Residential System Sizing Calculation

Summary

Aileen Crapps

Lake City, FL

Project Title:
240224 Crapps

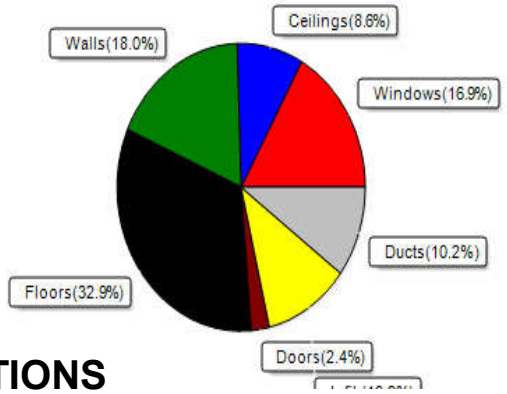
2024-02-27

Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(100 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	**34963**	**Btuh**	**Total cooling load calculation**	**27237**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	108.7	38000	Sensible (SHR = 0.75)	125.1	28500
Heat Pump + Auxiliary(0.0kW)	108.7	38000	Latent	212.9	9500
			Total (Electric Heat Pump)	139.5	38000

WINTER CALCULATIONS

Winter Heating Load (for 2369 sqft)

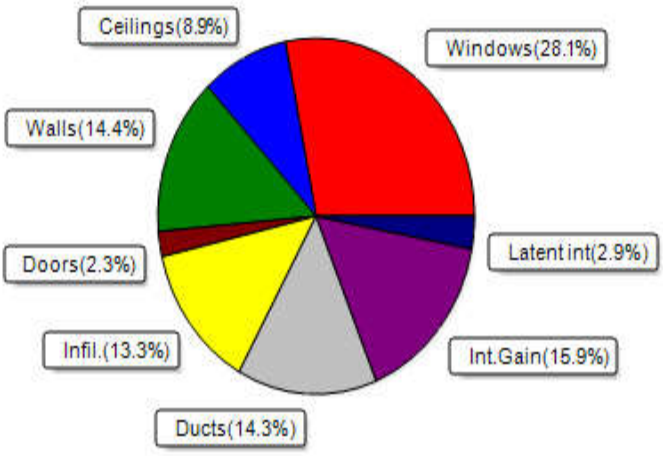
Load component			Load	
Window total	423	sqft	5922	Btuh
Wall total	1725	sqft	6278	Btuh
Door total	52	sqft	832	Btuh
Ceiling total	2509	sqft	3023	Btuh
Floor total	2369	sqft	11517	Btuh
Infiltration	87	cfm	3811	Btuh
Duct loss			3580	Btuh
Subtotal			**34963**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**34963**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2369 sqft)

Load component			Load	
Window total	423	sqft	7661	Btuh
Wall total	1725	sqft	3911	Btuh
Door total	52	sqft	624	Btuh
Ceiling total	2509	sqft	2419	Btuh
Floor total			0	Btuh
Infiltration	65	cfm	1358	Btuh
Internal gain			4320	Btuh
Duct gain			2483	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**22775**	**Btuh**
Latent gain(ducts)			1409	Btuh
Latent gain(infiltration)			2253	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			800	Btuh
Total latent gain			**4461**	**Btuh**
TOTAL HEAT GAIN			**27237**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2024-02-27

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Aileen Crapps

Project Title:
240224 Crapps

Lake City, FL

Building Type: User

2024-02-27

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 °F (TMY3 99%)
Winter Setpoint: 70 °F (Required Manual J default)

