91 Hyde Blvd
HVAC Load Calculations

for

Liz Kormos

Elite Software

RHVAC RESIDENTIAL HVAC LOADS

Prepared By:

Saturday, May 26, 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.

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Glenville, NY 12302

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Project Report

General Project Information

Project Title:	91 Hyde Blvd
Project Date:	Sunday, April 15, 2012
Client Name:	Liz Kormos

Design Data

Reference City:		Albany, New York
Building Orientation:		Front door faces West
Daily Temperature Range:		Medium
Latitude:	42	Degrees
Elevation:	275	ft.
Altitude Factor:	0.990	
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:	1	0.31	80%	n/a	70	n/a
Summer:	88	72	47%	50%	75	28

Check Figures

Total Building Supply CFM:	794	CFM Per Square ft.:	0.382
Square ft. of Room Area:	2,077	Square ft. Per Ton:	1,149
Volume (ft³) of Cond. Space:	17,612		

Building Loads

Total Heating Required Including Ventilation Air:	14,594	Btuh	14.594 MBH
Total Sensible Gain:	17,551	Btuh	81 %
Total Latent Gain:	4,150	Btuh	19 %
Total Cooling Required Including Ventilation Air:	21,701	Btuh	1.81 Tons (Based On Sensible + Latent)

Notes

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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.

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Miscellaneous Report

System 1 House Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	1	0.31	80%	n/a	70	n/a
Summer:	88	72	47%	50%	75	28.13

System 2 Mudroom Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	1	0.31	80%	n/a	50	n/a
Summer:	88	72	47%	50%	75	28.13

Duct Sizing Inputs

	Main Trunk	Runouts
Calculate:	Yes	Yes
Use Schedule:	Yes	Yes
Roughness Factor:	0.00300	0.01000
Pressure Drop:	0.1000 in.wg./100 ft.	0.1000 in.wg./100 ft.
Minimum Velocity:	650 ft./min	450 ft./min
Maximum Velocity:	900 ft./min	750 ft./min
Minimum Height:	0 in.	0 in.
Maximum Height:	0 in.	0 in.

Outside Air Data

	Winter	Summer
Infiltration Specified:	0.117 AC/hr	0.053 AC/hr
	34 CFM	15 CFM
Infiltration Actual:	0.035 AC/hr	0.012 AC/hr
Above Grade Volume:	X 17,612 Cu.ft.	X 17,612 Cu.ft.
	625 Cu.ft./hr	205 Cu.ft./hr
	X 0.0167	X 0.0167
Total Building Infiltration:	10 CFM	3 CFM
Total Building Ventilation:	89 CFM	89 CFM

  ---System 1---
Infiltration & Ventilation Sensible Gain Multiplier: 14.16   = (1.10 X 0.990 X 13.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 18.94   = (0.68 X 0.990 X 28.13 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 75.15   = (1.10 X 0.990 X 69.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.085 AC/hr (24 CFM), Construction: Unknown, Fireplaces: 2, 7 CFM, Tight
Summer Infiltration Specified: 0.043 AC/hr (12 CFM), Construction: Unknown

  ---System 2---
Infiltration & Ventilation Sensible Gain Multiplier: 14.16   = (1.10 X 0.990 X 13.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 18.94   = (0.68 X 0.990 X 28.13 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 53.37   = (1.10 X 0.990 X 49.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.300 AC/hr (3 CFM), Construction: Unknown, Fireplaces: 2, 7 CFM, Tight
Summer Infiltration Specified: 0.300 AC/hr (3 CFM), Construction: Unknown

