Residential System Sizing Calculation

Summary

Shelley Res

Project Title:
211328 Shelley

Lake City, FL

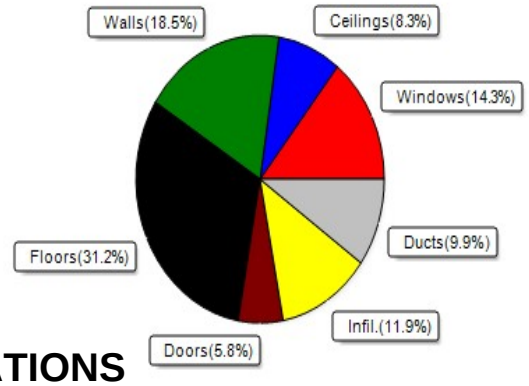
2021-09-24

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	**56344**	**Btuh**		**Total cooling load calculation**	**44664**	**Btuh**
Submitted heating capacity	% of calc	Btuh		Submitted cooling capacity	% of calc	Btuh
Total (Electric Heat Pump)	108.3	61000		Sensible (SHR = 0.75)	123.9	45750
Heat Pump + Auxiliary(0.0kW)	108.3	61000		Latent	197.0	15250
				Total (Electric Heat Pump)	136.6	61000

WINTER CALCULATIONS

Winter Heating Load (for 3696 sqft)

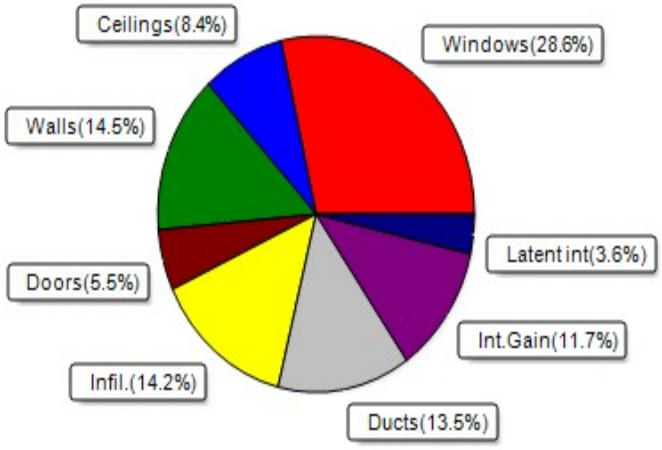
Load component			Load	
Window total	673	sqft	8080	Btuh
Wall total	2933	sqft	10412	Btuh
Door total	205	sqft	3285	Btuh
Ceiling total	3880	sqft	4675	Btuh
Floor total	3696	sqft	17606	Btuh
Infiltration	153	cfm	6700	Btuh
Duct loss			5585	Btuh
Subtotal			**56344**	**Btuh**
Ventilation	0	cfm	0	Btuh
TOTAL HEAT LOSS			**56344**	**Btuh**



SUMMER CALCULATIONS

Summer Cooling Load (for 3696 sqft)

Load component			Load	
Window total	673	sqft	12761	Btuh
Wall total	2933	sqft	6460	Btuh
Door total	205	sqft	2464	Btuh
Ceiling total	3880	sqft	3740	Btuh
Floor total			0	Btuh
Infiltration	115	cfm	2387	Btuh
Internal gain			5240	Btuh
Duct gain			3869	Btuh
Sens. Ventilation	0	cfm	0	Btuh
Blower Load			0	Btuh
Total sensible gain			**36921**	**Btuh**
Latent gain(ducts)			2181	Btuh
Latent gain(infiltration)			3961	Btuh
Latent gain(ventilation)			0	Btuh
Latent gain(internal/occupants/other)			1600	Btuh
Total latent gain			**7742**	**Btuh**
TOTAL HEAT GAIN			**44664**	**Btuh**



8th Edition

EnergyGauge® System Sizing
PREPARED BY: Evan Beamsley
DATE: 2021-09-24

System Sizing Calculations - Winter

Residential Load - Whole House Component Details

Shelley Res

Project Title:
211328 Shelley

Lake City, FL

Building Type: User

2021-09-24

Reference City: Gainesville, FL (Defaults) Winter Temperature Difference: 40.0 F (TMY3 99%)
This calculation is for Worst Case. The house has been rotated 315 degrees.

