

*Jones Residence
HVAC Load Calculations*

for

Mr. and Mrs. Jeffrey Jones
1234 First Street NW
Harrisburg, PA 17177

Prepared By:

Jeff Williamson
ACE Heating And Cooling
8724 West Halver St.
Allentown, PA 18105
(717) 555-HEAT
Thursday, June 17, 2010



Project Report

Project Title: Jones Residence
 Designed By: Your Name
 Project Date: Sunday, January 24, 2010
 Project Comment: Don't forget the picture window which will be installed later.
 Client Name: Mr. and Mrs. Jeffrey Jones
 Client Address: 1234 First Street NW
 Client City: Harrisburg, PA 17177
 Client Phone: (717) 555-5294
 Client Fax: None
 Company Name: ACE Heating And Cooling
 Company Representative: Jeff Williamson
 Company Address: 8724 West Halver St.
 Company City: Allentown, PA 18105
 Company Phone: (717) 555-HEAT
 Company Fax: (717) 555-COOL
 Company Comment: Bid prepared by Rodney.

Design Data

Reference City: Harrisburg, Pennsylvania
 Building Orientation: Front door faces Southeast
 Daily Temperature Range: Medium
 Latitude: 40 Degrees
 Elevation: 308 ft.
 Altitude Factor: 0.989
 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:	3	-0.65	5%	n/a	71	n/a
Summer:	95	75.22	41%	50%	74	38

Check Figures

Total Building Supply CFM:	261	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	1,000	Square ft. Per Ton:	0 **
Volume (ft³) of Cond. Space: (htg.)	8,717	Air Turnover Rate (per hour):	1.8

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.

** Based on area of rooms being cooled.

Building Loads

Total Heating Required Including Ventilation Air: 19,903 Btuh 19.903 MBH

Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.
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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.



Miscellaneous Report

System 1 Main Floor Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	3	-0.65	5%	n/a	71	n/a
Summer:	95	75.22	41%	50%	74	38.18

Duct Sizing Inputs

	Main Trunk	Runouts
Calculate:	Yes	Yes
Use Schedule:	No	No
Roughness Factor:	0.00300	0.01000
Pressure Drop:	0.0996 in.wg./100 ft.	0.0996 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:	0.450 AC/hr 38 CFM	0.000 AC/hr 0 CFM
Infiltration Actual:	0.450 AC/hr	0.000 AC/hr
Above Grade Volume:	X 5,117 Cu.ft. 2,303 Cu.ft./hr X 0.0167	X 0 Cu.ft. 0 Cu.ft./hr X 0.0167
Total Building Infiltration:	38 CFM	0 CFM
Total Building Ventilation:	0 CFM	0 CFM

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier:	22.84	= (1.10 X 0.989 X 21.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier:	25.67	= (0.68 X 0.989 X 38.18 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier:	73.97	= (1.10 X 0.989 X 68.00 Winter Temp. Difference)
Winter Infiltration Specified:	0.450 AC/hr (38 CFM), Construction: Average	
Summer Infiltration Specified:	0.000 AC/hr (0 CFM), Construction: Average	

Duct Load Factor Scenarios for System 1

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From MDD
1	Supply	Main	Under Slab	-	0.12	6	120	No



Load Preview Report

Scope	Has AED	Net Ton	Rec 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		0.00	0.00	0	1,000	0	0	0	19,903	261	0	261	
System 1	Yes	0.00	0.00	0	1,000	0	0	0	19,903	261	0	261	7x9
Zone 1					1,000	0	0	0	19,903	261	0	261	7x9
1-Living Room					144	0	0	0	9,297	122	0	122	1-7
2-Kitchen					90	0	0	0	2,303	30	0	30	1-4
3-Bedroom					166	0	0	0	6,184	81	0	81	1-6
4-Basement					600	0	0	0	2,120	28	0	28	1-3