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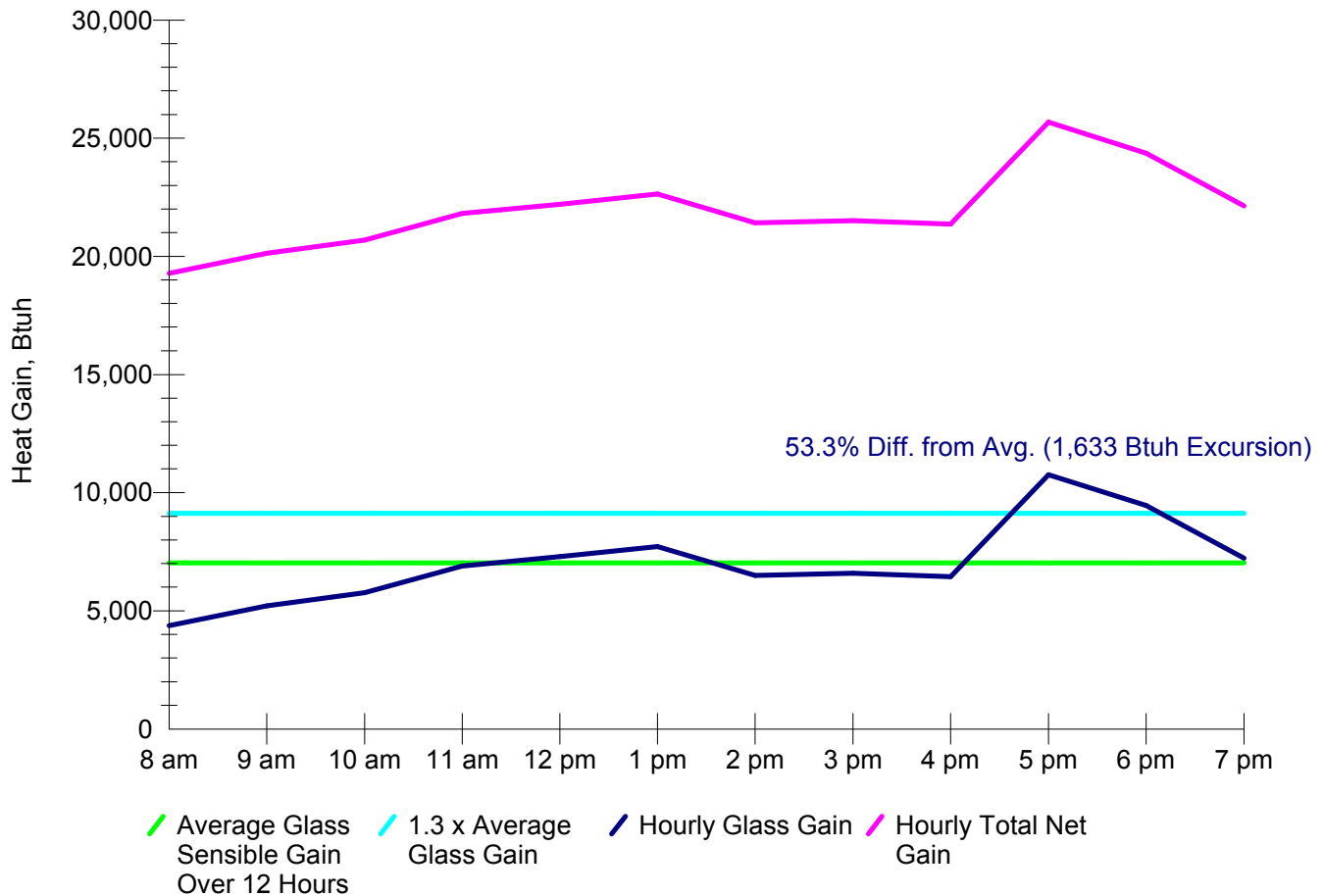**Elite Software Development, Inc.**
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Load Preview Report

