Residential System Sizing Calculation

Summary

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title:
231200 Raulerson Res

2023-11-16

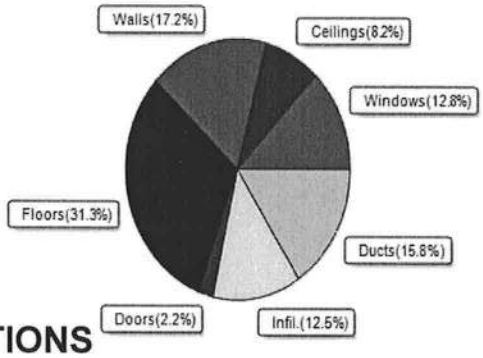
Location for weather data: Gainesville, FL - Defaults: Latitude(29.7) Altitude(100 ft.) Temp Range(M)
Humidity data: Interior RH (50%) Outdoor wet bulb (77F) Humidity difference(51gr.)

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	**29906**	**Btuh**	**Total cooling load calculation**	**26029**	**Btuh**
Submitted heating capacity	% of calc	Btuh	Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	127.1	38000	Sensible (SHR = 0.75)	127.8	28500
Heat Pump + Auxiliary(0.0kW)	127.1	38000	Latent	254.8	9500
			Total (Electric Heat Pump)	146.0	38000

WINTER CALCULATIONS

Winter Heating Load (for 1926 sqft)

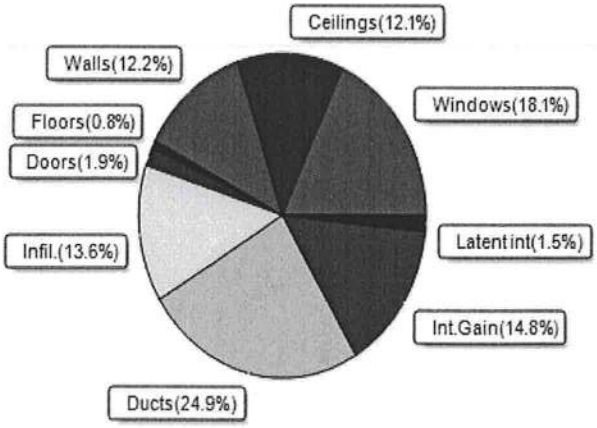
Load component			Load	
Window total	274	sqft	3833	Btuh
Wall total	1451	sqft	5152	Btuh
Door total	41	sqft	658	Btuh
Ceiling total	2229	sqft	2449	Btuh
Floor total	See detail report		9351	Btuh
Infiltration	85	cfm	3741	Btuh
Duct loss			4722	Btuh
Subtotal			**29906**	**Btuh**
Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
TOTAL HEAT LOSS			**29906**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 1926 sqft)

Load component			Load	
Window total	274	sqft	4714	Btuh
Wall total	1451	sqft	3185	Btuh
Door total	41	sqft	493	Btuh
Ceiling total	2229	sqft	3142	Btuh
Floor total			200	Btuh
Infiltration	64	cfm	1333	Btuh
Internal gain			3860	Btuh
Duct gain			5374	Btuh
Sens.Ventilation	Ex:0 cfm; Sup:0 cfm		0	Btuh
Blower Load			0	Btuh
Total sensible gain			**22301**	**Btuh**
Latent gain(ducts)			1116	Btuh
Latent gain(infiltration)			2212	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			400	Btuh
Total latent gain			**3728**	**Btuh**
TOTAL HEAT GAIN			**26029**	**Btuh**



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Plans Examiner

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2023-11-16

EnergyGauge® / USRCZB v7.5.00

System Sizing Calculations - Winter

Residential Load - Room by Room Component Details

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title:
231200 Raulerson Res
Building Type: User

2023-11-16

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

Component Loads for Room #1: Main

Window	Panes/Type	Frame	U	Orientation	Area(sqft) X	HTM=	Load
1	2, NFRC 0.25	Metal	0.35	N	12.0	14.0	168 Btuh
2	2, NFRC 0.25	Metal	0.35	N	25.0	14.0	350 Btuh
3	2, NFRC 0.25	Metal	0.35	N	20.0	14.0	280 Btuh
4	2, NFRC 0.25	Metal	0.35	N	9.0	14.0	126 Btuh
5	2, NFRC 0.25	Metal	0.35	N	30.0	14.0	420 Btuh
6	2, NFRC 0.25	Metal	0.35	E	6.0	14.0	84 Btuh
7	2, NFRC 0.25	Metal	0.35	E	30.0	14.0	420 Btuh
8	2, NFRC 0.25	Metal	0.35	S	37.5	14.0	525 Btuh
9	2, NFRC 0.25	Metal	0.35	S	7.8	14.0	109 Btuh
10	2, NFRC 0.25	Metal	0.35	S	6.7	14.0	93 Btuh
11	2, NFRC 0.25	Metal	0.35	S	4.3	14.0	61 Btuh
12	2, NFRC 0.25	Metal	0.35	S	15.0	14.0	210 Btuh
13	2, NFRC 0.25	Metal	0.35	S	15.0	14.0	210 Btuh
14	2, NFRC 0.25	Metal	0.35	W	20.0	14.0	280 Btuh
15	2, NFRC 0.25	Metal	0.35	W	16.0	14.0	224 Btuh
16	2, NFRC 0.25	Metal	0.35	W	4.5	14.0	63 Btuh
	Window Total				258.8(sqft)		3623 Btuh