Component Loads for Whole House

Window	Panes/Type	Frame	U	Orientation	Area(sqft) X	HTM=	Load
1	2, NFRC 0.25	Metal	0.35	N	36.0	14.0	504 Btuh
2	2, NFRC 0.25	Metal	0.35	NE	16.0	14.0	224 Btuh
3	2, NFRC 0.25	Metal	0.35	N	54.0	14.0	756 Btuh
4	2, NFRC 0.25	Metal	0.35	E	56.0	14.0	784 Btuh
5	2, NFRC 0.25	Metal	0.35	N	72.0	14.0	1008 Btuh
6	2, NFRC 0.25	Metal	0.35	N	36.0	14.0	504 Btuh
7	2, NFRC 0.25	Metal	0.35	E	15.0	14.0	210 Btuh
8	2, NFRC 0.25	Metal	0.35	E	15.0	14.0	210 Btuh
9	2, NFRC 0.25	Metal	0.35	E	8.0	14.0	112 Btuh
10	2, NFRC 0.25	Metal	0.35	S	30.0	14.0	420 Btuh
11	2, NFRC 0.25	Metal	0.35	S	32.0	14.0	448 Btuh
12	2, NFRC 0.25	Metal	0.35	S	15.0	14.0	210 Btuh
13	2, NFRC 0.25	Metal	0.35	W	15.0	14.0	210 Btuh
14	2, NFRC 0.25	Metal	0.35	W	15.0	14.0	210 Btuh
15	2, NFRC 0.25	Metal	0.35	W	8.0	14.0	112 Btuh
	Window Total				423.0(sqft)		5922 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	87	3.55	309 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	91	3.55	322 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	11	3.55	40 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	62	3.55	221 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	22	3.55	76 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	66	3.55	234 Btuh
7	Frame - Wood	- Ext	(0.240)	0.0/0.0	26	9.60	245 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	99	3.55	351 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	298	3.55	1058 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	122	3.55	431 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	53	3.55	186 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	125	3.55	442 Btuh
13	Frame - Wood	- Adj	(0.089)	13.0/0.0	34	3.55	121 Btuh
14	Frame - Wood	- Adj	(0.089)	13.0/0.0	33	3.55	117 Btuh
15	Frame - Wood	- Adj	(0.089)	13.0/0.0	144	3.55	511 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	454	3.55	1612 Btuh
	Wall Total				1725(sqft)		6278 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)	8	16.0	128 Btuh
2	Insulated - Exterior,	n	(0.400)	8	16.0	128 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			52(sqft)		832Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Aileen Crapps

Project Title:
240224 Crapps

Lake City, FL

Building Type: User

2024-02-27

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Flat ceil/D/Shing	(0.241)	0.0/22.0	2369	1.2	2855 Btuh
2	Knee wall/D/Shing	(0.241)	0.0/22.0	140	1.2	169 Btuh
	Ceiling Total			2509(sqft)		3023Btuh
Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	244.0 ft(perim.)	47.2	11517 Btuh
	Floor Total			2369 sqft		11517 Btuh
				Envelope Subtotal:		27572 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=
	Natural		0.23	22269	1.00	86.9	3811 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)				(DLM of 0.114)	3580 Btuh
All Zones	**Sensible Subtotal All Zones**					**34963 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	34963 Btuh
	Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Total Heat Loss	34963 Btuh

EQUIPMENT

1. Electric Heat Pump	#	38000 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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Version 8

System Sizing Calculations - Summer

Residential Load - Whole House Component Details

Aileen Crapps

Project Title:
240224 Crapps

Lake City, FL

2024-02-27

Reference City: Gainesville, FL (Defaults)
Humidity difference: 51gr.

Temperature Difference: 19.0F(TMY3 99%)
Summer Setpoint: 75 °F (Required Manual J default)