Component Loads for Whole House

Window	Panes/Type	Frame	U	Orientation	Area(sqft) X	HTM=	Load
1	2, NFRC 0.20	Vinyl	0.30	NW	75.0	12.0	900 Btuh
2	2, NFRC 0.20	Vinyl	0.30	NE	48.0	12.0	576 Btuh
3	2, NFRC 0.20	Vinyl	0.30	SE	32.0	12.0	384 Btuh
4	2, NFRC 0.20	Vinyl	0.30	NE	13.3	12.0	160 Btuh
5	2, NFRC 0.20	Vinyl	0.30	NW	48.0	12.0	576 Btuh
6	2, NFRC 0.20	Vinyl	0.30	NE	64.0	12.0	768 Btuh
7	2, NFRC 0.20	Vinyl	0.30	NW	96.0	12.0	1152 Btuh
8	2, NFRC 0.20	Vinyl	0.30	SW	13.3	12.0	160 Btuh
9	2, NFRC 0.20	Vinyl	0.30	NW	30.0	12.0	360 Btuh
10	2, NFRC 0.20	Vinyl	0.30	NW	24.0	12.0	288 Btuh
11	2, NFRC 0.20	Vinyl	0.30	NE	8.0	12.0	96 Btuh
12	2, NFRC 0.20	Vinyl	0.30	NE	8.0	12.0	96 Btuh
13	2, NFRC 0.20	Vinyl	0.30	NE	37.5	12.0	450 Btuh
14	2, NFRC 0.20	Vinyl	0.30	SE	30.0	12.0	360 Btuh
15	2, NFRC 0.20	Vinyl	0.30	SE	8.3	12.0	100 Btuh
16	2, NFRC 0.20	Vinyl	0.30	SE	32.0	12.0	384 Btuh
17	2, NFRC 0.20	Vinyl	0.30	SE	10.0	12.0	120 Btuh
18	2, NFRC 0.20	Vinyl	0.30	SE	15.0	12.0	180 Btuh
19	2, NFRC 0.20	Vinyl	0.30	NE	4.0	12.0	48 Btuh
20	2, NFRC 0.20	Vinyl	0.30	SW	12.5	12.0	150 Btuh
21	2, NFRC 0.20	Vinyl	0.30	SW	33.3	12.0	400 Btuh
22	2, NFRC 0.20	Vinyl	0.30	SW	8.0	12.0	96 Btuh
23	2, NFRC 0.20	Vinyl	0.30	SW	8.0	12.0	96 Btuh
24	2, NFRC 0.20	Vinyl	0.30	SW	15.0	12.0	180 Btuh
	Window Total				673.3(sqft)		8080 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Shelley Res
Lake City, FL

