Residential System Sizing Calculation

Summary

Review for Code Compliance
Universal Engineering Science

Daniel Helmick
283 SE Rolling Meadows
Ft White, FL

Project Title:
Helmick

Examiner-License No. PX2707 09/27/2024

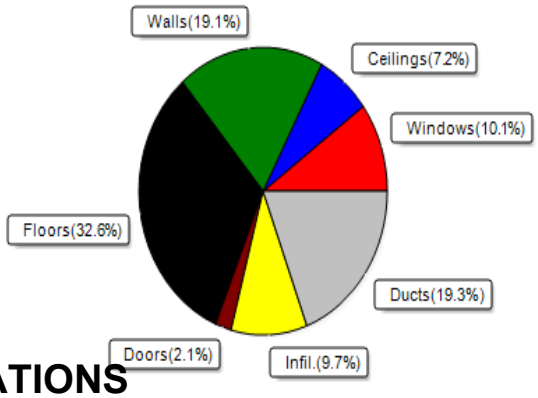
9/3/2024

Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(152 ft.) Temp Range(M)					
Humidity data: Interior RH (50%) Outdoor wet bulb (79F) Humidity difference(54gr.)					
Winter design temperature(MJ8 99%/Cu)	33	F	Summer design temperature(MJ8 99%/Cu)	99	F
Winter setpoint	70	F	Summer setpoint	75	F
Winter temperature difference	37	F	Summer temperature difference	24	F
Total heating load calculation	**30654**	**Btuh**	**Total cooling load calculation**	**28720**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	108.0	33118	Sensible (SHR = 0.75)	83.5	19591
Heat Pump + Auxiliary(0.0kW)	108.0	33118	Latent	124.2	6530
			Total (Electric Heat Pump)	90.9	26121

WINTER CALCULATIONS

Winter Heating Load (for 2123 sqft)

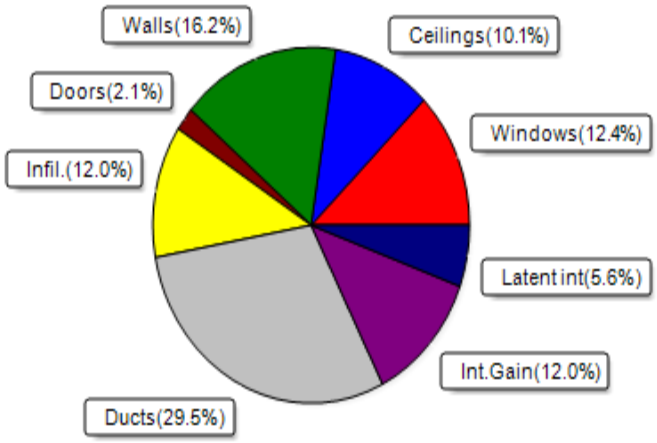
Load component			Load	
Window total	232	sqft	3091	Btuh
Wall total	1785	sqft	5863	Btuh
Door total	38	sqft	643	Btuh
Ceiling total	2335	sqft	2193	Btuh
Floor total	2123	sqft	9981	Btuh
Infiltration	73	cfm	2967	Btuh
Duct loss			5917	Btuh
Subtotal			**30654**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**30654**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 2123 sqft)

Load component			Load	
Window total	232	sqft	3565	Btuh
Wall total	1785	sqft	4665	Btuh
Door total	38	sqft	608	Btuh
Ceiling total	2335	sqft	2904	Btuh
Floor total			0	Btuh
Infiltration	55	cfm	1444	Btuh
Internal gain			3440	Btuh
Duct gain			6836	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**23462**	**Btuh**
Latent gain(ducts)			1650	Btuh
Latent gain(infiltration)			2008	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**5258**	**Btuh**
TOTAL HEAT GAIN			**28720**	**Btuh**



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EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 9 / 3 / 2024

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Daniel Helmick
283 SE Rolling Meadows
Ft White, FL

Project Title:
Helmi
Building Type: User

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Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 37.0 °F (MJ8 99%/Cu)
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	1, NFRC 0.25	Vinyl	0.36	S	7.0	13.3	93 Btuh
2	1, NFRC 0.25	Vinyl	0.36	S	32.0	13.3	426 Btuh
3	1, NFRC 0.25	Vinyl	0.36	S	32.0	13.3	426 Btuh
4	1, NFRC 0.25	Vinyl	0.36	S	18.0	13.3	240 Btuh
5	1, NFRC 0.25	Vinyl	0.36	E	4.0	13.3	53 Btuh
6	1, NFRC 0.25	Vinyl	0.36	N	15.5	13.3	206 Btuh
7	2, NFRC 0.25	Vinyl	0.36	N	27.6	13.3	367 Btuh
8	1, NFRC 0.25	Metal	0.36	N	40.0	13.3	533 Btuh
9	1, NFRC 0.25	Vinyl	0.36	N	9.0	13.3	120 Btuh
10	1, NFRC 0.25	Vinyl	0.36	N	31.0	13.3	413 Btuh
11	1, NFRC 0.25	Vinyl	0.36	W	16.0	13.3	213 Btuh
	Window Total				232.1(sqft)		3091 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	68	3.28	223 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	35	3.28	113 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	73	3.28	240 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.28	59 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	37	3.28	122 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.28	59 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	76	3.28	250 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	45	3.28	148 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	102	3.28	335 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	349	3.28	1144 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	102	3.28	333 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	112	3.28	369 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	323	3.28	1061 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	137	3.28	450 Btuh
15	Frame - Wood	- Adj	(0.089)	13.0/0.0	192	3.28	631 Btuh
16	Frame - Wood	- Adj	(0.089)	13.0/0.0	99	3.28	326 Btuh
	Wall Total				1785(sqft)		5863 Btuh

