

HVAC Load Calculations

for



**RHVAC RESIDENTIAL
HVAC LOADS**

Prepared By:

Thursday, September 20, 2012

Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.



Project Report

General Project Information

Project Title: rhv
 Designed By:
 Project Date: 09192012
 Project Comment: Living area is based on inside square footage.
 Client Name:
 Client Address:
 Client City:
 Client Phone:
 Company Name:
 Company Representative:
 Company Address:
 Company City:
 Company Phone:
 Company Fax:
 Company Comment: Btu means British Thermal Unit, is a measurement of heat, 12,000 = 1 ton of TOTAL Cooling
 CFM means Cubic Feet Per Minute, is a measurement of volume of moving air, 400 CFM = 1 ton of Cooling

Design Data

Reference City: Orlando, Florida
 Building Orientation: Front door faces North
 Daily Temperature Range: Medium
 Latitude: 28 Degrees
 Elevation: 100 ft.
 Altitude Factor: 0.996
 Elevation Sensible Adj. Factor: 1.000
 Elevation Total Adj. Factor: 1.000
 Elevation Heating Adj. Factor: 1.000
 Elevation Heating Adj. Factor: 1.000

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	38	35.63	80%	n/a	70	n/a
Summer:	93	76	46%	50%	75	44

Check Figures

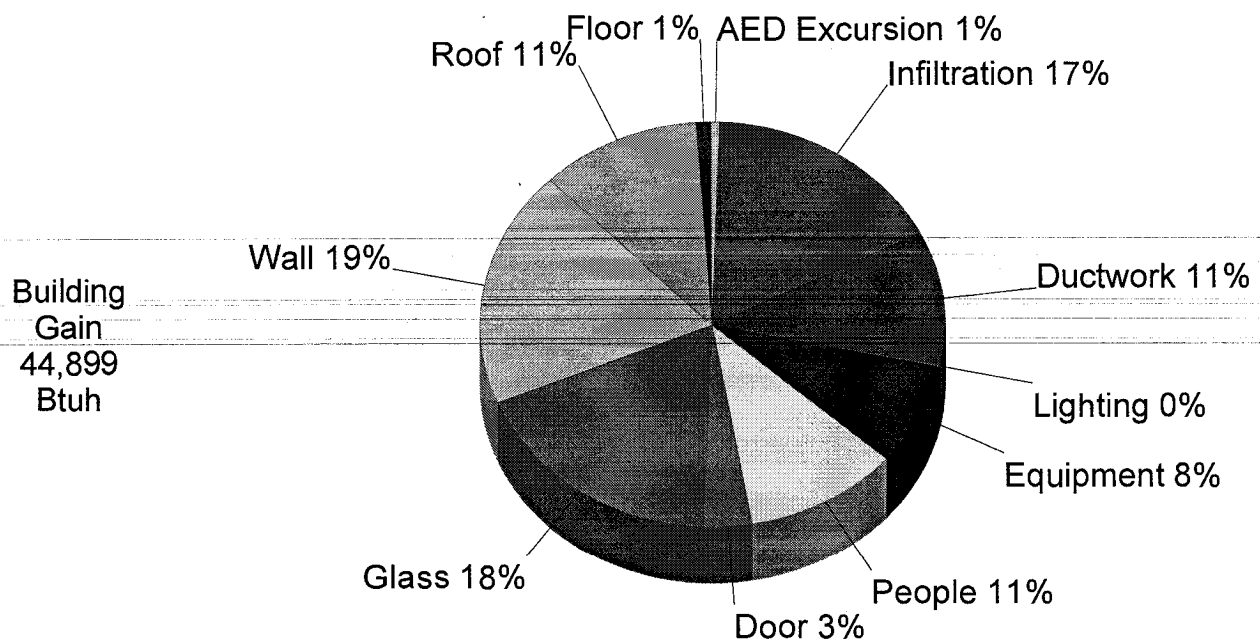
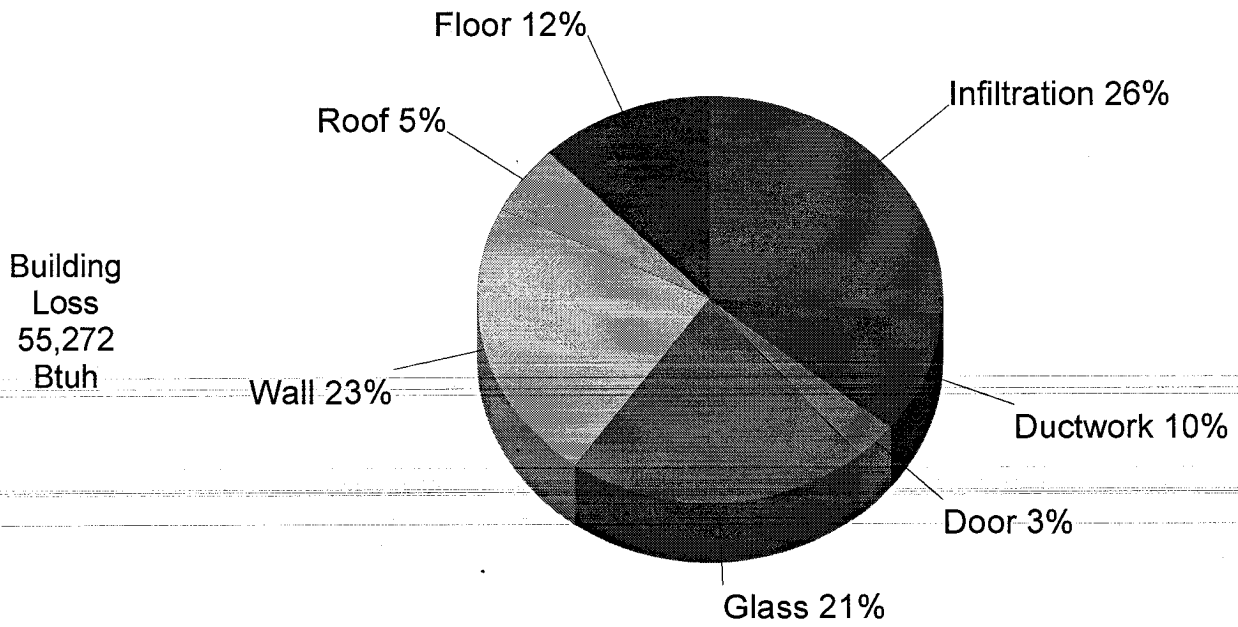
Total Building Supply CFM:	1,712	CFM Per Square ft.:	0.532
Square ft. of Room Area:	3,215	Square ft. Per Ton:	751
Volume (ft³) of Cond. Space:	30,930		

Building Loads

Total Heating Required Including Ventilation Air:	55,272 Btuh	55.272 MBH
Total Sensible Gain:	37,524 Btuh	84 %
Total Latent Gain:	7,375 Btuh	16 %
Total Cooling Required Including Ventilation Air:	44,899 Btuh	3.74 Tons (Based On Sensible + Latent)
		4.28 Tons (Based On 73% Sensible Capacity)

Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.
 Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
 All computed results are estimates as building use and weather may vary.
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