Project Title:
211328 Shelley
Building Type: User

2021-09-24

Walls	Type	Ornt.	Ueff.	R-Value (Cav/Sh)	Area X	HTM=	Load
1	Frame - Wood	- Ext	(0.089)	13.0/0.0	188	3.55	669 Btuh
2	Frame - Wood	- Ext	(0.089)	13.0/0.0	52	3.55	185 Btuh
3	Frame - Wood	- Ext	(0.089)	13.0/0.0	44	3.55	155 Btuh
4	Frame - Wood	- Ext	(0.089)	13.0/0.0	89	3.55	317 Btuh
5	Frame - Wood	- Ext	(0.089)	13.0/0.0	45	3.55	160 Btuh
6	Frame - Wood	- Ext	(0.089)	13.0/0.0	24	3.55	84 Btuh
7	Frame - Wood	- Ext	(0.089)	13.0/0.0	34	3.55	120 Btuh
8	Frame - Wood	- Ext	(0.089)	13.0/0.0	32	3.55	115 Btuh
9	Frame - Wood	- Ext	(0.089)	13.0/0.0	62	3.55	220 Btuh
10	Frame - Wood	- Ext	(0.089)	13.0/0.0	107	3.55	380 Btuh
11	Frame - Wood	- Ext	(0.089)	13.0/0.0	99	3.55	353 Btuh
12	Frame - Wood	- Ext	(0.089)	13.0/0.0	193	3.55	686 Btuh
13	Frame - Wood	- Ext	(0.089)	13.0/0.0	63	3.55	225 Btuh
14	Frame - Wood	- Ext	(0.089)	13.0/0.0	92	3.55	327 Btuh
15	Frame - Wood	- Ext	(0.089)	13.0/0.0	63	3.55	225 Btuh
16	Frame - Wood	- Ext	(0.089)	13.0/0.0	165	3.55	587 Btuh
17	Frame - Wood	- Adj	(0.089)	13.0/0.0	78	3.55	278 Btuh
18	Frame - Wood	- Adj	(0.089)	13.0/0.0	19	3.55	66 Btuh
19	Frame - Wood	- Adj	(0.089)	13.0/0.0	12	3.55	41 Btuh
20	Frame - Wood	- Ext	(0.089)	13.0/0.0	134	3.55	475 Btuh
21	Frame - Wood	- Ext	(0.089)	13.0/0.0	35	3.55	124 Btuh
22	Frame - Wood	- Ext	(0.089)	13.0/0.0	28	3.55	99 Btuh
23	Frame - Wood	- Ext	(0.089)	13.0/0.0	94	3.55	334 Btuh
24	Frame - Wood	- Ext	(0.089)	13.0/0.0	50	3.55	178 Btuh
25	Frame - Wood	- Ext	(0.089)	13.0/0.0	66	3.55	234 Btuh
26	Frame - Wood	- Ext	(0.089)	13.0/0.0	63	3.55	225 Btuh
27	Frame - Wood	- Ext	(0.089)	13.0/0.0	39	3.55	140 Btuh
28	Frame - Wood	- Adj	(0.089)	13.0/0.0	199	3.55	708 Btuh
29	Frame - Wood	- Ext	(0.089)	13.0/0.0	489	3.55	1738 Btuh
30	Frame - Wood	- Ext	(0.089)	13.0/0.0	28	3.55	101 Btuh
31	Frame - Wood	- Ext	(0.089)	13.0/0.0	85	3.55	303 Btuh
32	Frame - Wood	- Ext	(0.089)	13.0/0.0	12	3.55	41 Btuh
33	Frame - Wood	- Ext	(0.089)	13.0/0.0	147	3.55	521 Btuh
	Wall Total				2933(sqft)		10412 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Shelley Res
Project Title:
211328 Shelley
Lake City, FL
Building Type: User
2021-09-24

Doors	Type	Storm	Ueff.		Area X	HTM=	Load
1	Insulated - Exterior,	n	(0.400)		24	16.0	384 Btuh
2	Insulated - Exterior,	n	(0.400)		16	16.0	256 Btuh
3	Insulated - Exterior,	n	(0.400)		8	16.0	128 Btuh
4	Insulated - Exterior,	n	(0.400)		24	16.0	384 Btuh
5	Insulated - Exterior,	n	(0.400)		32	16.0	512 Btuh
6	Insulated - Exterior,	n	(0.400)		32	16.0	512 Btuh
7	Insulated - Exterior,	n	(0.400)		8	16.0	128 Btuh
8	Insulated - Garage,	n	(0.400)		21	16.0	341 Btuh
9	Insulated - Exterior,	n	(0.400)		16	16.0	256 Btuh
10	Insulated - Garage,	n	(0.400)		24	16.0	384 Btuh
	Door Total				205(sqft)		3285Btuh
Ceilings	Type/Color/Surface		Ueff.	R-Value	Area X	HTM=	Load
1	Unvent Attic/D/Shing		(0.241)	0.0/22.0	3880	1.2	4675 Btuh
	Ceiling Total				3880(sqft)		4675Btuh
Floors	Type		Ueff.	R-Value	Size X	HTM=	Load
1	Slab On Grade		(1.180)	0.0	373.0 ft(perim.)	47.2	17606 Btuh
	Floor Total				3696 sqft		17606 Btuh
					Envelope Subtotal:		44058 Btuh

