

# Residential System Sizing Calculation

## Summary

Project Title:  
Townsend



, FL

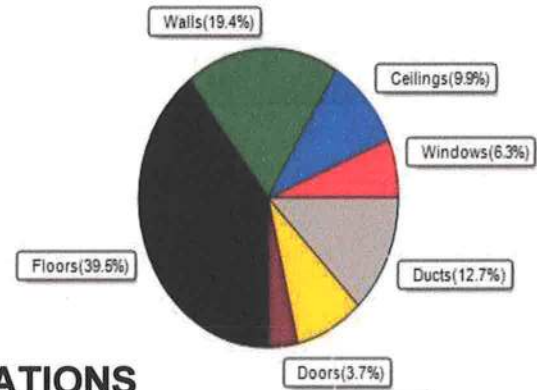
12/17/2021

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
<b>Total heating load calculation</b>	<b>25897 Btuh</b>	<b>Total cooling load calculation</b>	<b>18804 Btuh</b>
Submitted heating capacity	% of calc Btuh	Submitted cooling capacity	% of calc Btuh
Total (Electric Heat Pump)	139.0 36000	Sensible (SHR = 0.80)	182.9 28800
Heat Pump + Auxiliary(0.0kW)	139.0 36000	Latent	235.5 7200
		<b>Total (Electric Heat Pump)</b>	<b>191.5 36000</b>

## WINTER CALCULATIONS

Winter Heating Load (for 2016 sqft)

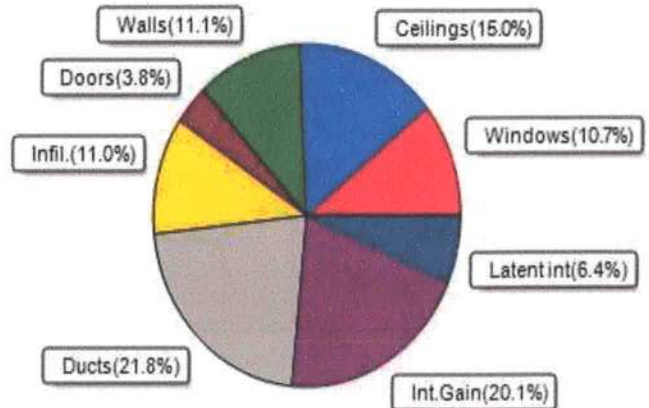
Load component	Load		
Window total	157 sqft	1636	Btuh
Wall total	1875 sqft	5026	Btuh
Door total	60 sqft	960	Btuh
Ceiling total	2016 sqft	2568	Btuh
Floor total	2016 sqft	10242	Btuh
Infiltration	50 cfm	2176	Btuh
Duct loss		3289	Btuh
<b>Subtotal</b>		<b>25897</b>	<b>Btuh</b>
Ventilation	0 cfm	0	Btuh
<b>TOTAL HEAT LOSS</b>		<b>25897</b>	<b>Btuh</b>



## SUMMER CALCULATIONS

Summer Cooling Load (for 2016 sqft)

Load component	Load		
Window total	157 sqft	2019	Btuh
Wall total	1875 sqft	2093	Btuh
Door total	60 sqft	720	Btuh
Ceiling total	2016 sqft	2825	Btuh
Floor total		0	Btuh
Infiltration	37 cfm	775	Btuh
Internal gain		3780	Btuh
Duct gain		3534	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
<b>Total sensible gain</b>		<b>15746</b>	<b>Btuh</b>
Latent gain(ducts)		572	Btuh
Latent gain(infiltration)		1286	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1200	Btuh
<b>Total latent gain</b>		<b>3058</b>	<b>Btuh</b>
<b>TOTAL HEAT GAIN</b>		<b>18804</b>	<b>Btuh</b>



8th Edition

EnergyGauge® System Sizing  
 PREPARED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ 12-17-21