Doors	Type	Storm	Ueff.		Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.460)		20	17.0	340 Btuh
2	Insulated - Garage,	n	(0.460)		18	17.0	303 Btuh
	Door Total				38(sqft)		643Btuh

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Flat ceil/D/Shing	(0.025)	38.0/0.0	2335	0.94	2193 Btuh
	Ceiling Total			2335(sqft)		2193Btuh

Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	228.6 ft(perim.)	43.7	9981 Btuh
	Floor Total			2123 sqft		9981 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Daniel Helmick
283 SE Rolling Meadows
Ft White, FL

Project Title:
Helmick
Building Type: User

9/3/2024

				Envelope Subtotal:			21770 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.23	19107	1.00	73.3	2967 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)				(DLM of 0.239)		5917 Btuh
All Zones				**Sensible Subtotal All Zones**			**30654 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss		30654 Btuh
	Ventilation Sens. Heat Loss	(Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Total Heat Loss		30654 Btuh

EQUIPMENT

1. Electric Heat Pump	#	33118 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

Daniel Helmick
283 SE Rolling Meadows
Ft White, FL

Project Title:
Helmick

9/3/2024

Reference City: Gainesville, FL (Defaults)
Humidity difference: 54gr.

Temperature Difference: 24.0F(MJ8 99%/Cu)
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	1 NFRC	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	7.0	7.0	0.0	14	16	97 Btuh
2	1 NFRC	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	32.0	32.0	0.0	14	16	445 Btuh
3	1 NFRC	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	32.0	32.0	0.0	14	16	445 Btuh
4	1 NFRC	0.25, 0.36		No	No	S	1.5ft.	1.0ft.	18.0	18.0	0.0	14	16	250 Btuh
5	1 NFRC	0.25, 0.36		No	No	E	1.5ft.	1.0ft.	4.0	1.0	3.0	14	33	113 Btuh
6	1 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	15.5	0.0	15.5	14	14	215 Btuh
7	2 NFRC	0.25, 0.36		No	No	N	11.5f	1.0ft.	27.6	0.0	27.6	14	14	383 Btuh
8	1 NFRC	0.25, 0.36		No	No	N	11.5f	1.0ft.	40.0	0.0	40.0	14	14	556 Btuh
9	1 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	9.0	0.0	9.0	14	14	125 Btuh
10	1 NFRC	0.25, 0.36		No	No	N	1.5ft.	1.0ft.	31.0	0.0	31.0	14	14	431 Btuh
11	1 NFRC	0.25, 0.36		No	No	W	1.5ft.	1.0ft.	16.0	1.0	15.0	14	33	505 Btuh
	Window Total								232 (sqft)					3565 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	68.0	2.7	184 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	34.5	2.7	93 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	73.0	2.7	198 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.7	49 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	37.0	2.7	100 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.7	49 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	76.0	2.7	206 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	45.0	2.7	122 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	102.0	2.7	276 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	348.5	2.7	943 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	101.5	2.7	275 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	112.4	2.7	304 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	323.0	2.7	874 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	137.0	2.7	371 Btuh
15	Frame - Wood - Adj	0.09	13.0/0.0	192.0	2.1	409 Btuh
16	Frame - Wood - Adj	0.09	13.0/0.0	99.2	2.1	211 Btuh
	Wall Total			1785 (sqft)		4665 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	20.0	16.1	322 Btuh
2	Insulated - Garage	17.8	16.1	286 Btuh
	Door Total	38 (sqft)		608 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Vented Attic/DarkShingle/RB	0.025	38.0/0.0	2335.3	1.24	2904 Btuh
	Ceiling Total			2335 (sqft)		2904 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	2123 (ft-perimeter)	0.0	0 Btuh
	Floor Total		2123.0 (sqft)		0 Btuh

	Envelope Subtotal:	11742 Btuh

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Manual J Summer Calculations

Residential Load - Component Details (continued)

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283 SE Rolling Meadows
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Project Title: Helmick

Climate:FL_GAINESVILLE_REGIONAL_A

9/3/2024

Infiltration	Type	Average ACH	Volume(cuft)		Wall Ratio		CFM=	Load	
	Natural	0.17	19107		1		54.9	1444	Btuh
Internal gain		Occupants	Btuh/occupant				Appliance	Load	
		8	X	230	+		1600	3440	Btuh
						Sensible Envelope Load:		16626	Btuh
Duct load	Average sealed,Supply(R6.0-Attic), Return(R6.0-Attic)					(DGM of 0.411)		6836	Btuh
						Sensible Load All Zones		**23462**	**Btuh**

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Residential Load - Component Details (continued)

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Project Title: Helmick

Climate:FL_GAINESVILLE_REGIONAL_A

9/3/2024

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**16626 Btuh**
	Sensible Duct Load	6836 Btuh
	Total Sensible Zone Loads	**23462 Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**23462 Btuh**
	Latent infiltration gain (for 54 gr. humidity difference)	2008 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1650 Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**5258 Btuh**
	TOTAL GAIN	**28720 Btuh**

EQUIPMENT

1. Central Unit	#	26121 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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