Infiltration	Type	Wholehouse	ACH	Volume(cuft)	Wall Ratio	CFM=	
	Natural		0.24	37884	1.00	153.0	6700 Btuh
Duct load	Average sealed, R6.0, Supply(Att), Return(Att)				(DLM of 0.110)		5585 Btuh
All Zones	**Sensible Subtotal All Zones**						**56344 Btuh**

WHOLE HOUSE TOTALS

Totals for Heating	Subtotal Sensible Heat Loss	56344 Btuh
	Ventilation Sensible Heat Loss	0 Btuh
	Total Heat Loss	56344 Btuh

EQUIPMENT

1. Electric Heat Pump	#	61000 Btuh

Manual J Winter Calculations

Residential Load - Component Details (continued)

Shelley Res

Project Title:
211328 Shelley

Lake City, FL

Building Type: User

2021-09-24

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

Shelley Res

Project Title:
211328 Shelley

Lake City, FL

2021-09-24

Reference City: Gainesville, FL Temperature Difference: 19.0F(TMY3 99%) Humidity difference: 51gr.
This calculation is for Worst Case. The house has been rotated 315 degrees.

Component Loads for Whole House

Window	Type*					Overhang		Window Area(sqft)			HTM		Load	
	Panes	SHGC	U	InSh	IS	Ornt	Len	Hgt	Gross	Shaded	Unshaded	Shaded	Unshaded		
1	2 NFRC	0.20,	0.30	No	No	NW	1.5ft	1.5ft	75.0	0.0	75.0	10	19	1435	Btuh
2	2 NFRC	0.20,	0.30	No	No	NE	6.7ft	0.7ft	48.0	0.0	48.0	10	19	919	Btuh
3	2 NFRC	0.20,	0.30	No	No	SE	99.0f	0.7ft	32.0	32.0	0.0	10	20	317	Btuh
4	2 NFRC	0.20,	0.30	No	No	NE	10.6f	0.7ft	13.3	0.0	13.3	10	19	255	Btuh
5	2 NFRC	0.20,	0.30	No	No	NW	25.3f	0.7ft	48.0	0.0	48.0	10	19	919	Btuh
6	2 NFRC	0.20,	0.30	No	No	NE	99.0f	0.7ft	64.0	0.0	64.0	10	19	1225	Btuh
7	2 NFRC	0.20,	0.30	No	No	NW	12.8f	0.7ft	96.0	0.0	96.0	10	19	1837	Btuh
8	2 NFRC	0.20,	0.30	No	No	SW	99.0f	0.7ft	13.3	13.3	0.0	10	20	132	Btuh
9	2 NFRC	0.20,	0.30	No	No	NW	1.5ft	1.5ft	30.0	0.0	30.0	10	19	574	Btuh
10	2 NFRC	0.20,	0.30	No	No	NW	1.5ft	1.5ft	24.0	0.0	24.0	10	19	459	Btuh
11	2 NFRC	0.20,	0.30	No	No	NE	1.5ft	1.5ft	8.0	0.0	8.0	10	19	153	Btuh
12	2 NFRC	0.20,	0.30	No	No	NE	1.5ft	1.5ft	8.0	0.0	8.0	10	19	153	Btuh
13	2 NFRC	0.20,	0.30	No	No	NE	1.5ft	1.5ft	37.5	0.0	37.5	10	19	718	Btuh
14	2 NFRC	0.20,	0.30	No	No	SE	1.5ft	3.5ft	30.0	0.0	30.0	10	20	601	Btuh
15	2 NFRC	0.20,	0.30	No	No	SE	1.5ft	1.5ft	8.3	4.8	3.5	10	20	118	Btuh
16	2 NFRC	0.20,	0.30	No	No	SE	7.8ft	3.0ft	32.0	32.0	0.0	10	20	317	Btuh
17	2 NFRC	0.20,	0.30	No	No	SE	7.8ft	1.0ft	10.0	10.0	0.0	10	20	99	Btuh
18	2 NFRC	0.20,	0.30	No	No	SE	1.5ft	1.5ft	15.0	2.4	12.6	10	20	276	Btuh
19	2 NFRC	0.20,	0.30	No	No	NE	1.5ft	1.5ft	4.0	0.0	4.0	10	19	77	Btuh
20	2 NFRC	0.20,	0.30	No	No	SW	1.5ft	1.5ft	12.5	2.4	10.1	10	20	226	Btuh
21	2 NFRC	0.20,	0.30	No	No	SW	1.5ft	1.5ft	33.3	6.5	26.9	10	20	602	Btuh
22	2 NFRC	0.20,	0.30	No	No	SW	1.5ft	1.5ft	8.0	1.9	6.1	10	20	141	Btuh
23	2 NFRC	0.20,	0.30	No	No	SW	1.5ft	1.5ft	8.0	1.9	6.1	10	20	141	Btuh
24	2 NFRC	0.20,	0.30	No	No	SW	1.5ft	1.5ft	15.0	2.4	12.6	10	20	276	Btuh
	Excursion													791	Btuh
	Window Total								673 (sqft)					12761	Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Shelley Res | Project Title: 211328 Shelley | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-09-24