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	102	3.55	362 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	95	3.55	336 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	78	3.55	277 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	18	3.55	64 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	74	3.55	261 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	267	3.55	948 Btuh
10	Frame - Wood	- Adj	(0.089)	13.0/0.0	173	3.55	613 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	21	3.55	75 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	65	3.55	229 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	36	3.55	128 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	22	3.55	79 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	36	3.55	128 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	39	3.55	138 Btuh
17	Frame - Wood	- Ext	(0.089)	13.0/0.0	45	3.55	160 Btuh
18	Frame - Wood	- Ext	(0.089)	13.0/0.0	105	3.55	371 Btuh
19	Frame - Wood	- Ext	(0.089)	13.0/0.0	15	3.55	53 Btuh
20	Frame - Wood	- Ext	(0.089)	13.0/0.0	119	3.55	422 Btuh
	Wall Total				1362(sqft)		4836 Btuh

Doors	Type	Storm	Ueff.	Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)	13	16.0	213 Btuh
2	Insulated - Garage,	n	(0.400)	18	16.0	284 Btuh
3	Insulated - Exterior,	n	(0.400)	10	16.0	160 Btuh
	Door Total			41(sqft)		658Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Raulerson Res
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Building Type: User

2023-11-16

Ceilings	Type/Color/Surface	Ueff.	R-Value	Area X	HTM=	Load
1	Flat ceil/D/Shing	(0.025)	38.0/0.0	1531	1.0	1554 Btuh
2	Knee wall/D/Shing	(0.025)	38.0/0.0	44	1.0	45 Btuh
	Ceiling Total			1575(sqft)		1599Btuh
Floors	Type	Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade	(1.180)	0.0	186.0 ft(perim.)	47.2	8779 Btuh
	Floor Total			1586 sqft		8779 Btuh
				Room Envelope Subtotal:		19495 Btuh
Infiltration	Type	Wholehouse ACH	Room Volume	Wall Ratio	CFM=	
	Natural	0.30	14274	0.94	80.1	3512 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)				(DLM of 0.205)	4722 Btuh
Room #1				**Sensible Room Subtotal**		**27729 Btuh**

Component Loads for Room #2: bonus Room

Window	Panes/Type	Frame	U	Orientation	Area(sqft) X	HTM=	Load
17	2, NFRC 0.25	Metal	0.35	S	15.0	14.0	210 Btuh
	Window Total				15.0(sqft)		210 Btuh
Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
21	Frame - Wood	- Ext	(0.089)	13.0/0.0	89	3.55	316 Btuh
	Wall Total				89(sqft)		316 Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area X	HTM=	Load
3	Flat ceil/D/Shing		(0.032)	30.0/0.0	203	1.3	259 Btuh
4	Single as/D/Shing		(0.034)	30.0/0.0	192	1.4	261 Btuh
5	Knee wall/D/Shing		(0.032)	30.0/0.0	259	1.3	330 Btuh
	Ceiling Total				654(sqft)		850Btuh
Floors	Type		Ueff.	R-Value	Size X	HTM=	Load
2	Raised Wood - Adj		(0.050)	19.0	285.0 sqft	2.0	572 Btuh
3	Interior		(0.050)	0.0	55.0 sqft	0.0	0 Btuh
	Floor Total				340 sqft		572 Btuh
					Room Envelope Subtotal:		1947 Btuh
Infiltration	Type	Wholehouse ACH		Room Volume	Wall Ratio	CFM=	
	Natural	0.30		2720	0.06	5.2	229 Btuh
Duct load	No ducts assigned to this zone.					(DLM of 0.000)	0 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title:
231200 Raulerson Res
Building Type: User

2023-11-16

Room #2	**Sensible Room Subtotal**	**2177 Btuh**

SYSTEM GROUPS (BLOCK LOADS)

Heating Loads For System(s):1 Block #1:Block1 Serving Rooms: 1	Block load	27729 Btuh

Heating Loads For System(s):2 Block #2:Block2 Serving Rooms: 2	Block load	2177 Btuh