Duct Size Preview

Room or Duct Name	Source	Minimum Velocity	Maximum Velocity	Rough. Factor	Design L/100	SP Loss	Duct Velocity	Duct Length	Htg Flow	Clg Flow	Act. Flow	Duct Size
System 1												
Supply Runouts												
Zone 1												
1-Living Room	Built-In	450	750	0	0.1		456.8		122	0	122	1--7
2-Kitchen (SR-100)	MD Duct Sizer	0	0	0.01	0.08	0.01079	346.5	8	30	0	30	1--4
3-Bedroom (SR-200)	MD Duct Sizer	0	0	0.01	0.08	0.00974	413.6	9	81	0	81	1--6
4-Basement	Built-In	450	750	0	0.1		567.3		28	0	28	1--3
Other Ducts												
Supply Main Trunk (ST-100)	MD Duct Sizer	0	0	0.0003	0.08	0.00398	597.4	5	261	0	261	7x9
ST-200 (Rm:1,2)	MD Duct Sizer	0	0	0.0003	0.08	0.01482	548.4	16	152	0	152	5x8
ST-400 (Rm:2,3)	MD Duct Sizer	0	0	0.0003	0.08	0.00789	458.5	11	111	0	111	5x7

Summary

System 1					
Heating Flow:	261	Design Friction Rate:	0.079	TEL Return:	0
Cooling Flow:	0	Total Cumulative SP Loss:	0.428	TEL Supply:	162
Fan ESP:	0.428	Device SP Loss:	0.3	TEL Total:	162
Fan SP Available:	0.128	Path with Highest Loss:	1		



Manual D Duct Sizer Report

Path 1, From Fan To Kitchen, Ups.Path: 0, Ups.Item: 0, Ups.Loss: 0.000, System: 1

Total Path SP Loss: 0.428
 Total Effective Length: 162
 Friction Rate/100 ft.: 0.079

Item	Type Description -Rooms Fed	Flow Fit/Misc Duct Ref	Length Des.Loss Shape	Sizing Opt Min.Hei Min.Vel	Rough. Max.Hei Max.Vel	Calc.Dia Calc.Wid Calc.Hei	Calc.Vel Loss/100 Equiv.Len	SP Loss Subtotal
1	Misc Equipment	0.3 Below						0.300 0.300
2	Duct ST-100	261	5 0.080 Rect	Inch 0 0	0.0003 0 0	8.7 7 9	597 0.080	0.004 0.304
3	Fitting Fitting 1-F1	1-F1 Above					597 0.080 53.17	0.042 0.346
4	Duct ST-200 -Living Room -Kitchen	152	16 0.080 Rect	Inch 0 0	0.0003 0 0	6.9 5 8	548 0.093	0.015 0.361
5	Fitting Fitting 9-A1	9-A1 Above					548 0.093 25.65	0.024 0.385
6	Duct SR-100 -Kitchen (1 reg)	30	8 0.080 Rnd	Inch 0 0	0.01 0 0	4 3.1 4.4	346 0.135	0.011 0.396

Path 2, Partial Route To Bedroom, Ups.Path: 1, Ups.Item: 4, Ups.Loss: 0.382, System: 1

Total Path SP Loss: 0.414
 Total Effective Length: 149
 Friction Rate/100 ft.: 0.076

1	Duct ST-400 -Kitchen -Bedroom	111	11 0.080 Rect	Inch 0 0	0.0003 0 0	6.4 5 7	458 0.072	0.008 0.390
2	Fitting Fitting 9-A1	9-A1 Below					414 0.108 12.50	0.014 0.404
3	Duct SR-200 -Bedroom (1 reg)	81	9 0.080 Rnd	Inch 0 0	0.01 0 0	6 4.7 6.6	414 0.108	0.010 0.414

Summary of Paths in System 1

Path with highest loss: Path 1
 Path total static pressure loss: 0.428 in.wg
 Fan external static pressure: 0.428 in.wg
 Device pressure losses: 0.300 in.wg
 Fan static pressure available: 0.128 in.wg
 Total effective length of return: 0 ft.
 Total effective length of supply: 162 ft.
 Total effective length overall: 162 ft.
 Design friction rate/100 ft.: 0.079 in.wg