Walls	Type	U-Value	R-Value	Area(sqft)	HTM	Load
			Cav/Sheath			
1	Frame - Wood - Ext	0.09	13.0/0.0	188.3	2.3	426 Btuh
2	Frame - Wood - Ext	0.09	13.0/0.0	52.2	2.3	118 Btuh
3	Frame - Wood - Ext	0.09	13.0/0.0	43.7	2.3	99 Btuh
4	Frame - Wood - Ext	0.09	13.0/0.0	89.2	2.3	202 Btuh
5	Frame - Wood - Ext	0.09	13.0/0.0	45.0	2.3	102 Btuh
6	Frame - Wood - Ext	0.09	13.0/0.0	23.7	2.3	54 Btuh
7	Frame - Wood - Ext	0.09	13.0/0.0	33.8	2.3	77 Btuh
8	Frame - Wood - Ext	0.09	13.0/0.0	32.3	2.3	73 Btuh
9	Frame - Wood - Ext	0.09	13.0/0.0	62.0	2.3	140 Btuh
10	Frame - Wood - Ext	0.09	13.0/0.0	107.0	2.3	242 Btuh
11	Frame - Wood - Ext	0.09	13.0/0.0	99.3	2.3	225 Btuh
12	Frame - Wood - Ext	0.09	13.0/0.0	193.3	2.3	438 Btuh
13	Frame - Wood - Ext	0.09	13.0/0.0	63.3	2.3	143 Btuh
14	Frame - Wood - Ext	0.09	13.0/0.0	92.0	2.3	208 Btuh
15	Frame - Wood - Ext	0.09	13.0/0.0	63.3	2.3	143 Btuh
16	Frame - Wood - Ext	0.09	13.0/0.0	165.3	2.3	374 Btuh
17	Frame - Wood - Adj	0.09	13.0/0.0	78.3	1.7	132 Btuh
18	Frame - Wood - Adj	0.09	13.0/0.0	18.7	1.7	31 Btuh
19	Frame - Wood - Adj	0.09	13.0/0.0	11.7	1.7	20 Btuh
20	Frame - Wood - Ext	0.09	13.0/0.0	133.7	2.3	303 Btuh
21	Frame - Wood - Ext	0.09	13.0/0.0	35.0	2.3	79 Btuh
22	Frame - Wood - Ext	0.09	13.0/0.0	28.0	2.3	63 Btuh
23	Frame - Wood - Ext	0.09	13.0/0.0	94.0	2.3	213 Btuh
24	Frame - Wood - Ext	0.09	13.0/0.0	50.0	2.3	113 Btuh
25	Frame - Wood - Ext	0.09	13.0/0.0	66.0	2.3	149 Btuh
26	Frame - Wood - Ext	0.09	13.0/0.0	63.3	2.3	143 Btuh
27	Frame - Wood - Ext	0.09	13.0/0.0	39.3	2.3	89 Btuh
28	Frame - Wood - Adj	0.09	13.0/0.0	199.3	1.7	336 Btuh
29	Frame - Wood - Ext	0.09	13.0/0.0	489.5	2.3	1108 Btuh
30	Frame - Wood - Ext	0.09	13.0/0.0	28.3	2.3	64 Btuh
31	Frame - Wood - Ext	0.09	13.0/0.0	85.3	2.3	193 Btuh
32	Frame - Wood - Ext	0.09	13.0/0.0	11.7	2.3	26 Btuh
33	Frame - Wood - Ext	0.09	13.0/0.0	146.7	2.3	332 Btuh
	Wall Total			2933 (sqft)		6460 Btuh