# System Sizing Calculations - Summer

## Residential Load - Whole House Component Details

Project Title:  
Townsend

, FL

12/17/2021

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	0.20, 0.26	No	No	N	1.5ft	2.3ft	30.0	0.0	30.0	9	9		274	Btuh
2	2 NFRC	0.20, 0.26	No	No	S	12.5f	2.3ft	20.0	20.0	0.0	9	11		183	Btuh
3	2 NFRC	0.20, 0.26	No	No	W	1.5ft	2.3ft	15.0	0.0	15.0	9	24		363	Btuh
4	2 NFRC	0.20, 0.26	No	No	N	1.5ft	2.3ft	3.0	0.0	3.0	9	9		27	Btuh
5	2 NFRC	0.20, 0.26	No	No	N	1.5ft	2.3ft	15.0	0.0	15.0	9	9		137	Btuh
6	2 NFRC	0.20, 0.26	No	No	S	7.5ft	2.3ft	30.0	30.0	0.0	9	11		274	Btuh
7	2 NFRC	0.20, 0.26	No	No	W	13.5f	2.3ft	13.3	13.3	0.0	9	24		122	Btuh
8	2 NFRC	0.20, 0.26	No	No	E	7.5ft	2.3ft	15.0	11.7	3.3	9	24		187	Btuh
9	2 NFRC	0.20, 0.26	No	No	E	1.5ft	2.3ft	16.0	0.0	16.0	9	24		388	Btuh
	Excursion													63	Btuh
	Window Total								157 (sqft)					2019 Btuh	
Walls	Type	U-Value	R-Value	Area(sqft)		HTM	Load								
1	Concrete Blk,Hollow - Adj	0.06	13.0/0.6	106.9		1.2	125	Btuh							
2	Concrete Blk,Hollow - Ext	0.06	13.0/0.6	11.0		1.0	11	Btuh							
3	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	255.1		1.0	262	Btuh							
4	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	87.7		1.0	90	Btuh							
5	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	103.3		1.0	106	Btuh							
6	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	372.0		1.0	382	Btuh							
7	Frame - Wood - Adj	0.09	13.0/0.0	234.4		1.7	395	Btuh							
8	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	85.8		1.0	88	Btuh							
9	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	42.7		1.0	44	Btuh							
10	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	57.6		1.0	59	Btuh							
11	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	41.0		1.0	42	Btuh							
12	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	147.8		1.0	152	Btuh							
13	Concrete Blk,Hollow - Ext	0.06	13.0/0.0	329.3		1.0	338	Btuh							
	Wall Total			1875 (sqft)			2093 Btuh								
Doors	Type	Area (sqft)	HTM	Load											
1	Insulated - Exterior	20.0	12.0	240	Btuh										
2	Insulated - Exterior	20.0	12.0	240	Btuh										
3	Insulated - Exterior	20.0	12.0	240	Btuh										
	Door Total			720 Btuh											
				60 (sqft)											
Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load									
1	Vented Attic/Light/Wood shing	0.032	30.0/0.0	2016.0	1.40	2825	Btuh								
	Ceiling Total			2016 (sqft)		2825	Btuh								
Floors	Type	R-Value	Size	HTM	Load										
1	Slab On Grade	0.0	2016 (ft-perimeter)	0.0	0	Btuh									
	Floor Total		2016.0 (sqft)		0	Btuh									
Envelope Subtotal:						7657	Btuh								

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Project Title: Climate:FL\_GAINESVILLE\_REGIONAL\_A  
Townsend

, FL

12/17/2021

<b>Infiltration</b>	Type Natural	Average ACH 0.12	Volume(cuft) 18144	Wall Ratio 1	CFM= 37.3	Load 775 Btuh
<b>Internal gain</b>		Occupants 6	Btuh/occupant X 230	+	Appliance 2400	Load 3780 Btuh
		Sensible Envelope Load:				12212 Btuh
<b>Duct load</b>	Extremely sealed, Supply(R8.0-Attic), Return(R8.0-Attic)			(DGM of 0.289)		3534 Btuh
		<b>Sensible Load All Zones</b>				<b>15746 Btuh</b>

# Manual J Summer Calculations

## Residential Load - Component Details (continued)

Project Title:  
Townsend

Climate: FL\_GAINESVILLE\_REGIONAL\_A

, FL

12/17/2021

### WHOLE HOUSE TOTALS

<b>Whole House Totals for Cooling</b>	<b>Sensible Envelope Load All Zones</b>	<b>12212 Btuh</b>
	Sensible Duct Load	3534 Btuh
	<b>Total Sensible Zone Loads</b>	<b>15746 Btuh</b>
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	<b>Total sensible gain</b>	<b>15746 Btuh</b>
	Latent infiltration gain (for 51 gr. humidity difference)	1286 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	572 Btuh
	Latent occupant gain (6.0 people @ 200 Btuh per person)	1200 Btuh
	Latent other gain	0 Btuh
	<b>Latent total gain</b>	<b>3058 Btuh</b>
	<b>TOTAL GAIN</b>	<b>18804 Btuh</b>