**Building Pie Chart**



Detailed Room Loads - Room 1 - Lower Level (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	1,814.0 ft.	System Number:	1
Room Width:	1.0 ft.	Zone Number:	1
Area:	1,814.0 sq.ft.	Supply Air:	967 CFM
Ceiling Height:	10.1 ft.	Supply Air Changes:	3.2 AC/hr
Volume:	18,321.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	9	Actual Winter Vent.:	0 CFM
Runout Air:	107 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	547 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	547 ft./min.	Actual Winter Infil.:	244 CFM
Actual Loss:	0.191 in.wg./100 ft.	Actual Summer Infil.:	92 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
S -Wall-13AB-0ocs 15 X 10.1	56.9	0.201	6.4	366	4.1	0	233
S -Wall-13AB-0ocs 49 X 10.1	440.6	0.201	6.4	2,834	4.1	0	1,806
S -Wall-13AB-0ocs 38 X 10.1	296	0.201	6.4	1,904	4.1	0	1,214
S -Wall-13AB-0ocs 49 X 10.1	425.6	0.201	6.4	2,738	4.1	0	1,745
N -Wall-12B-2sw 23 X 10.1	211.9	0.086	2.8	583	2.1	0	446
S -Door-11F 6 X 6.8	40.8	0.280	9.0	366	8.1	0	331
S -Door-11F 3 X 6.8	20.4	0.280	9.0	183	8.1	0	166
S -Door-11F 3 X 6.8	20.4	0.280	9.0	183	8.1	0	166
N -Door-11F 3 X 6.8	20.4	0.280	9.0	183	8.1	0	166
S -Gls-10A-w shgc-0.45 100%S	33.4	0.820	26.2	876	24.2	0	808
S -Gls-1B-hm shgc-0.52 100%S (2)	18.7	1.130	36.2	676	31.2	0	584
S -Gls-1A-hb-o shgc-0.52 100%S	6.5	1.080	34.6	225	21.6	0	140
S -Gls-1A-hb-o shgc-0.52 100%S (2)	29.1	1.080	34.6	1,006	21.6	0	628
S -Gls-1A-hb-o shgc-0.52 100%S (4)	58.2	1.080	34.6	2,012	21.6	0	1,256
S -Gls-1B-hw shgc-0.52 100%S (2)	6	0.980	31.4	188	28.7	0	172
S -Gls-1B-hw shgc-0.52 100%S	3.2	0.980	31.4	100	28.4	0	91
S -Gls-1A-hb-o shgc-0.52 100%S (2)	29.1	1.080	34.6	1,006	21.6	0	628
S -Gls-1A-hb-o shgc-0.52 100%S (2)	12.3	1.080	34.6	426	21.6	0	266
S -Gls-1A-hb-o shgc-0.52 100%S	16.6	1.080	34.6	572	21.6	0	357
S -Gls-1A-hb-o shgc-0.52 100%S	6.8	1.080	34.6	234	21.6	0	146
S -Gls-1B-hw shgc-0.52 0%S	4.5	0.980	31.4	141	32.7	0	147
UP-Ceil-16B-19 965 X 1	965	0.049	1.6	1,513	2.6	0	2,506
Floor-22A-pl 174 ft..Per.	174	0.989	31.6	5,507	0.0	0	0
Subtotals for Structure:				23,822		0	14,002
Infil.: Win.: 244.3, Sum.: 91.6	1,757		4.875	8,568	1.028	2,704	1,807
Ductwork:				2,340			1,644
People: 230 lat/per, 300 sen/per:	4					920	1,200
Equipment:						0	2,500
Lighting:	11						38
Room Totals:				34,730		3,624	21,191