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	N	1.5ft	1.0ft	36.0	1.5	34.5	12	31	1079 Btuh
2	2 NFRC	0.25, 0.35		No	No	NE	16.0f	0.5ft	16.0	0.0	16.0	12	23	375 Btuh
3	2 NFRC	0.25, 0.35		No	No	N	14.3f	0.5ft	54.0	54.0	0.0	12	31	643 Btuh
4	2 NFRC	0.25, 0.35		No	No	E	17.0f	0.5ft	56.0	0.0	56.0	12	12	667 Btuh
5	2 NFRC	0.25, 0.35		No	No	N	13.8f	0.5ft	72.0	72.0	0.0	12	31	857 Btuh
6	2 NFRC	0.25, 0.35		No	No	N	1.5ft	1.0ft	36.0	1.5	34.5	12	31	1079 Btuh
7	2 NFRC	0.25, 0.35		No	No	E	1.5ft	3.0ft	15.0	0.0	15.0	12	12	179 Btuh
8	2 NFRC	0.25, 0.35		No	No	E	1.5ft	8.0ft	15.0	0.0	15.0	12	12	179 Btuh
9	2 NFRC	0.25, 0.35		No	No	E	1.5ft	7.0ft	8.0	0.0	8.0	12	12	95 Btuh
10	2 NFRC	0.25, 0.35		No	No	S	1.5ft	1.0ft	30.0	1.2	28.8	12	31	899 Btuh
11	2 NFRC	0.25, 0.35		No	No	S	9.0ft	0.5ft	32.0	27.9	4.1	12	31	459 Btuh
12	2 NFRC	0.25, 0.35		No	No	S	9.0ft	1.0ft	15.0	15.0	0.0	12	31	179 Btuh
13	2 NFRC	0.25, 0.35		No	No	W	1.5ft	5.0ft	15.0	10.6	4.4	12	14	187 Btuh
14	2 NFRC	0.25, 0.35		No	No	W	1.5ft	13.0f	15.0	0.0	15.0	12	14	208 Btuh
15	2 NFRC	0.25, 0.35		No	No	W	1.5ft	7.0ft	8.0	3.0	5.0	12	14	105 Btuh
	Excursion													470 Btuh
	Window Total								423 (sqft)					7661 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	87.0	2.3	197 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	90.8	2.3	205 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	11.3	2.3	25 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	62.3	2.3	141 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	21.5	2.3	49 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	66.0	2.3	149 Btuh
7	Frame - Wood - Ext	0.24	0.0/0.0	25.5	7.3	187 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	99.0	2.3	224 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	298.0	2.3	674 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	121.5	2.3	275 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	52.5	2.3	119 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	124.5	2.3	282 Btuh
13	Frame - Wood - Adj	0.09	13.0/0.0	34.0	1.7	57 Btuh
14	Frame - Wood - Adj	0.09	13.0/0.0	33.0	1.7	56 Btuh
15	Frame - Wood - Adj	0.09	13.0/0.0	144.0	1.7	243 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	454.0	2.3	1028 Btuh
	Wall Total			1725 (sqft)		3911 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	8.0	12.0	96 Btuh
2	Insulated - Exterior	8.0	12.0	96 Btuh
3	Insulated - Exterior	16.0	12.0	192 Btuh
4	Insulated - Garage	20.0	12.0	240 Btuh
	Door Total	52 (sqft)		624 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Unvented Attic/DarkShingle	0.241	0.0/22.0	2369.0	0.96	2284 Btuh
2	Knee wall to attic/DarkShingle	0.241	0.0/22.0	140.0	0.96	135 Btuh
	Ceiling Total			2509 (sqft)		2419 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2369 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2369.0 (sqft)		0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Aileen Crapps | Project Title: 240224 Crapps | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2024-02-27

				Envelope Subtotal:			14615	Btuh
Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio		CFM=	Load	
	Natural	0.18	22269	1		65.2	1358	Btuh
Internal gain		Occupants	Btuh/occupant			Appliance	Load	
		4	X 230	+		3400	4320	Btuh
				Sensible Envelope Load:			20292	Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)			(DGM of 0.122)			2483	Btuh
				Sensible Load All Zones			**22775**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Aileen Crapps

Project Title: 240224 Crapps

Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2024-02-27

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**20292**	**Btuh**
	Sensible Duct Load	2483	Btuh
	Total Sensible Zone Loads	**22775**	**Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0	Btuh
	Blower	0	Btuh
	Total sensible gain	**22775**	**Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	2253	Btuh
	Latent ventilation gain	0	Btuh
	Latent duct gain	1409	Btuh
	Latent occupant gain (4.0 people @ 200 Btuh per person)	800	Btuh
	Latent other gain	0	Btuh
	Latent total gain	**4461**	**Btuh**
	TOTAL GAIN	**27237**	**Btuh**

EQUIPMENT

1. Central Unit	#	38000 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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