Residential System Sizing Calculation

Summary

Glenwood King

Lake City, FL

Project Title:
200712 King

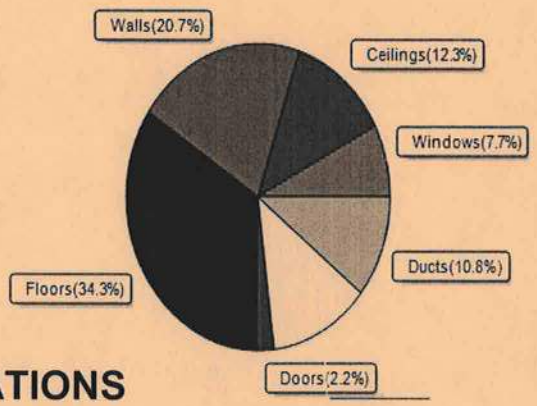
2020-07-02

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	**23976**	**Btuh**	**Total cooling load calculation**	**18501**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	112.6	27000	Sensible (SHR = 0.75)	135.0	20250
Heat Pump + Auxiliary(0.0kW)	112.6	27000	Latent	192.7	6750
			Total (Electric Heat Pump)	145.9	27000

WINTER CALCULATIONS

Winter Heating Load (for 1730 sqft)

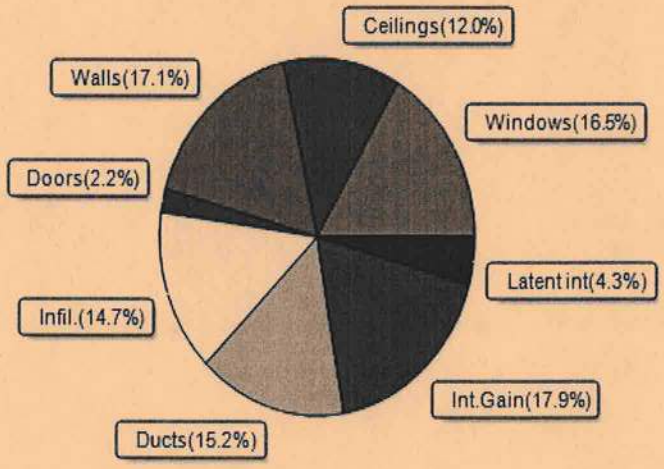
Load component			Load	
Window total	132	sqft	1843	Btuh
Wall total	1401	sqft	4974	Btuh
Door total	33	sqft	533	Btuh
Ceiling total	1730	sqft	2957	Btuh
Floor total	1730	sqft	8213	Btuh
Infiltration	66	cfm	2870	Btuh
Duct loss			2585	Btuh
Subtotal			**23976**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**23976**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 1730 sqft)

Load component			Load	
Window total	132	sqft	3059	Btuh
Wall total	1401	sqft	3171	Btuh
Door total	33	sqft	400	Btuh
Ceiling total	1730	sqft	2218	Btuh
Floor total			0	Btuh
Infiltration	49	cfm	1023	Btuh
Internal gain			3320	Btuh
Duct gain			1807	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**14997**	**Btuh**
Latent gain(ducts)			1006	Btuh
Latent gain(infiltration)			1697	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			800	Btuh
Total latent gain			**3503**	**Btuh**
TOTAL HEAT GAIN			**18501**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2020-07-02

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Glenwood King
Lake City, FL

Project Title:
200712 King
Building Type: User

2020-07-02

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	Metal	0.35	NE	15.0	14.0	210 Btuh
2	2, NFRC 0.25	Metal	0.35	NE	6.0	14.0	84 Btuh
3	2, NFRC 0.25	Metal	0.35	NE	13.3	14.0	187 Btuh
4	2, NFRC 0.25	Metal	0.35	NE	15.0	14.0	210 Btuh
5	2, NFRC 0.25	Metal	0.35	SE	13.3	14.0	187 Btuh
6	2, NFRC 0.25	Metal	0.35	SW	30.0	14.0	420 Btuh
7	2, NFRC 0.25	Metal	0.35	SW	15.0	14.0	210 Btuh
8	2, NFRC 0.25	Metal	0.35	SW	15.0	14.0	210 Btuh
9	2, NFRC 0.25	Metal	0.35	NW	9.0	14.0	126 Btuh
	Window Total				131.7(sqft)		1843 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	249	3.55	884 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	190	3.55	675 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	268	3.55	951 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	105	3.55	373 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	190	3.55	675 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	120	3.55	426 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	261	3.55	927 Btuh
	Wall Total				1401(sqft)		4974 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)	7	16.0	107 Btuh
2	Insulated - Exterior,	n	(0.400)	7	16.0	107 Btuh
3	Insulated - Exterior,	n	(0.400)	20	16.0	320 Btuh
	Door Total			33(sqft)		533Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Unvent Attic/D/Shing	(0.043)	0.5/22.0	1730	1.7	2957 Btuh
	Ceiling Total			1730(sqft)		2957Btuh