Scope	Net Ton	ft.² /Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	1.81	1,149	2,077	17,551	4,150	21,701	14,594	174	794	794	
System 1	1.72	1,160	1,991	16,715	3,885	20,601	13,169	155	756	756	10x15
Ventilation				252	1,685	1,937	1,338				
Blower				682		682					
Zone 1			384	3,095	400	3,495	2,562	34	147	147	5x5
1-Master Bedroom			182	2,486	400	2,886	1,444	19	118	118	1–6
2-Master Closet			87	415	0	415	661	9	20	20	1–4
3-Master WC			52	138	0	138	383	5	7	7	1–4
4-Master Bath			63	55	0	55	74	1	3	3	1–4
Zone 2			774	9,302	1,000	10,302	3,894	51	441	441	8x12
12-East Office			171	2,283	200	2,483	1,000	13	108	108	1–6
13-West Office			205	3,594	200	3,794	1,275	17	170	170	2–5
14-Away Room			136	1,309	400	1,709	680	9	62	62	1–5
15-2F Hall			128	531	200	731	401	5	25	25	1–4
16-Guest Bath			68	203	0	203	385	5	10	10	1–4
17-Mechanical Room			32	1,352	0	1,352	113	1	64	64	1–5
18-Closet			34	30	0	30	40	1	1	1	1–4
Zone 3			833	9,265	800	10,065	5,375	71	439	439	8x12
5-Kitchen			136	2,084	400	2,484	524	7	99	99	1–6
6-Pantry			79	97	0	97	255	3	5	5	1–4
8-Dining			198	2,431	400	2,831	1,053	14	115	115	1–6
9-Living Room			305	4,257	0	4,257	2,506	33	202	202	2–6
10-Entry			89	293	0	293	755	10	14	14	1–4
11-Half Bathroom			26	103	0	103	282	4	5	5	1–4
System 2	0.09	938	86	835	265	1,100	1,425	19	38	38	4x4
Zone 1			86	835	265	1,100	1,425	19	38	38	4x4
7-Mudroom			86	835	265	1,100	1,425	19	38	38	1–4

Sum of room airflows may be greater than system airflow because system has multiple zones.

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System 1 - House - Adequate Exposure Diversity Test

Test For Adequate Exposure Diversity

Legend:
- Average Glass Sensible Gain Over 12 Hours
- 1.3 x Average Glass Gain
- Hourly Glass Gain
- Hourly Total Net Gain

53.3% Diff. from Avg. (1,633 Btuh Excursion)