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss Ventilation Sens. Heat Loss (Ex:0 cfm; Sup:0 cfm) Total Heat Loss	29906 Btuh 0 Btuh 29906 Btuh

EQUIPMENT

1. Electric Heat Pump 2. Electric Heat Pump	# #	30000 Btuh 8000 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title:
231200 Raulerson Res
Building Type: User

2023-11-16

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 - Room by Room Component Details

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title:
231200 Raulerson Res

2023-11-16

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 Room #1: Main

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	0.7ft	12.0	0.0	12.0	12	12	143 Btuh
2	2 NFRC	0.25,	0.35	No	No	N	10.0f	1.3ft	25.0	0.0	25.0	12	12	298 Btuh
3	2 NFRC	0.25,	0.35	No	No	N	10.0f	0.7ft	20.0	0.0	20.0	12	12	238 Btuh
4	2 NFRC	0.25,	0.35	No	No	N	1.5ft	1.7ft	9.0	0.0	9.0	12	12	107 Btuh
5	2 NFRC	0.25,	0.35	No	No	N	1.5ft	5.0ft	30.0	0.0	30.0	12	12	357 Btuh
6	2 NFRC	0.25,	0.35	No	No	E	1.5ft	11.0f	6.0	0.0	6.0	12	31	185 Btuh
7	2 NFRC	0.25,	0.35	No	No	E	1.5ft	5.0ft	30.0	0.0	30.0	12	31	923 Btuh
8	2 NFRC	0.25,	0.35	No	No	S	6.0ft	1.5ft	37.5	37.5	0.0	12	14	447 Btuh
9	2 NFRC	0.25,	0.35	No	No	S	10.0f	1.5ft	7.8	7.8	0.0	12	14	93 Btuh
10	2 NFRC	0.25,	0.35	No	No	S	10.0f	1.5ft	6.7	6.7	0.0	12	14	79 Btuh
11	2 NFRC	0.25,	0.35	No	No	S	10.0f	0.3ft	4.3	4.3	0.0	12	14	52 Btuh
12	2 NFRC	0.25,	0.35	No	No	S	6.0ft	1.5ft	15.0	15.0	0.0	12	14	179 Btuh
13	2 NFRC	0.25,	0.35	No	No	S	1.5ft	1.5ft	15.0	15.0	0.0	12	14	179 Btuh
14	2 NFRC	0.25,	0.35	No	No	W	1.5ft	5.0ft	20.0	0.0	20.0	12	31	615 Btuh
15	2 NFRC	0.25,	0.35	No	No	W	1.5ft	4.0ft	16.0	0.0	16.0	12	31	492 Btuh
16	2 NFRC	0.25,	0.35	No	No	W	1.5ft	3.0ft	4.5	0.0	4.5	12	31	138 Btuh
	Window Total								259 (sqft)					4523 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
1	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	102.0	2.3	231 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	94.7	2.3	214 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	78.0	2.3	177 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	18.0	2.3	41 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	73.5	2.3	166 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	267.0	2.3	604 Btuh
10	Frame - Wood - Adj	0.09	13.0/0.0	172.7	1.7	291 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	21.0	2.3	48 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	64.5	2.3	146 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	36.0	2.3	81 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	22.2	2.3	50 Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	36.0	2.3	81 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	39.0	2.3	88 Btuh
17	Frame - Wood - Ext	0.09	13.0/0.0	45.0	2.3	102 Btuh
18	Frame - Wood - Ext	0.09	13.0/0.0	104.5	2.3	237 Btuh
19	Frame - Wood - Ext	0.09	13.0/0.0	15.0	2.3	34 Btuh
20	Frame - Wood - Ext	0.09	13.0/0.0	119.0	2.3	269 Btuh
	Wall Total			1362 (sqft)		2983 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	13.3	12.0	160 Btuh
2	Insulated - Garage	17.8	12.0	213 Btuh
3	Insulated - Exterior	10.0	12.0	120 Btuh
	Door Total	41 (sqft)		493 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Vented Attic/DarkShingle	0.025	38.0/0.0	1531.0	1.37	2098 Btuh
2	Knee wall to attic/DarkShingle	0.025	38.0/0.0	44.0	1.37	60 Btuh
	Ceiling Total			1575 (sqft)		2159 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	1586 (ft-perimeter)	0.0	0 Btuh
	Floor Total		1586.0 (sqft)		0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title: 231200 Raulerson Res

Climate:FL_GAINESVILLE_REGIONAL_A

2023-11-16

					Zone Envelope Subtotal:	10158 Btuh
Infiltration	Type Natural	Wholehouse ACH 0.23	Volume(cuft) 14274	Wall Ratio 0.94	CFM= 60.0	Load 1251 Btuh
Internal gain		Occupants 1	Btuh/occupant X 230	+	Appliance 3400	Load 3630 Btuh
					Sensible Envelope Load:	15040 Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)				(DGM of 0.357)	5374 Btuh
					Sensible Zone Load	**20413 Btuh**

