

Residential System Sizing Calculation

Summary

Project Title:
Howard Residence

, FL

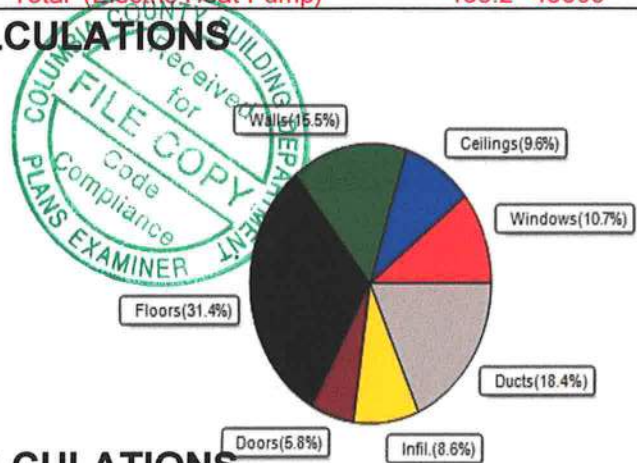
1/22/2021

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
Total heating load calculation	34749 Btuh	Total cooling load calculation	29418 Btuh
Submitted heating capacity	% of calc Btuh	Submitted cooling capacity	% of calc Btuh
Total (Electric Heat Pump)	138.1 48000	Sensible (SHR = 0.85)	166.5 40800
Heat Pump + Auxiliary(0.0kW)	138.1 48000	Latent	146.7 7200
		Total (Electric Heat Pump)	163.2 48000

WINTER CALCULATIONS

Winter Heating Load (for 2613 sqft)

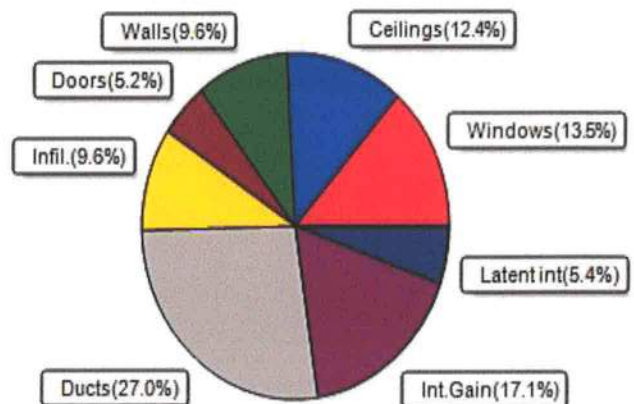
Load component		Load	
Window total	282 sqft	3722	Btuh
Wall total	1753 sqft	5379	Btuh
Door total	127 sqft	2027	Btuh
Ceiling total	2613 sqft	3329	Btuh
Floor total	See detail report	10903	Btuh
Infiltration	68 cfm	2985	Btuh
Duct loss		6404	Btuh
Subtotal		34749	Btuh
Ventilation	0 cfm	0	Btuh
TOTAL HEAT LOSS		34749	Btuh



SUMMER CALCULATIONS

Summer Cooling Load (for 2613 sqft)

Load component		Load	
Window total	282 sqft	3980	Btuh
Wall total	1753 sqft	2834	Btuh
Door total	127 sqft	1520	Btuh
Ceiling total	2613 sqft	3662	Btuh
Floor total		0	Btuh
Infiltration	51 cfm	1063	Btuh
Internal gain		5040	Btuh
Duct gain		6410	Btuh
Sens. Ventilation	0 cfm	0	Btuh
Blower Load		0	Btuh
Total sensible gain		24510	Btuh
Latent gain(ducts)		1543	Btuh
Latent gain(infiltration)		1764	Btuh
Latent gain(ventilation)		0	Btuh
Latent gain(internal/occupants/other)		1600	Btuh
Total latent gain		4908	Btuh
TOTAL HEAT GAIN		29418	Btuh



8th Edition

EnergyGauge® System Sizing

PREPARED BY: _____

DATE: _____

EnergyGauge® / USRCZB v6.1.04

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Project Title:
Howard Residence