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	174.0 ft(perim.)	47.2	8213 Btuh
	Floor Total			1730 sqft		8213 Btuh

	Envelope Subtotal:	18521 Btuh

Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.25	15570	1.00	65.5	2870 Btuh

Duct load	Average sealed, R6.0, Supply(Att), Return(Att)	(DLM of 0.121)	2585 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Glenwood King

Lake City, FL

Project Title:
200712 King
Building Type: User

2020-07-02

All Zones	Sensible Subtotal All Zones	23976 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	23976 Btuh 0 Btuh 23976 Btuh

EQUIPMENT

1. Electric Heat Pump	#	27000 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)

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System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Glenwood King

Lake City, FL

Project Title:
200712 King

2020-07-02

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, 0.35		No	No	NE	1.5ft.	1.5ft.	15.0	0.0	15.0	12	23	352 Btuh
2	2 NFRC	0.25, 0.35		No	No	NE	1.5ft.	1.5ft.	6.0	0.0	6.0	12	23	141 Btuh
3	2 NFRC	0.25, 0.35		No	No	NE	9.5ft.	1.0ft.	13.3	0.0	13.3	12	23	313 Btuh
4	2 NFRC	0.25, 0.35		No	No	NE	9.5ft.	1.0ft.	15.0	0.0	15.0	12	23	352 Btuh
5	2 NFRC	0.25, 0.35		No	No	SE	22.0f	1.0ft.	13.3	13.3	0.0	12	25	159 Btuh
6	2 NFRC	0.25, 0.35		No	No	SW	1.5ft.	1.5ft.	30.0	5.8	24.2	12	25	663 Btuh
7	2 NFRC	0.25, 0.35		No	No	SW	9.5ft.	1.0ft.	15.0	15.0	0.0	12	25	179 Btuh
8	2 NFRC	0.25, 0.35		No	No	SW	1.5ft.	1.5ft.	15.0	2.9	12.1	12	25	332 Btuh
9	2 NFRC	0.25, 0.35		No	No	NW	1.5ft.	1.5ft.	9.0	0.0	9.0	12	23	211 Btuh
	Excursion													359 Btuh
	Window Total								132 (sqft)					3059 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	249.0	2.3	564 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	190.0	2.3	430 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	268.0	2.3	607 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	105.0	2.3	238 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	190.0	2.3	430 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	120.0	2.3	272 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	261.0	2.3	591 Btuh
	Wall Total			1401 (sqft)		3171 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	6.7	12.0	80 Btuh
2	Insulated - Exterior	6.7	12.0	80 Btuh
3	Insulated - Exterior	20.0	12.0	240 Btuh
	Door Total	33 (sqft)		400 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Unvented Attic/DarkShingle	0.043	0.5/22.0	1730.0	1.28	2218 Btuh
	Ceiling Total			1730 (sqft)		2218 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	1730 (ft-perimeter)	0.0	0 Btuh
	Floor Total		1730.0 (sqft)		0 Btuh
			Envelope Subtotal:		8848 Btuh

Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio	CFM=	Load
	Natural	0.19	15570	1	49.2	1023 Btuh

Internal gain	Occupants	Btuh/occupant		Appliance	Load
	4	X 230	+	2400	3320 Btuh
			Sensible Envelope Load:		13191 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Glenwood King

Lake City, FL

Project Title: 200712 King

Climate:FL_GAINESVILLE_REGIONAL_A

2020-07-02

Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)	(DGM of 0.137)	1807 Btuh
		Sensible Load All Zones	**14997 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Glenwood King

Lake City, FL

Project Title: 200712 King

Climate:FL_GAINESVILLE_REGIONAL_A

2020-07-02

WHOLE HOUSE TOTALS

	Sensible Envelope Load All Zones	**13191 Btuh**
	Sensible Duct Load	1807 Btuh
	Total Sensible Zone Loads	**14997 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
Whole House	**Total sensible gain**	**14997 Btuh**
Totals for Cooling	Latent infiltration gain (for 51 gr. humidity difference)	1697 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1006 Btuh
	Latent occupant gain (4.0 people @ 200 Btuh per person)	800 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**3503 Btuh**
	TOTAL GAIN	**18501 Btuh**

EQUIPMENT

1. Central Unit	#	27000 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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