AED Calculation Summary

---   SYSTEM DOES NOT HAVE ADEQUATE EXPOSURE DIVERSITY.   ---

System is on N, E, S, W rosette.
Peak load exceeds 12-hour average load by 53.3%.
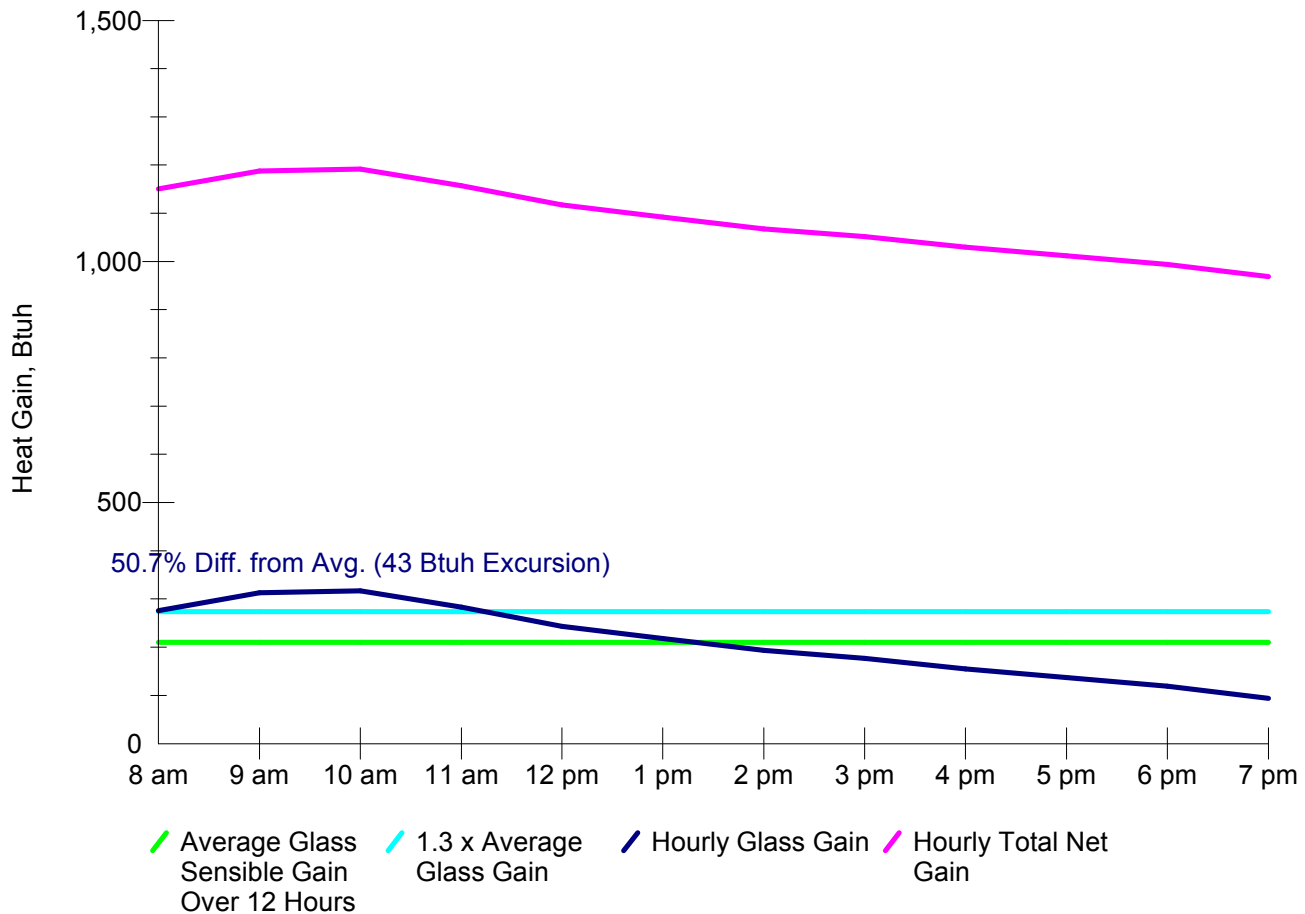AED Excursion (amount by which peak exceeds 1.3 x average): 1,633 Btuh

Definition: A system has adequate exposure diversity if the peak-hour glass load for the entire conditioned space does not exceed the average glass load for the entire conditioned space by more than 30 percent.

(System Concept Warning for excursion equal to or exceeding 1.5 x baseline) This application has glass areas that produced large heat gains for part of the day. Variable air volume devices are required to overcome large spikes in solar gain for one or more rooms. Install a zoned system or provide zone control (individual, motorized, thermostatically controlled dampers) for problem rooms. Single speed equipment may not be suitable for the application.

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System 2 - Mudroom - Adequate Exposure Diversity Test

Test For Adequate Exposure Diversity

Heat Gain, Btuh

50.7% Diff. from Avg. (43 Btuh Excursion)

Legend:
- / Average Glass Sensible Gain Over 12 Hours
- / 1.3 x Average Glass Gain
- / Hourly Glass Gain
- / Hourly Total Net Gain

AED Calculation Summary

--- SYSTEM DOES NOT HAVE ADEQUATE EXPOSURE DIVERSITY. ---

System is on N, E, S, W rosette.
Peak load exceeds 12-hour average load by 50.7%.
AED Excursion (amount by which peak exceeds 1.3 x average): 43 Btuh

Definition: A system has adequate exposure diversity if the peak-hour glass load for the entire conditioned space does not exceed the average glass load for the entire conditioned space by more than 30 percent.

(System Concept Warning for excursion equal to or exceeding 1.5 x baseline) This application has glass areas that produced large heat gains for part of the day. Variable air volume devices are required to overcome large spikes in solar gain for one or more rooms. Install a zoned system or provide zone control (individual, motorized, thermostatically controlled dampers) for problem rooms. Single speed equipment may not be suitable for the application.