Component Loads for Room #2: bonus Room

Window	Type* Panes	SHGC	U	InSh	IS	Ornt	Overhang Len	Hgt	Window Area(sqft) Gross	Shaded	Unshaded	HTM Shaded	Unshaded	Load
17	2 NFRC	0.25, 0.35		No	No	S	1.5ft	3.0ft	15.0	15.0	0.0	12	14	179 Btuh
	Window Total								15 (sqft)					179 Btuh

Walls	Type	U-Value	R-Value Cav/Sheath	Area(sqft)	HTM	Load
21	Frame - Wood - Ext	0.09	13.0/0.0	89.0	2.3	201 Btuh
	Wall Total			89 (sqft)		201 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
3	Vented Attic/DarkShingle	0.032	30.0/0.0	203.0	1.72	349 Btuh
4	SnglAsmb w airsp/DarkShingle	0.034	30.0/0.0	192.0	0.99	189 Btuh
5	Knee wall to attic/DarkShingle	0.032	30.0/0.0	259.0	1.72	445 Btuh
	Ceiling Total			654 (sqft)		984 Btuh

Floors	Type	R-Value	Size	HTM	Load
2	Raised Wood - Adj	19.0	285 (sqft)	0.7	200 Btuh
3	Interior	0.0	55 (sqft)	0.0	0 Btuh
	Floor Total		340.0 (sqft)		200 Btuh

					Zone Envelope Subtotal:	1564 Btuh
Infiltration	Type Natural	Wholehouse ACH 0.23	Volume(cuft) 2720	Wall Ratio 0.06	CFM= 3.9	Load 82 Btuh
Internal gain		Occupants 1	Btuh/occupant X 230	+	Appliance 0	Load 230 Btuh
					Sensible Envelope Load:	1876 Btuh
Duct load	No ducts assigned to this zone.				(DGM of 0.000)	0 Btuh
					Sensible Zone Load	**1876 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Raulerson Res
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Climate:FL_GAINESVILLE_REGIONAL_A

2023-11-16

The following window Excursion will be assigned to the system loads.

Windows	July excursion for System 1	0 Btuh
	July excursion for System 2	12 Btuh
	Excursion Subtotal:	12 Btuh
Duct load		0 Btuh
	Sensible Excursion Load	**12 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title: 231200 Raulerson Res
Climate:FL_GAINESVILLE_REGIONAL_A

2023-11-16

SYSTEM GROUPS (BLOCK LOADS)

	Sensible Envelope Load	**15040 Btuh**
	Window Excursion	0 Btuh
Cooling Loads	Sensible Duct Load (duct gain multiplier of 0.357)	5374 Btuh
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
For System(s): 1	**Zone Sensible gain**	**20413 Btuh**
Block #1:Block1	Latent infiltration/ventilation gain	2076 Btuh
Serving Zones:	Latent duct gain	1116 Btuh
1	Latent occupant gain	200 Btuh
	Latent other gain	0 Btuh
	Total block load	**23806 Btuh**

	Sensible Envelope Load	**1876 Btuh**
	Window Excursion	12 Btuh
Cooling Loads	Sensible Duct Load (duct gain multiplier of 0.000) (Includes 0 Btuh due to window excursion)	0 Btuh
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
For System(s): 2	**Zone Sensible gain**	**1888 Btuh**
Block #2:Block2	Latent infiltration/ventilation gain	136 Btuh
Serving Zones:	Latent duct gain	0 Btuh
2	Latent occupant gain	200 Btuh
	Latent other gain	0 Btuh
	Total block load	**2223 Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Raulerson Res
369 SW Pinehurst Dr
Lake City, FL

Project Title: 231200 Raulerson Res
Climate:FL_GAINESVILLE_REGIONAL_A

2023-11-16

WHOLE HOUSE TOTALS		
Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**16927 Btuh**
	Sensible Duct Load	5374 Btuh
	Total Sensible Zone Loads	**22301 Btuh**
	Sensible ventilation (Ex:0 cfm; Sup:0 cfm)	0 Btuh
	Blower	0 Btuh
	Total sensible gain	**22301 Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	2212 Btuh
	Latent ventilation gain	0 Btuh
	Latent duct gain	1116 Btuh
	Latent occupant gain (2.0 people @ 200 Btuh per person)	400 Btuh
	Latent other gain	0 Btuh
	Latent total gain	**3728 Btuh**
	TOTAL GAIN	**26029 Btuh**

EQUIPMENT		
1. Central Unit	#	30000 Btuh
2. Central Unit	#	8000 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