exterior						24.0		12.0			288 Btuh			
2	Insulated - Exterior						24.0		12.0			288 Btuh			
3	Insulated - Garage						20.0		12.0			240 Btuh			
	Door Total						68 (sqft)					816 Btuh			
Ceilings	Type/Color/Surface					U-Value	R-Value		Area(sqft)			HTM		Load	
1	Vented Attic/DarkShingle					0.025	38.0/0.0		2034.0			1.37		2788 Btuh	
	Ceiling Total							2034 (sqft)					2788 Btuh		
Floors	Type						R-Value		Size			HTM		Load	
1	Slab On Grade						0.0		1930 (ft-perimeter)			0.0		0 Btuh	
	Floor Total							1930.0 (sqft)					0 Btuh		
	Envelope Subtotal:													13020 Btuh	

Manual J Summer Calculations

Residential Load - Component Details (continued)

Arata Res

Project Title:
211518 Arata Res

Climate:FL_GAINESVILLE_REGIONAL_A

lake City, FL

2021-11-10

Infiltration	Type Natural	Average ACH 0.17	Volume(cuft) 17563	Wall Ratio 1	CFM= 50.7	Load 1055 Btuh
Internal gain		Occupants 6	Btuh/occupant X 230	Appliance +	3400	Load 4780 Btuh
					Sensible Envelope Load:	18855 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.308)					5813 Btuh
					Sensible Load All Zones	24668 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Arata Res

Project Title:
211518 Arata Res

Climate:FL_GAINESVILLE_REGIONAL_A

lake City, FL

2021-11-10

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	Sensible Envelope Load All Zones	18855 Btuh
	Sensible Duct Load	5813 Btuh
	Total Sensible Zone Loads	24668 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	24668 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	1751 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1178 Btuh
	Latent occupant gain (6.0 people @ 200 Btuh per person)	1200 Btuh
	Latent other gain	0 Btuh
	Latent total gain	4129 Btuh
	TOTAL GAIN	28797 Btuh

EQUIPMENT

1. Central Unit	#	31000 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