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Project Bill of Materials

Part No.	Description	Req. Qty.	Qty. Unit	Unit Matl. Cost	Matl. Cost	Unit Shop Labor Hours	Unit Field Labor Hours	Total Labor Cost	Total Cost
Ducts									
DFD10in	Duct, Round, Flexible Duct, 10 in	8.5	ft	\$1.28	\$10.88	0.052	0.052	\$9.83	\$20.71
DFD8in	Duct, Round, Flexible Duct, 8 in	33.81	ft	\$1.02	\$34.49	0.042	0.042	\$31.60	\$66.08
DGS13x9in	Duct, Rectangular, Galvanized Steel, 13x9 in	5	ft	\$2.18	\$10.90	0.216	0.216	\$24.03	\$34.93
DGS10x7in	Duct, Rectangular, Galvanized Steel, 10x7 in	16.5	ft	\$1.63	\$26.90	0.17	0.17	\$62.41	\$89.31
DGS15x11in	Duct, Rectangular, Galvanized Steel, 15x11 in	12.5	ft	\$2.57	\$32.13	0.256	0.256	\$71.20	\$103.33
Subtotal - Ducts					\$115.29			\$199.07	\$314.36
Fittings									
FGSDTOP10in	Fitting, Round takeoff at 90 degrees, Galvanized Steel, 10 in	1	ea	\$2.52	\$2.52	0.524	0.524	\$11.66	\$14.18
FGSDBOT10in	Fitting, Round angled floor boot with transition, Galvanized Steel, 10 in	1	ea	\$2.52	\$2.52	0.524	0.524	\$11.66	\$14.18
FGSDBOT8in	Fitting, Round angled floor boot with transition, Galvanized Steel, 8 in	4	ea	\$1.61	\$6.44	0.335	0.335	\$29.82	\$36.26
FGSDJBF8in	Fitting, Junction box for flex duct, Galvanized Steel, 8 in	2	ea	\$1.61	\$3.22	0.335	0.335	\$14.91	\$18.13
FGSRTOT10x7in	Fitting, Rectangular takeoff at 90 degrees with transition, Galvanized Steel, 10x7 in	1	ea	\$2.09	\$2.09	0.435	0.435	\$9.68	\$11.77
FGSRTOP15x11in	Fitting, Rectangular takeoff at 90 degrees, Galvanized Steel, 15x11 in	2	ea	\$5.07	\$10.14	0.941	0.941	\$41.87	\$52.01
FGSRBONT15x11in	Fitting, Rectangular floor boot, no transition, Galvanized Steel, 15x11 in	1	ea	\$5.07	\$5.07	0.941	0.941	\$20.94	\$26.01
FGSRELSQ15x11in	Fitting, Rectangular square elbow, Galvanized Steel, 15x11 in	1	ea	\$3.80	\$3.80	0.706	0.706	\$15.71	\$19.51
Subtotal - Fittings					\$35.80			\$156.24	\$192.04
Grilles and Registers									
RS12x12in	Supply register, 12x12 in	1	ea	\$22.50	\$22.50	0	0.2	\$2.35	\$24.85
RR12x12in	Return grille, 12x12 in	1	ea	\$22.50	\$22.50	0	0.2	\$2.35	\$24.85
RS12x8in	Supply register, 12x8 in	4	ea	\$15.00	\$60.00	0	0.133	\$6.25	\$66.25
Subtotal - Grilles and Registers					\$105.00			\$10.95	\$115.95
Ductwork Accessories									
DUCTMASTIC	Duct mastic	8	ea	\$11.51	\$92.08	0	0	\$0.00	\$92.08
SC1000	Box of 1000 screws	2	ea	\$8.62	\$17.24	0	0	\$0.00	\$17.24
Subtotal - Ductwork Accessories					\$109.32			\$0.00	\$109.32
HVAC Equipment									
QC-F38-E78-G	Quikcool HVAC Manufacturing Natural Gas Furnace, Quikcool FE Series	1	ea	\$1,400.00	\$1,400.00	0	0	\$0.00	\$1,400.00
QC-C12	Quikcool HVAC Manufacturing Standard Air Conditioner - Outdoor Unit, Quikcool AS Series	1	ea	\$2,100.00	\$2,100.00	0	0	\$0.00	\$2,100.00
S12	Quikcool Coils Standard Air Conditioner - Indoor Unit, Quikcool AS Series	1	ea	\$600.00	\$600.00	0	0	\$0.00	\$600.00
Subtotal - HVAC Equipment					\$4,100.00			\$0.00	\$4,100.00
Grand Total					\$4,465.41			\$366.26	\$4,831.67



Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1G-cm-s: Glazing-Double pane with storm, clear, metal frame no break, u-value 0.55, SHGC 0.62	21	786	0	0	0
1C-cb: Glazing-Single pane window with storm, clear, metal frame with break, external shade screen coefficient of 0.25 and 100% coverage, u-value 0.65, SHGC 0.67	42	1,856	0	0	0
1A-cw-o: Glazing-Single pane, operable window, clear, wood frame, u-value 0.9, SHGC 0.64	3.9	241	0	0	0
9Bc-sww: Glazing-Skylight, Dome double pane clear plastic, transmittance = 0.87, small curb, wood sash, wood curb, no insulation, plywood shaft, no insulation, with a tilt angle of 30°, u-value 0.88, SHGC 0.52	12	718	0	0	0
1C-cm: Glazing-Single pane window with storm, clear, metal frame no break, light color drapes with medium weave with 100% coverage, u-value 0.87, SHGC 0.67	24	1,420	0	0	0
11F: Door-Wood - Solid Core With Metal Storm	21	400	0	0	0
12B-4sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, R-4 board insulation, siding finish, wood studs	241.1	1,196	0	0	0
12B-0sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	479	3,158	0	0	0
15B0-15sf-6: Wall-Basement, , R-15 board insulation to floor, no interior finish, 6' floor depth	400	1,177	0	0	0
16CR-19-ad: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), vented attic with radiant barrier, R-19 insulation, dark asphalt	380.7	1,269	0	0	0
16B-21: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-21 insulation	180	539	0	0	0
22C-10ph: Floor-Slab on grade, Horizontal board insulation extends 4' under slab, any floor cover, R-10 insulation, passive, heavy moist soil	35	2,906	0	0	0
20P-19-v: Floor-Over open crawl space or garage, Passive, R-19 blanket insulation, vinyl covering	158.7	539	0	0	0
21B-28: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 28' wide	600	612	0	0	0
Subtotals for structure:		16,817	0	0	0
People:	3		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		247	0	0	0
Infiltration: Winter CFM: 38, Summer CFM: 0		2,839	0	0	0
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		19,903	0	0	0

Check Figures

Total Building Supply CFM:	261	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	1,000	Square ft. Per Ton:	0 **
Volume (ft³) of Cond. Space: (htg.)	8,717	Air Turnover Rate (per hour):	1.8

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.

** Based on area of rooms being cooled.



Total Building Summary Loads (cont'd)