, FL

1/22/2021

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	0.22, 0.33	No	No	N	11.5f	1.3ft	18.0	0.0	18.0	11	11	196 Btuh
2	2 NFRC	0.22, 0.33	No	No	N	11.5f	1.3ft	45.0	0.0	45.0	11	11	490 Btuh
3	2 NFRC	0.22, 0.33	No	No	S	1.5ft	1.3ft	36.0	36.0	0.0	11	13	392 Btuh
4	2 NFRC	0.22, 0.33	No	No	S	8.5ft	1.3ft	72.0	72.0	0.0	11	13	785 Btuh
5	2 NFRC	0.22, 0.33	No	No	S	1.5ft	1.3ft	36.0	36.0	0.0	11	13	392 Btuh
6	2 NFRC	0.22, 0.33	No	No	W	1.5ft	1.3ft	6.0	0.0	6.0	11	27	165 Btuh
7	2 NFRC	0.22, 0.33	No	No	W	1.5ft	1.3ft	30.0	0.0	30.0	11	27	824 Btuh
8	2 NFRC	0.22, 0.33	No	No	W	1.5ft	1.3ft	9.0	0.0	9.0	11	27	247 Btuh
9	2 NFRC	0.22, 0.33	No	No	S	1.5ft	1.3ft	30.0	30.0	0.0	11	13	327 Btuh
	Excursion												161 Btuh
	Window Total							282 (sqft)					3980 Btuh
Walls	Type	U-Value		R-Value		Area(sqft)		HTM		Load			
					Cav/Sheath								
1	Frame - Wood - Ext		0.08		19.0/0.6		169.5		1.6		273 Btuh		
2	Frame - Wood - Ext		0.08		19.0/0.6		116.5		1.6		187 Btuh		
3	Frame - Wood - Ext		0.08		19.0/0.6		180.7		1.6		291 Btuh		
4	Frame - Wood - Ext		0.08		19.0/0.6		147.0		1.6		236 Btuh		
5	Frame - Wood - Ext		0.08		19.0/0.6		90.0		1.6		145 Btuh		
6	Frame - Wood - Ext		0.08		19.0/0.6		33.0		1.6		53 Btuh		
7	Frame - Wood - Ext		0.08		19.0/0.6		197.7		1.6		318 Btuh		
8	Frame - Wood - Ext		0.08		19.0/0.6		33.0		1.6		53 Btuh		
9	Frame - Wood - Ext		0.08		19.0/0.6		90.0		1.6		145 Btuh		
10	Frame - Wood - Ext		0.08		19.0/0.6		364.5		1.6		586 Btuh		
11	Frame - Wood - Ext		0.08		19.0/0.6		127.3		1.6		205 Btuh		
12	Frame - Wood - Adj		0.09		13.0/0.0		203.5		1.7		343 Btuh		
	Wall Total						1753 (sqft)				2834 Btuh		
Doors	Type	Area (sqft)		HTM		Load							
1	Insulated - Exterior		20.0		12.0	240 Btuh							
2	Insulated - Exterior		33.3		12.0	400 Btuh							
3	Insulated - Exterior		20.0		12.0	240 Btuh							
4	Insulated - Exterior		33.3		12.0	400 Btuh							
5	Insulated - Garage		20.0		12.0	240 Btuh							
	Door Total					1520 Btuh							
	127 (sqft)												
Ceilings	Type/Color/Surface	U-Value		R-Value		Area(sqft)		HTM		Load			
1	Vented Attic/Light/Shingle		0.032		30.0/0.0		2255.0		1.40		3160 Btuh		
2	Vented Attic/Light/Shingle		0.032		30.0/0.0		358.0		1.40		502 Btuh		
	Ceiling Total					3662 Btuh							
	2613 (sqft)												
Floors	Type	R-Value		Size		HTM		Load					
1	Slab On Grade		0.0		2255 (ft-perimeter)		0.0		0 Btuh				
2	Interior		0.0		358 (sqft)		0.0		0 Btuh				
	Floor Total					0 Btuh							
	2613.0 (sqft)												
	Envelope Subtotal:											11996 Btuh	

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Howard Residence

, FL

1/22/2021

Infiltration	Type Natural	Average ACH 0.13	Volume(cuft) 23159	Wall Ratio 1	CFM= 51.1	Load 1063 Btuh
Internal gain		Occupants 8	Btuh/occupant X 230	Appliance +	3200	Load 5040 Btuh
	Sensible Envelope Load:					18099 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic) (DGM of 0.354)					6410 Btuh
	Sensible Load All Zones					24510 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Project Title: Climate:FL_GAINESVILLE_REGIONAL_A
Howard Residence