Doors	Type	Area (sqft)	HTM	Load
1	Insulated - Exterior	24.0	12.0	288 Btuh
2	Insulated - Exterior	16.0	12.0	192 Btuh
3	Insulated - Exterior	8.0	12.0	96 Btuh
4	Insulated - Exterior	24.0	12.0	288 Btuh
5	Insulated - Exterior	32.0	12.0	384 Btuh
6	Insulated - Exterior	32.0	12.0	384 Btuh
7	Insulated - Exterior	8.0	12.0	96 Btuh
8	Insulated - Garage	21.3	12.0	256 Btuh
9	Insulated - Exterior	16.0	12.0	192 Btuh
10	Insulated - Garage	24.0	12.0	288 Btuh
	Door Total	205 (sqft)		2464 Btuh

Ceilings	Type/Color/Surface	U-Value	R-Value	Area(sqft)	HTM	Load
1	Unvented Attic/DarkShingle	0.241	0.0/22.0	3880.0	0.96	3740 Btuh
	Ceiling Total			3880 (sqft)		3740 Btuh

Floors	Type	R-Value	Size	HTM	Load
1	Slab On Grade	0.0	3696 (ft-perimeter)	0.0	0 Btuh
	Floor Total		3696.0 (sqft)		0 Btuh

Manual J Summer Calculations

Residential Load - Component Details (continued)

Shelley Res | Project Title: 211328 Shelley | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-09-24

				Envelope Subtotal:			25426 Btuh
Infiltration	Type	Average ACH	Volume(cuft)	Wall Ratio	CFM=	Load	
	Natural	0.18	37884	1	114.8	2387	Btuh
Internal gain		Occupants	Btuh/occupant		Appliance	Load	
		8	X 230	+	3400	5240	Btuh
				Sensible Envelope Load:		33053	Btuh
Duct load	Average sealed, Supply(R6.0-Attic), Return(R6.0-Attic)			(DGM of 0.117)		3869	Btuh
				Sensible Load All Zones		**36921**	**Btuh**

Manual J Summer Calculations

Residential Load - Component Details (continued)

Shelley Res | Project Title: 211328 Shelley | Climate:FL_GAINESVILLE_REGIONAL_A

Lake City, FL

2021-09-24

WHOLE HOUSE TOTALS

Whole House Totals for Cooling	**Sensible Envelope Load All Zones**	**33053**	**Btuh**
	Sensible Duct Load	3869	Btuh
	Total Sensible Zone Loads	**36921**	**Btuh**
	Sensible ventilation	0	Btuh
	Blower	0	Btuh
	Total sensible gain	**36921**	**Btuh**
	Latent infiltration gain (for 51 gr. humidity difference)	3961	Btuh
	Latent ventilation gain	0	Btuh
	Latent duct gain	2181	Btuh
	Latent occupant gain (8.0 people @ 200 Btuh per person)	1600	Btuh
	Latent other gain	0	Btuh
	Latent total gain	**7742**	**Btuh**
	TOTAL GAIN	**44664**	**Btuh**

EQUIPMENT

1. Central Unit	#	61000 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