Building Loads

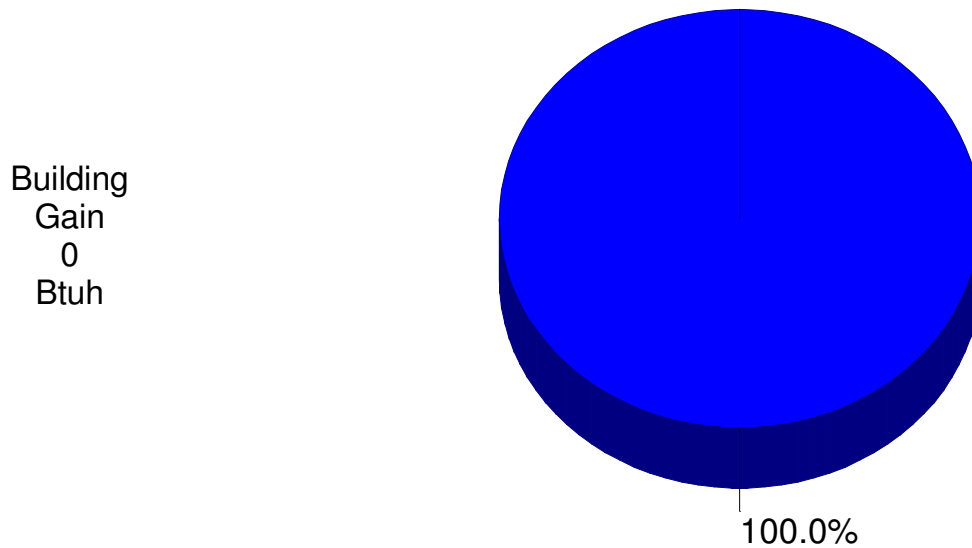
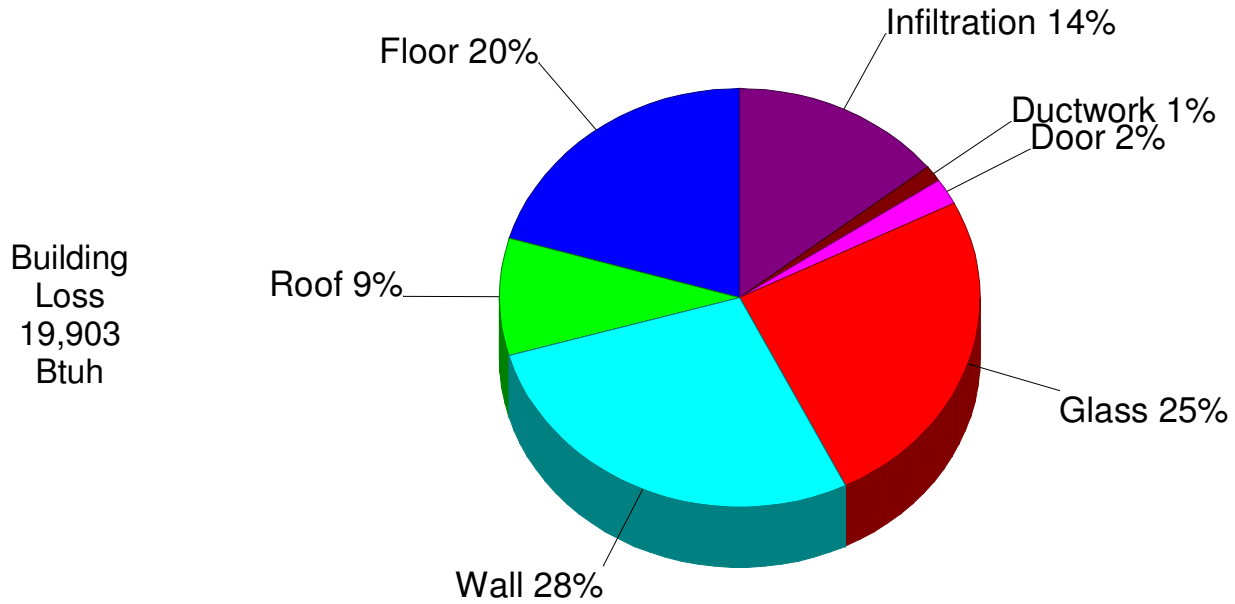