FL

1/22/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	Sensible Envelope Load All Zones	18099 Btuh
	Sensible Duct Load	6410 Btuh
	Total Sensible Zone Loads	24510 Btuh
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	24510 Btuh
	Latent infiltration gain (for 51 gr. humidity difference)	1764 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1543 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	4908 Btuh
	TOTAL GAIN	29418 Btuh

EQUIPMENT

1. Central Unit	#	48000 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

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Project Title:
Howard Residence
Building Type: User

, FL

1/22/2021

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 0.22	Vinyl	0.33	N	18.0		13.2	238 Btuh
2	2, NFRC 0.22	Vinyl	0.33	N	45.0		13.2	594 Btuh
3	2, NFRC 0.22	Vinyl	0.33	S	36.0		13.2	475 Btuh
4	2, NFRC 0.22	Vinyl	0.33	S	72.0		13.2	950 Btuh
5	2, NFRC 0.22	Vinyl	0.33	S	36.0		13.2	475 Btuh
6	2, NFRC 0.22	Vinyl	0.33	W	6.0		13.2	79 Btuh
7	2, NFRC 0.22	Vinyl	0.33	W	30.0		13.2	396 Btuh
8	2, NFRC 0.22	Vinyl	0.33	W	9.0		13.2	119 Btuh
9	2, NFRC 0.22	Vinyl	0.33	S	30.0		13.2	396 Btuh
	Window Total					282.0(sqft)		3722 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area	X	HTM=	Load
1	Frame - Wood	- Ext	(0.075)	19.0/0.6	170		3.01	509 Btuh
2	Frame - Wood	- Ext	(0.075)	19.0/0.6	117		3.01	350 Btuh
3	Frame - Wood	- Ext	(0.075)	19.0/0.6	181		3.01	543 Btuh
4	Frame - Wood	- Ext	(0.075)	19.0/0.6	147		3.01	442 Btuh
5	Frame - Wood	- Ext	(0.075)	19.0/0.6	90		3.01	271 Btuh
6	Frame - Wood	- Ext	(0.075)	19.0/0.6	33		3.01	99 Btuh
7	Frame - Wood	- Ext	(0.075)	19.0/0.6	198		3.01	594 Btuh
8	Frame - Wood	- Ext	(0.075)	19.0/0.6	33		3.01	99 Btuh
9	Frame - Wood	- Ext	(0.075)	19.0/0.6	90		3.01	271 Btuh
10	Frame - Wood	- Ext	(0.075)	19.0/0.6	365		3.01	1096 Btuh
11	Frame - Wood	- Ext	(0.075)	19.0/0.6	127		3.01	383 Btuh
12	Frame - Wood	- Adj	(0.089)	13.0/0.0	204		3.55	722 Btuh
	Wall Total					1753(sqft)		5379 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)		33		16.0	533 Btuh
3	Insulated - Exterior,	n	(0.400)		20		16.0	320 Btuh
4	Insulated - Exterior,	n	(0.400)		33		16.0	533 Btuh
5	Insulated - Garage,	n	(0.400)		20		16.0	320 Btuh
	Door Total					127(sqft)		2027Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area	X	HTM=	Load
1	Vented Attic/L/Shing		(0.032)	30.0/0.0	2255		1.3	2873 Btuh
2	Vented Attic/L/Shing		(0.032)	30.0/0.0	358		1.3	456 Btuh
	Ceiling Total					2613(sqft)		3329Btuh
Floors	Type		Ueff.	R-Value	Size	X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	231.0 ft(perim.)		47.2	10903 Btuh
2	Interior		(1.180)	0.0	358.0 sqft		0.0	0 Btuh
	Floor Total					2613 sqft		10903 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Project Title:
Howard Residence
Building Type: User

, FL

1/22/2021

	Envelope Subtotal:						25360 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.18	23159	1.00	68.2	2985 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)					(DLM of 0.226)	6404 Btuh
All Zones	Sensible Subtotal All Zones						34749 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	34749 Btuh
	Ventilation Sensible Heat Loss	0 Btuh
	Total Heat Loss	34749 Btuh

EQUIPMENT

1. Electric Heat Pump	#	48000 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