Detailed Room Loads - Room 2 - Upper Level (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	1,401.0 ft.	System Number:	2
Room Width:	1.0 ft.	Zone Number:	2
Area:	1,401.0 sq.ft.	Supply Air:	745 CFM
Ceiling Height:	9.0 ft.	Supply Air Changes:	3.5 AC/hr
Volume:	12,609.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	7	Actual Winter Vent.:	0 CFM
Runout Air:	106 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	542 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	542 ft./min.	Actual Winter Infil.:	168 CFM
Actual Loss:	0.188 in.wg./100 ft.	Actual Summer Infil.:	63 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
S -Wall-12B-2sw 23 X 9.1	186.2	0.086	2.8	513	2.1	0	392
E -Wall-12B-2sw 68.5 X 9.1	607.2	0.086	2.8	1,671	2.1	0	1,279
N -Wall-12B-2sw 23 X 9.1	193.4	0.086	2.8	532	2.1	0	408
W -Wall-12B-2sw 68.5 X 9.1	471.8	0.086	2.8	1,298	2.1	0	994
W -Door-11D 3 X 6.8	20.4	0.390	12.5	255	11.3	0	231
W -Door-11D 3 X 6.8	20.4	0.390	12.5	255	11.3	0	231
W -Door-11D 3 X 6.8	20.4	0.390	12.5	255	11.3	0	231
S -Gls-1A-hb-o shgc-0.52 100%S (2)	16.8	1.080	34.6	580	21.5	0	362
S -Gls-1A-hb-o shgc-0.52 100%S	6.2	1.080	34.6	216	21.6	0	135
E -Gls-1A-hb-o shgc-0.52 7%S	16.2	1.080	34.6	560	26.6	0	431
N -Gls-1A-hb-o shgc-0.52 100%S	15.9	1.080	34.6	548	30.3	0	481
W -Gls-1D-hb-o shgc-0.44 88%S (4)	58.2	0.650	20.8	1,212	13.5	0	784
W -Gls-1B-hw shgc-0.52 97%S (3)	32.1	0.980	31.4	1,008	22.5	0	723
UP-Ceil-16B-28 1401 X 1	1401	0.034	1.1	1,524	1.8	0	2,525
Floor-20P-13 1 X 552	552	0.068	2.2	1,201	0.9	0	488
Subtotals for Structure:				11,628		0	9,695
Infil.: Win.: 168.1, Sum.: 63.0	1,665		3.541	5,896	0.747	1,861	1,244
Ductwork:				3,018			2,411
AED Excursion:							260
People: 230 lat/per, 300 sen/per:	5					1,150	1,500
Equipment:						0	1,200
Lighting:	7						24
Room Totals:				20,542		3,011	16,334



System 1 Room Load Summary

Room No Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---									
1 Lower Level	1,814	34,730	453	9-6	547	21,191	3,624	967	967
Duct Latent							297		
System 1 total	1,814	34,730	453			21,191	3,921	967	967

System 1 Main Trunk Size: 15 in.
 Velocity: 788 ft./min
 Loss per 100 ft.: 0.114 in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	2.09	84% / 16%	21,191	3,921	25,112
Recommended:	2.42	73% / 27%	21,191	7,838	29,028
Actual:	2.42	72% / 28%	21,000	8,000	29,000

Equipment Data

	Heating System	Cooling System
Type:	Air Source Heat Pump	Air Source Heat Pump
Model:		38ycd030330
Indoor Model:		fa4anf030
Brand:		carrier
Efficiency:	6.9 HSPF	10 SEER
Sound:		
Capacity:	47°F: 29,000 / 17°F: 0 Btuh	29,000 Btuh
Sensible Capacity:	n/a	21,000 Btuh
Latent Capacity:	n/a	8,000 Btuh



System 2 Room Load Summary

Room No Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 2---									
2 Upper Level	1,401	20,542	268	7-6	542	16,334	3,011	745	745
Duct Latent							443		
System 2 total	1,401	20,542	268			16,334	3,454	745	745

System 2 Main Trunk Size: 14 in.
 Velocity: 697 ft./min
 Loss per 100 ft.: 0.098 in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	1.65	83% / 17%	16,334	3,454	19,787
Recommended:	1.86	73% / 27%	16,334	6,041	22,375
Actual:	2.42	72% / 28%	21,000	8,000	29,000

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		38YCD030330
Indoor Model:		FA4ANF030
Brand:		CARRIER
Efficiency:	80 AFUE	10 SEER
Sound:		
Capacity:	24,000 Btuh	29,000 Btuh
Sensible Capacity:	n/a	21,000 Btuh
Latent Capacity:	n/a	8,000 Btuh