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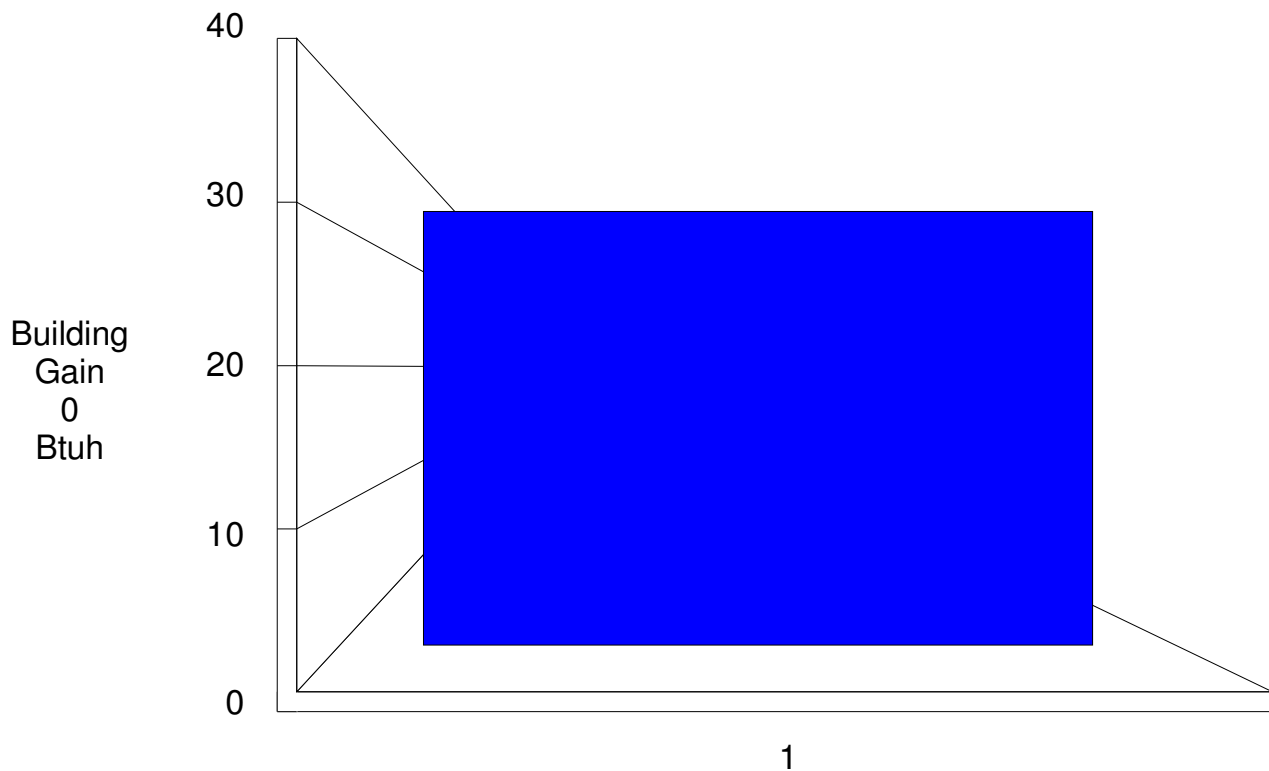
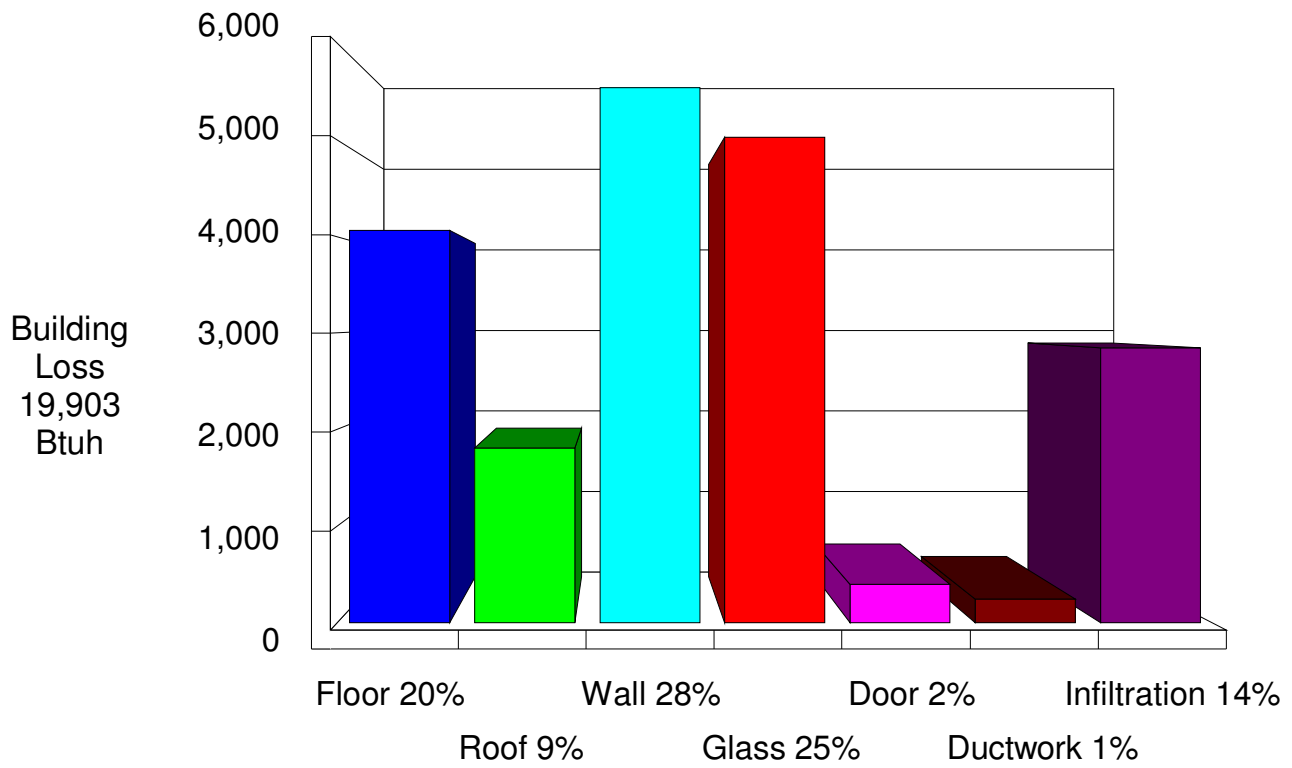


