Residential System Sizing Calculation

Summary

David & Pam Senn

Lake City, FL 32055

Project Title:
Senn Garage

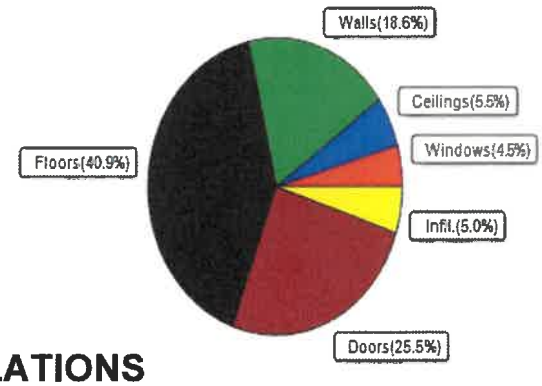
8/4/2021

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	**11531**	**Btuh**	**Total cooling load calculation**	**6979**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	86.7	10000	Sensible (SHR = 0.70)	112.1	7000
Heat Pump + Auxiliary(0.0kW)	86.7	10000	Latent	406.7	3000
			Total (Electric Heat Pump)	143.3	10000

WINTER CALCULATIONS

Winter Heating Load (for 624 sqft)

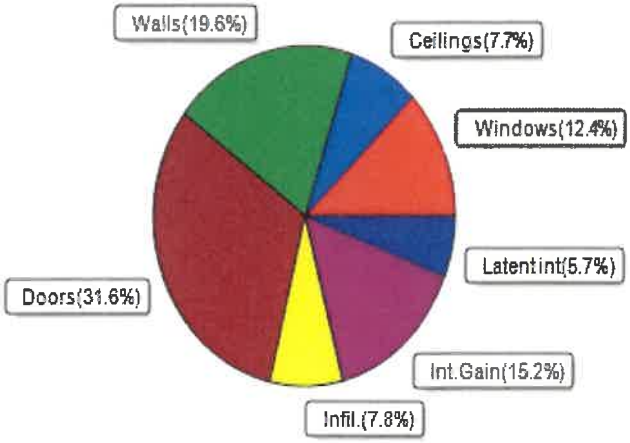
Load component			Load	
Window total	36	sqft	518	Btuh
Wall total	604	sqft	2144	Btuh
Door total	160	sqft	2944	Btuh
Ceiling total	624	sqft	634	Btuh
Floor total	624	sqft	4720	Btuh
Infiltration	13	cfm	571	Btuh
Duct loss			0	Btuh
Subtotal			**11531**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**11531**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 624 sqft)

Load component			Load	
Window total	36	sqft	865	Btuh
Wall total	604	sqft	1367	Btuh
Door total	160	sqft	2208	Btuh
Ceiling total	624	sqft	538	Btuh
Floor total			0	Btuh
Infiltration	10	cfm	203	Btuh
Internal gain			1060	Btuh
Duct gain			0	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**6242**	**Btuh**
Latent gain(ducts)			0	Btuh
Latent gain(infiltration)			338	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			400	Btuh
Total latent gain			**738**	**Btuh**
TOTAL HEAT GAIN			**6979**	**Btuh**



8th Edition

EnergyGauge® System Sizing
PREPARED BY: _____
DATE: 8/4/2021

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

David & Pam Senn
Lake City, FL 32055

Project Title:
Senn Garage
Building Type: User

8/4/2021

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	W	18.0	14.4	259 Btuh
2	2, NFRC 0.25	Vinyl	0.36	S	9.0	14.4	130 Btuh
3	2, NFRC 0.25	Vinyl	0.36	E	9.0	14.4	130 Btuh
	Window Total				36.0(sqft)		518 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	174	3.55	618 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	179	3.55	636 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	183	3.55	650 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	68	3.55	241 Btuh
	Wall Total				604(sqft)		2144 Btuh
Doors	Type	Storm	Ueff.		Area X	HTM=	Load
1	Insulated - Exterior, n		(0.460)		20	18.4	368 Btuh
2	Insulated - Exterior, n		(0.460)		70	18.4	1288 Btuh
3	Insulated - Exterior, n		(0.460)		70	18.4	1288 Btuh
	Door Total				160(sqft)		2944Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area X	HTM=	Load
1	Vented Attic/L/Shing		(0.025)	38.0/0.0	624	1.0	634 Btuh
	Ceiling Total				624(sqft)		634Btuh
Floors	Type		Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	100.0 ft(perim.)	47.2	4720 Btuh
	Floor Total				624 sqft		4720 Btuh
					Envelope Subtotal:		10960 Btuh
Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.16	4992	1.00	13.0	571 Btuh
Duct load	NA, R0.0, Supply(), Return()					(DLM of 0.000)	0 Btuh
All Zones				**Sensible Subtotal All Zones**			**11531 Btuh**

Manual J Winter Calculations

Residential Load - Component Details (continued)

David & Pam Senn
Lake City, FL 32055

Project Title:
Senn Garage
Building Type: User

8/4/2021

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sensible Heat Loss Total Heat Loss	11531 Btuh 0 Btuh 11531 Btuh

EQUIPMENT

1. Electric Heat Pump	#	10000 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

David & Pam Senn

Lake City, FL 32055

Project Title:
Senn Garage

8/4/2021

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	0.25, 0.36		No	No	W	1.5ft.	0.5ft.	18.0	4.5	13.5	12	31	473 Btuh
2	2 NFRC	0.25, 0.36		No	No	S	1.5ft.	0.5ft.	9.0	9.0	0.0	12	14	109 Btuh
3	2 NFRC	0.25, 0.36		No	No	E	1.5ft.	0.5ft.	9.0	2.2	6.8	12	31	236 Btuh
	Excursion													47 Btuh
	Window Total								36 (sqft)					865 Btuh

Walls	Type	U-Value	R-Value	Area(sqft)	HTM	Load
			Cav/Sheath			
1	Frame - Wood - Ext	0.09	13.0/0.0	174.0	2.3	394 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	179.0	2.3	405 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	183.0	2.3	414 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	68.0	2.3	154 Btuh
	Wall Total			604 (sqft)		1367 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	20.0	13.8	276 Btuh
2	Insulated - Exterior	70.0	13.8	966 Btuh
3	Insulated - Exterior	70.0	13.8	966 Btuh
	Door Total	160 (sqft)		2208 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	624.0	0.86	538 Btuh
	Ceiling Total			624 (sqft)		538 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	624 (ft-perimeter)	0.0	0 Btuh
	Floor Total		624.0 (sqft)		0 Btuh
			Envelope Subtotal:		4978 Btuh

Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio	CFM=	Load
	Natural	0.12	4992	1	9.8	203 Btuh
Internal gain		Occupants	Btuh/occupant		Appliance	Load
		2	X 230	+	600	1060 Btuh
				Sensible Envelope Load:		6242 Btuh
Duct load	NA, Supply(R0.0-None), Return(R0.0-None)			(DGM of 0.000)		0 Btuh
				Sensible Load All Zones		**6242 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

David & Pam Senn
Lake City, FL 32055

Project Title: Senn Garage
Climate:FL_GAINESVILLE_REGIONAL_A

8/4/2021

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**6242 Btuh**
	Sensible Duct Load	0 Btuh
	Total Sensible Zone Loads	**6242 Btuh**
	Sensible ventilation	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**6242 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	338 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	0 Btuh
	Latent occupant gain (2.0 people @ 200 Btuh per person)	400 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**738 Btuh**
	TOTAL GAIN	**6979 Btuh**

EQUIPMENT

1. Central Unit	#	10000 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