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Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Triple- shg: Glazing-south windows, u-value 0.2, SHGC 0.5	178.7	2,465	0	3,412	3,412
Triple-Block: Glazing-My first example custom glass, u-value 0.18, SHGC 0.25	167	2,043	0	2,472	2,472
Marvin-LowSHGC: Glazing-My first example custom glass, u-value 0.3, SHGC 0.18	3.9	81	0	29	29
Masonite1/4Lite: Door-Masonite entry door with 1/4 lite	20.1	319	0	111	111
11P: Door-Metal - Polyurethane Core	20.1	286	0	140	140
Dbl Wall-12": Wall-Frame, , My first example custom wall	2060.3	3,383	0	1,082	1,082
12F-5sw: Wall-Frame, R-21 insulation in 2 x 6 stud cavity, R-5 board insulation, siding finish, wood studs	115.2	282	0	58	58
Cellulose R60: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Custom, R60 cellulose	1454.6	1,675	0	1,188	1,188
22B-15pl: Floor-Slab on grade, Vertical board insulation covers slab edge and extends straight down to 3' below grade, any floor cover, R-15 insulation, passive, light dry soil	32	393	0	0	0
22D-15pl: Floor-Slab on grade, Vertical board insulation covers slab edge, turns under slab and extends 4' horizontally, any floor cover, R-15 insulation, passive, light dry soil	153	1,773	0	0	0
Subtotals for structure:		12,700	0	8,492	8,492
People:	12		2,400	3,000	5,400
Equipment:			0	3,400	3,400
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 10, Summer CFM: 3		556	65	48	113
Ventilation: Winter CFM: 89, Summer CFM: 89		1,338	1,685	252	1,937
Blower Heat Gain, 200 watts:		0	0	682	682
AED Excursion:		0	0	1,676	1,676
Total Building Load Totals:		14,594	4,150	17,551	21,701

