Residential System Sizing Calculation

Summary

Richard & Ann Wright

Lake City, FL 32024

Project Title:
Wright Residence

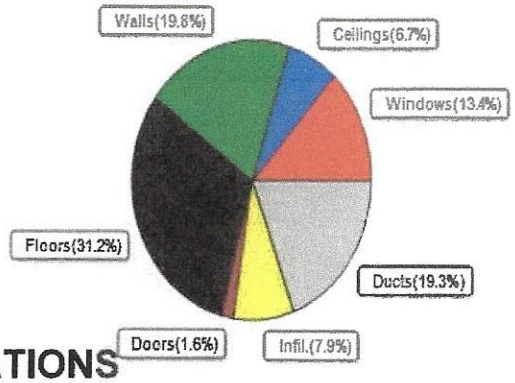
9/20/2021

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	**51335**	**Btuh**	**Total cooling load calculation**	**38470**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	100.0	51335	Sensible (SHR = 0.70)	83.9	26586
Heat Pump + Auxiliary(0.0kW)	100.0	51335	Latent	168.3	11394
			Total (Electric Heat Pump)	98.7	37980

WINTER CALCULATIONS

Winter Heating Load (for 3250 sqft)

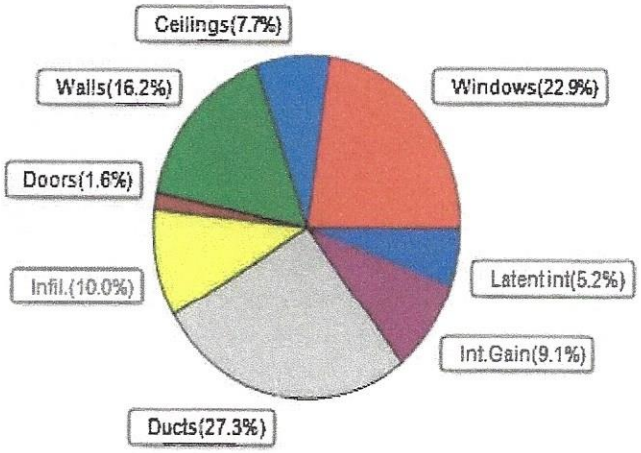
Load component			Load	
Window total	479	sqft	6893	Btuh
Wall total	2867	sqft	10180	Btuh
Door total	44	sqft	810	Btuh
Ceiling total	3413	sqft	3465	Btuh
Floor total	3250	sqft	16001	Btuh
Infiltration	93	cfm	4065	Btuh
Duct loss			9921	Btuh
Subtotal			**51335**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**51335**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 3250 sqft)

Load component			Load	
Window total	479	sqft	8820	Btuh
Wall total	2867	sqft	6244	Btuh
Door total	44	sqft	607	Btuh
Ceiling total	3413	sqft	2945	Btuh
Floor total			0	Btuh
Infiltration	70	cfm	1448	Btuh
Internal gain			3500	Btuh
Duct gain			8134	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**31699**	**Btuh**
Latent gain(ducts)			2368	Btuh
Latent gain(infiltration)			2403	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			2000	Btuh
Total latent gain			**6771**	**Btuh**
TOTAL HEAT GAIN			**38470**	**Btuh**



8th Edition

EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 9/20/2021

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Richard & Ann Wright

Lake City, FL 32024

Project Title:
Wright Residence
Building Type: User

9/20/2021

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 0.25	Vinyl	0.36	SE	18.0	14.4	259 Btuh
2	2, NFRC 0.25	Vinyl	0.36	SE	72.0	14.4	1037 Btuh
3	2, NFRC 0.25	TIM	0.36	SE	42.7	14.4	614 Btuh
4	2, NFRC 0.25	Vinyl	0.36	SE	36.0	14.4	518 Btuh
5	2, NFRC 0.25	Vinyl	0.36	NE	18.0	14.4	259 Btuh
6	2, NFRC 0.25	Vinyl	0.36	NW	18.0	14.4	259 Btuh
7	2, NFRC 0.25	Vinyl	0.36	NW	4.0	14.4	58 Btuh
8	2, NFRC 0.25	Vinyl	0.36	NW	24.0	14.4	346 Btuh
9	2, NFRC 0.25	TIM	0.36	W	128.0	14.4	1843 Btuh
10	2, NFRC 0.25	Vinyl	0.36	NW	54.0	14.4	778 Btuh
11	2, NFRC 0.25	Vinyl	0.36	SW	36.0	14.4	518 Btuh
12	2, NFRC 0.25	Vinyl	0.36	SW	16.0	14.4	230 Btuh
13	2, NFRC 0.25	Vinyl	0.36	SW	12.0	14.4	173 Btuh
	Window Total				478.7(sqft)		6893 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	112	3.55	398 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	100	3.55	355 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	285	3.55	1013 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	265	3.55	941 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	137	3.55	488 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	60	3.55	213 Btuh
7	Frame - Wood	- Adj	(0.089)	13.0/0.0	426	3.55	1512 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	197	3.55	699 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	175	3.55	620 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	80	3.55	284 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	89	3.55	317 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	87	3.55	308 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	102	3.55	362 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	167	3.55	592 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	109	3.55	388 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	476	3.55	1690 Btuh
	Wall Total				2867(sqft)		10180 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Garage,	n	(0.460)	24	18.4	442 Btuh
2	Insulated - Exterior,	n	(0.460)	20	18.4	368 Btuh
	Door Total			44(sqft)		810Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/L/Shing	(0.025)	38.0/0.0	3413	1.0	3465 Btuh
	Ceiling Total			3413(sqft)		3465Btuh

