Residential System Sizing Calculation

Summary

Nottingham Res

Project Title:
210812 Nottingham

Lake City, FL

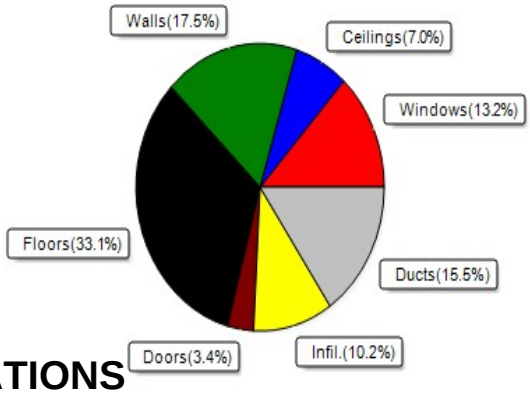
2021-06-02

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	**31371**	**Btuh**	**Total cooling load calculation**	**26812**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	108.4	34000	Sensible (SHR = 0.75)	113.2	25500
Heat Pump + Auxiliary(0.0kW)	108.4	34000	Latent	198.2	8500
			Total (Electric Heat Pump)	126.8	34000

WINTER CALCULATIONS

Winter Heating Load (for 2045 sqft)

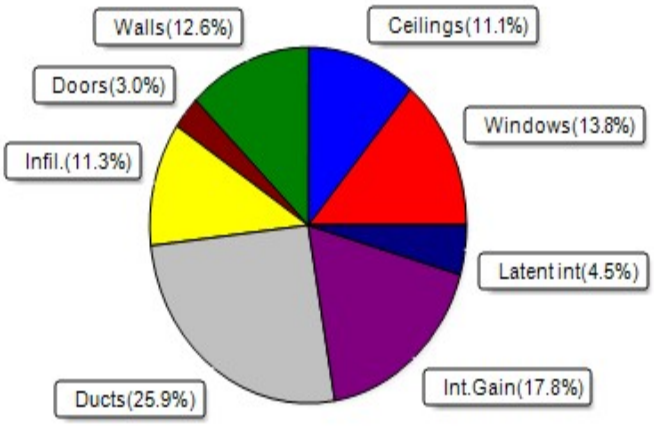
Load component			Load	
Window total	346	sqft	4156	Btuh
Wall total	1551	sqft	5505	Btuh
Door total	67	sqft	1067	Btuh
Ceiling total	2176	sqft	2209	Btuh
Floor total	2045	sqft	10384	Btuh
Infiltration	73	cfm	3187	Btuh
Duct loss			4863	Btuh
Subtotal			**31371**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**31371**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2045 sqft)

Load component			Load	
Window total	346	sqft	3706	Btuh
Wall total	1551	sqft	3391	Btuh
Door total	67	sqft	800	Btuh
Ceiling total	2176	sqft	2982	Btuh
Floor total			0	Btuh
Infiltration	55	cfm	1135	Btuh
Internal gain			4780	Btuh
Duct gain			5729	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**22524**	**Btuh**
Latent gain(ducts)			1204	Btuh
Latent gain(infiltration)			1884	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1200	Btuh
Total latent gain			**4288**	**Btuh**
TOTAL HEAT GAIN			**26812**	**Btuh**



8th Edition

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2021-06-02

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Nottingham Res
Lake City, FL