Check Figures

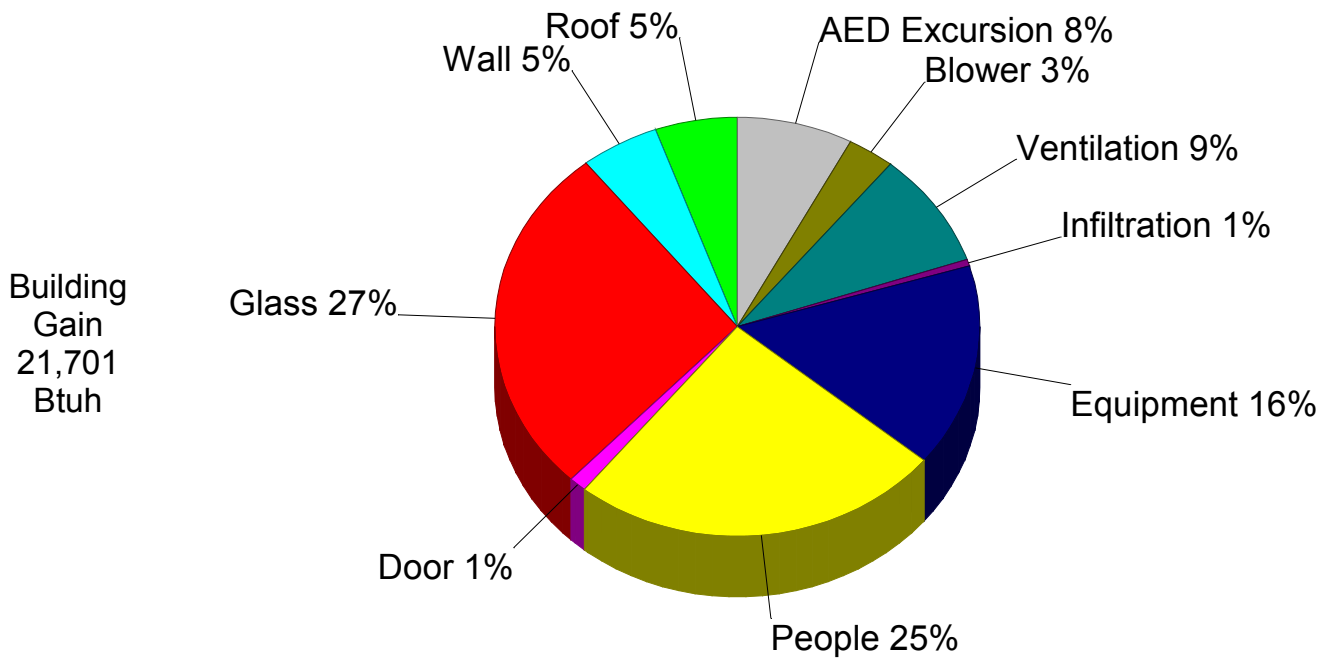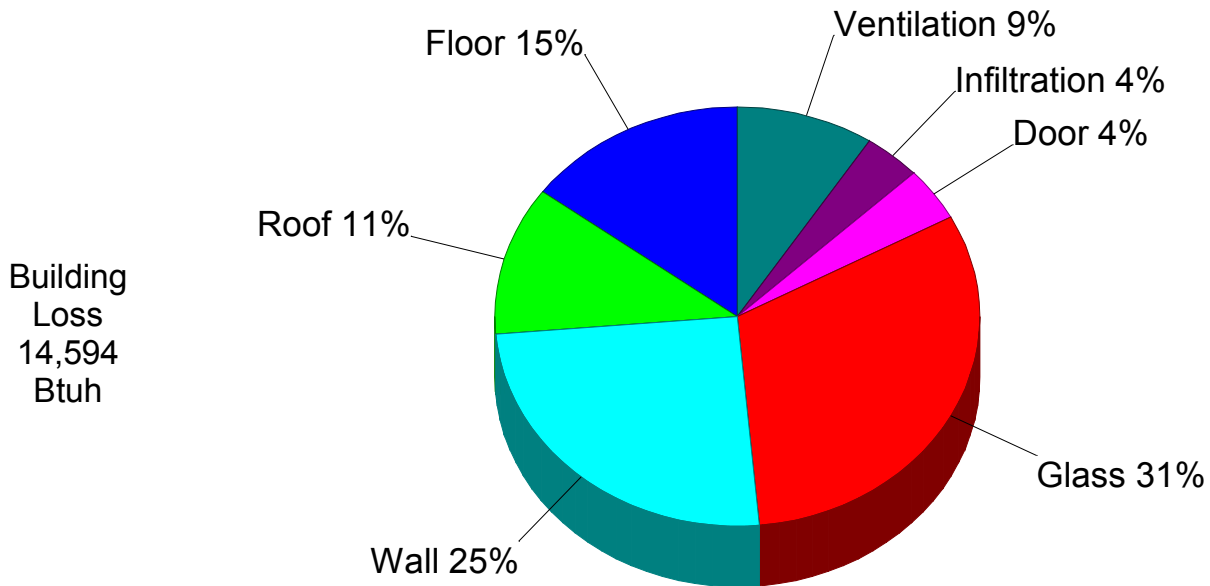|			
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Building Pie Chart

Building
Loss
14,594
Btuh

Floor 15%
Ventilation 9%
Infiltration 4%
Door 4%
Roof 11%
Glass 31%
Wall 25%

Building
Gain
21,701
Btuh

Roof 5%
Wall 5%
AED Excursion 8%
Blower 3%
Ventilation 9%
Infiltration 1%
Glass 27%
Equipment 16%
Door 1%
People 25%

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Building Bar Graph

Building
Loss
14,594
Btuh

Floor 15%   Wall 25%   Door 4%   Ventilation 9%

Roof 11%   Glass 31%   Infiltration 4%

Building
Gain
21,701
Btuh

Roof 5%   Glass 27%   People 25%   Infiltration 1%   Blower 3%

Wall 5%   Door 1%   Equipment 16%   Ventilation 9%   AED Excursion 8%