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	339.0 ft(perim.)	47.2	16001 Btuh
	Floor Total			3250 sqft		16001 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Richard & Ann Wright

Lake City, FL 32024

Project Title:
Wright Residence
Building Type: User

9/20/2021

	Envelope Subtotal:	37348 Btuh
Infiltration	Type Wholehouse ACH Volume(cuft) Wall Ratio CFM= Natural 0.17 32500 1.00 92.8	4065 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att) (DLM of 0.240)	9921 Btuh
All Zones	**Sensible Subtotal All Zones**	**51335 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	51335 Btuh 0 Btuh 51335 Btuh

EQUIPMENT

1. Electric Heat Pump	#	51335 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 - Whole House Component Details

Richard & Ann Wright

Lake City, FL 32024

Project Title:
Wright Residence

9/20/2021

Reference City: Gainesville, FL Temperature Difference: 19.0F(TMY3 99%) Humidity difference: 51gr.

Component Loads for Whole House

Window	Type* Panes	SHGC	U	InSh	IS	Ornt	Overhang Len	Hgt	Window Area(sqft) Gross	Shaded	Unshaded	HTM Shaded	Unshaded	Load
1	2 NFRC	0.25, 0.36	No	No	SE	1.0ft.	3.0ft.	18.0	0.0	18.0	12	25	446 Btuh
2	2 NFRC	0.25, 0.36	No	No	SE	9.5ft.	1.0ft.	72.0	72.0	0.0	12	25	871 Btuh
3	2 NFRC	0.25, 0.36	No	No	SE	9.5ft.	1.0ft.	42.7	42.7	0.0	12	25	516 Btuh
4	2 NFRC	0.25, 0.36	No	No	SE	1.0ft.	3.0ft.	36.0	0.0	36.0	12	25	891 Btuh
5	2 NFRC	0.25, 0.36	No	No	NE	1.5ft.	1.0ft.	18.0	0.0	18.0	12	24	426 Btuh
6	2 NFRC	0.25, 0.36	No	No	NW	1.5ft.	1.0ft.	18.0	0.0	18.0	12	24	426 Btuh
7	2 NFRC	0.25, 0.36	No	No	NW	1.5ft.	1.0ft.	4.0	0.0	4.0	12	24	95 Btuh
8	2 NFRC	0.25, 0.36	No	No	NW	9.5ft.	1.0ft.	24.0	0.0	24.0	12	24	567 Btuh
9	2 NFRC	0.25, 0.36	No	No	W	18.0f	1.0ft.	128.0	128.0	0.0	12	31	1549 Btuh
10	2 NFRC	0.25, 0.36	No	No	NW	1.5ft.	1.0ft.	54.0	0.0	54.0	12	24	1277 Btuh
11	2 NFRC	0.25, 0.36	No	No	SW	1.5ft.	1.0ft.	36.0	8.8	27.2	12	25	780 Btuh
12	2 NFRC	0.25, 0.36	No	No	SW	1.5ft.	1.0ft.	16.0	11.7	4.3	12	25	247 Btuh
13	2 NFRC	0.25, 0.36	No	No	SW	1.5ft.	1.0ft.	12.0	4.4	7.6	12	25	241 Btuh
	Excursion												490 Btuh
	Window Total							479 (sqft)					8820 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	112.0	2.3	253 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	100.0	2.3	226 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	285.3	2.3	646 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	265.0	2.3	600 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	137.3	2.3	311 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	60.0	2.3	136 Btuh
7	Frame - Wood - Adj	0.09	13.0/0.0	426.0	1.7	718 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	197.0	2.3	446 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	174.7	2.3	395 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	80.0	2.3	181 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	89.3	2.3	202 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	86.7	2.3	196 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	102.0	2.3	231 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	166.7	2.3	377 Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	109.3	2.3	247 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	476.0	2.3	1077 Btuh
	Wall Total			2867 (sqft)		6244 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Garage	24.0	13.8	331 Btuh
2	Insulated - Exterior	20.0	13.8	276 Btuh
	Door Total	44 (sqft)		607 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Vented Attic/Light/Shingle/RB	0.025	38.0/0.0	3413.0	0.86	2945 Btuh
	Ceiling Total			3413 (sqft)		2945 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	3250 (ft-perimeter)	0.0	0 Btuh
	Floor Total		3250.0 (sqft)		0 Btuh

	Envelope Subtotal:	18616 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Richard & Ann Wright

Lake City, FL 32024

Project Title: Wright Residence

Climate:FL_GAINESVILLE_REGIONAL_A

9/20/2021

Infiltration	Type Natural	Average ACH 0.13	Volume(cuft) 32500	Wall Ratio 1	CFM= 69.6	Load 1448 Btuh
Internal gain		Occupants 10	Btuh/occupant X 230	+	Appliance 1200	Load 3500 Btuh
				Sensible Envelope Load:		23565 Btuh
Duct load	Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic)			(DGM of 0.345)		8134 Btuh
				Sensible Load All Zones		**31699 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Richard & Ann Wright
Lake City, FL 32024

Project Title: Wright Residence
Climate:FL_GAINESVILLE_REGIONAL_A

9/20/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**23565 Btuh**
	Sensible Duct Load	8134 Btuh
	Total Sensible Zone Loads	**31699 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**31699 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	2403 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	2368 Btuh
	Latent occupant gain (10.0 people @ 200 Btuh per person)	2000 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**6771 Btuh**
	TOTAL GAIN	**38470 Btuh**

EQUIPMENT

1. Central Unit	#	37980 Btuh

*Key: Window types (Panes - 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)

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