### EQUIPMENT

1. Central Unit	#	36000 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



# System Sizing Calculations - Winter

## Residential Load - Whole House Component Details

Project Title:  
Townsend  
Building Type: User

, FL

12/17/2021

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 0.20	Vinyl	0.26	N	30.0		10.4	312 Btuh	
2	2, NFRC 0.20	Vinyl	0.26	S	20.0		10.4	208 Btuh	
3	2, NFRC 0.20	Vinyl	0.26	W	15.0		10.4	156 Btuh	
4	2, NFRC 0.20	Vinyl	0.26	N	3.0		10.4	31 Btuh	
5	2, NFRC 0.20	Vinyl	0.26	N	15.0		10.4	156 Btuh	
6	2, NFRC 0.20	Vinyl	0.26	S	30.0		10.4	312 Btuh	
7	2, NFRC 0.20	Vinyl	0.26	W	13.3		10.4	139 Btuh	
8	2, NFRC 0.20	Vinyl	0.26	E	15.0		10.4	156 Btuh	
9	2, NFRC 0.20	Vinyl	0.26	E	16.0		10.4	166 Btuh	
	Window Total					157.3(sqft)			1636 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load	
1	Conc Blk,Hollow - Adj		(0.062)	13.0/0.6	107		2.47	264 Btuh	
2	Conc Blk,Hollow - Ext		(0.062)	13.0/0.6	11		2.47	27 Btuh	
3	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	255		2.56	654 Btuh	
4	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	88		2.56	225 Btuh	
5	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	103		2.56	265 Btuh	
6	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	372		2.56	954 Btuh	
7	Frame - Wood - Adj		(0.089)	13.0/0.0	234		3.55	832 Btuh	
8	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	86		2.56	220 Btuh	
9	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	43		2.56	109 Btuh	
10	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	58		2.56	148 Btuh	
11	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	41		2.56	105 Btuh	
12	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	148		2.56	379 Btuh	
13	Conc Blk,Hollow - Ext		(0.064)	13.0/0.0	329		2.56	844 Btuh	
	Wall Total					1875(sqft)			5026 Btuh
Doors	Type	Storm	Ueff.		Area	X	HTM=	Load	
1	Insulated - Exterior,	n	(0.400)		20		16.0	320 Btuh	
2	Insulated - Exterior,	n	(0.400)		20		16.0	320 Btuh	
3	Insulated - Exterior,	n	(0.400)		20		16.0	320 Btuh	
	Door Total					60(sqft)			960Btuh
Ceilings	Type/Color/Surface	Ueff.	R-Value		Area	X	HTM=	Load	
1	Vented Attic/L/Wood	(0.032)	30.0/0.0		2016		1.3	2568 Btuh	
	Ceiling Total					2016(sqft)			2568Btuh
Floors	Type	Ueff.	R-Value		Size	X	HTM=	Load	
1	Slab On Grade	(1.180)	0.0		217.0	ft(perim.)	47.2	10242 Btuh	
	Floor Total					2016 sqft			10242 Btuh
Envelope Subtotal:								20433 Btuh	

# Manual J Winter Calculations

## Residential Load - Component Details (continued)

Project Title:  
Townsend  
Building Type: User

, FL

12/17/2021

<b>Infiltration</b>	Type Natural	Wholehouse ACH 0.16	Volume(cuft) 18144	Wall Ratio 1.00	CFM= 49.7	2176 Btuh
<b>Duct load</b>	Extremely sealed, R8.0, Supply(Att), Return(Att) (DLM of 0.145)					3289 Btuh
<b>All Zones</b>	<b>Sensible Subtotal All Zones</b>					<b>25897 Btuh</b>

### WHOLE HOUSE TOTALS

<b>Totals for Heating</b>	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	25897 Btuh 0 Btuh 25897 Btuh
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### EQUIPMENT

1. Electric Heat Pump	#	36000 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