Project Title:
210812 Nottingham
Building Type: User

2021-06-02

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 0.22	Metal	0.30	N	36.0	12.0	432 Btuh
2	2, NFRC 0.22	Metal	0.30	E	13.3	12.0	160 Btuh
3	2, NFRC 0.22	Metal	0.30	N	42.0	12.0	504 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	30.0	12.0	360 Btuh
6	2, NFRC 0.22	Metal	0.30	E	4.0	12.0	48 Btuh
7	2, NFRC 0.22	Metal	0.30	S	36.0	12.0	432 Btuh
8	2, NFRC 0.22	Metal	0.30	S	36.0	12.0	432 Btuh
9	2, NFRC 0.22	Metal	0.30	S	32.0	12.0	384 Btuh
10	2, NFRC 0.22	Metal	0.30	SE	36.0	12.0	432 Btuh
11	2, NFRC 0.22	Metal	0.30	W	4.0	12.0	48 Btuh
12	2, NFRC 0.22	Metal	0.30	W	5.0	12.0	60 Btuh
	Window Total				346.3(sqft)		4156 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	89	3.55	317 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	83	3.55	294 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	60	3.55	213 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	36	3.55	128 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	44	3.55	154 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	107	3.55	381 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	106	3.55	375 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	23	3.55	80 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	52	3.55	186 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	23	3.55	80 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	107	3.55	378 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	101	3.55	359 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	90	3.55	320 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	24	3.55	85 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
17	Frame - Wood	- Ext	(0.089)	13.0/0.0	30	3.55	107 Btuh
18	Frame - Wood	- Adj	(0.089)	13.0/0.0	81	3.55	288 Btuh
19	Frame - Wood	- Adj	(0.089)	13.0/0.0	27	3.55	96 Btuh
20	Frame - Wood	- Adj	(0.089)	13.0/0.0	97	3.55	344 Btuh
21	Frame - Wood	- Ext	(0.089)	13.0/0.0	68	3.55	240 Btuh
22	Frame - Wood	- Ext	(0.089)	13.0/0.0	269	3.55	953 Btuh
	Wall Total				1551(sqft)		5505 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Nottingham Res
Project Title:
210812 Nottingham
Lake City, FL
Building Type: User
2021-06-02

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)		24	16.0	384 Btuh
3	Insulated - Exterior,	n	(0.400)		16	16.0	256 Btuh
4	Insulated - Garage,	n	(0.400)		20	16.0	320 Btuh
	Door Total				67(sqft)		1067Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/D/Shing		(0.025)	38.0/0.0	2176	1.0	2209 Btuh
	Ceiling Total				2176(sqft)		2209Btuh
Floors	Type		Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	220.0 ft(perim.)	47.2	10384 Btuh
	Floor Total				2045 sqft		10384 Btuh
					Envelope Subtotal:		23321 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.23	18814	1.00	72.8	3187 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)					(DLM of 0.183)	4863 Btuh
All Zones					**Sensible Subtotal All Zones**		**31371 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	31371 Btuh
	Ventilation Sensible Heat Loss	0 Btuh
	Total Heat Loss	31371 Btuh

EQUIPMENT

1. Electric Heat Pump	#	34000 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Nottingham Res

Project Title:
210812 Nottingham

Lake City, FL

Building Type: User

2021-06-02

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

Nottingham Res

Project Title:
210812 Nottingham

Lake City, FL

2021-06-02

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

Component Loads for Whole House

	Type*					Overhang		Window Area(sqft)			HTM		Load	
Window	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	36.0	0.0	36.0	10	10	372	Btuh
2	2 NFRC	0.22, 0.30		No	No	E	29.3f	1.0ft	13.3	13.3	0.0	10	27	138	Btuh
3	2 NFRC	0.22, 0.30		No	No	N	8.5ft	1.0ft	42.0	0.0	42.0	10	10	434	Btuh
4	2 NFRC	0.22, 0.30		No	No	N	12.5f	0.5ft	72.0	0.0	72.0	10	10	744	Btuh
5	2 NFRC	0.22, 0.30		No	No	N	1.5ft	1.0ft	30.0	0.0	30.0	10	10	310	Btuh
6	2 NFRC	0.22, 0.30		No	No	E	1.5ft	0.5ft	4.0	3.0	1.0	10	27	58	Btuh
7	2 NFRC	0.22, 0.30		No	No	S	1.5ft	1.0ft	36.0	36.0	0.0	10	12	372	Btuh
8	2 NFRC	0.22, 0.30		No	No	S	5.2ft	1.0ft	36.0	36.0	0.0	10	12	372	Btuh
9	2 NFRC	0.22, 0.30		No	No	S	12.5f	0.5ft	32.0	32.0	0.0	10	12	330	Btuh
10	2 NFRC	0.22, 0.30		No	No	SE	9.0ft	1.0ft	36.0	36.0	0.0	10	21	372	Btuh
11	2 NFRC	0.22, 0.30		No	No	W	1.5ft	1.0ft	4.0	1.0	3.0	10	27	91	Btuh
12	2 NFRC	0.22, 0.30		No	No	W	1.5ft	1.0ft	5.0	1.2	3.8	10	27	114	Btuh
	Window Total								346 (sqft)					3706	Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load	
1	Frame - Wood - Ext	0.09	13.0/0.0	89.3	2.3	202	Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	82.8	2.3	187	Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	60.0	2.3	136	Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	36.0	2.3	81	Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	43.5	2.3	98	Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	107.3	2.3	243	Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	105.8	2.3	239	Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	22.5	2.3	51	Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	52.3	2.3	118	Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	22.5	2.3	51	Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	106.5	2.3	241	Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	101.3	2.3	229	Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	90.0	2.3	204	Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41	Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	24.0	2.3	54	Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41	Btuh
17	Frame - Wood - Ext	0.09	13.0/0.0	30.0	2.3	68	Btuh
18	Frame - Wood - Adj	0.09	13.0/0.0	81.0	1.7	137	Btuh
19	Frame - Wood - Adj	0.09	13.0/0.0	27.0	1.7	46	Btuh
20	Frame - Wood - Adj	0.09	13.0/0.0	97.0	1.7	164	Btuh
21	Frame - Wood - Ext	0.09	13.0/0.0	67.5	2.3	153	Btuh
22	Frame - Wood - Ext	0.09	13.0/0.0	268.5	2.3	608	Btuh
	Wall Total			1551 (sqft)		3391	Btuh

Doors	Type	Area (sqft)	HTM	Load	
1	Insulated - Exterior	6.7	12.0	80	Btuh
2	Insulated - Exterior	24.0	12.0	288	Btuh
3	Insulated - Exterior	16.0	12.0	192	Btuh
4	Insulated - Garage	20.0	12.0	240	Btuh
	Door Total	67 (sqft)		800	Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load	
1	Vented Attic/DarkShingle	0.025	38.0/0.0	2176.0	1.37	2982	Btuh
	Ceiling Total			2176 (sqft)		2982	Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Nottingham Res | Project Title: 210812 Nottingham | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-06-02

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2045 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2045.0 (sqft)		0 Btuh
			Envelope Subtotal:		10880 Btuh

Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio	CFM=	Load
	Natural	0.17	18814	1	54.6	1135 Btuh
Internal gain		Occupants	Btuh/occupant		Appliance	Load
		6	X 230	+	3400	4780 Btuh
				Sensible Envelope Load:		16795 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)			(DGM of 0.341)		5729 Btuh
				Sensible Load All Zones		**22524 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Nottingham Res | Project Title: 210812 Nottingham | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-06-02

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**16795**	**Btuh**
	Sensible Duct Load	5729	Btuh
	Total Sensible Zone Loads	**22524**	**Btuh**
	Sensible ventilation	0	Btuh
	Blower	0	Btuh
	Total sensible gain	**22524**	**Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	1884	Btuh
	Latent ventilation gain	0	Btuh
	Latent duct gain	1204	Btuh
	Latent occupant gain (6.0 people @ 200 Btuh per person)	1200	Btuh
	Latent other gain	0	Btuh
	Latent total gain	**4288**	**Btuh**
	TOTAL GAIN	**26812**	**Btuh**

EQUIPMENT

1. Central Unit	#	34000 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)

Version 8