Building Pie Chart





Building Bar Graph





System 1 Main Floor Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1G-cm-s: Glazing-Double pane with storm, clear, metal frame no break, u-value 0.55, SHGC 0.62	21	786	0	0	0
1C-cb: Glazing-Single pane window with storm, clear, metal frame with break, external shade screen coefficient of 0.25 and 100% coverage, u-value 0.65, SHGC 0.67	42	1,856	0	0	0
1A-cw-o: Glazing-Single pane, operable window, clear, wood frame, u-value 0.9, SHGC 0.64	3.9	241	0	0	0
9Bc-sww: Glazing-Skylight, Dome double pane clear plastic, transmittance = 0.87, small curb, wood sash, wood curb, no insulation, plywood shaft, no insulation, with a tilt angle of 30°, u-value 0.88, SHGC 0.52	12	718	0	0	0
1C-cm: Glazing-Single pane window with storm, clear, metal frame no break, light color drapes with medium weave with 100% coverage, u-value 0.87, SHGC 0.67	24	1,420	0	0	0
11F: Door-Wood - Solid Core With Metal Storm	21	400	0	0	0
12B-4sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, R-4 board insulation, siding finish, wood studs	241.1	1,196	0	0	0
12B-0sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	479	3,158	0	0	0
15B0-15sf-6: Wall-Basement, , R-15 board insulation to floor, no interior finish, 6' floor depth	400	1,177	0	0	0
16CR-19-ad: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), vented attic with radiant barrier, R-19 insulation, dark asphalt	380.7	1,269	0	0	0
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22C-10ph: Floor-Slab on grade, Horizontal board insulation extends 4' under slab, any floor cover, R-10 insulation, passive, heavy moist soil	35	2,906	0	0	0
20P-19-v: Floor-Over open crawl space or garage, Passive, R-19 blanket insulation, vinyl covering	158.7	539	0	0	0
21B-28: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 28' wide	600	612	0	0	0
Subtotals for structure:		16,817	0	0	0
People:	3		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		247	0	0	0
Infiltration: Winter CFM: 38, Summer CFM: 0		2,839	0	0	0
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
System 1 Main Floor Load Totals:		19,903	0	0	0

Check Figures

Supply CFM:	261	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	1,000	Square ft. Per Ton:	0 **
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System 1 Main Floor Summary Loads (cont'd)

System Loads

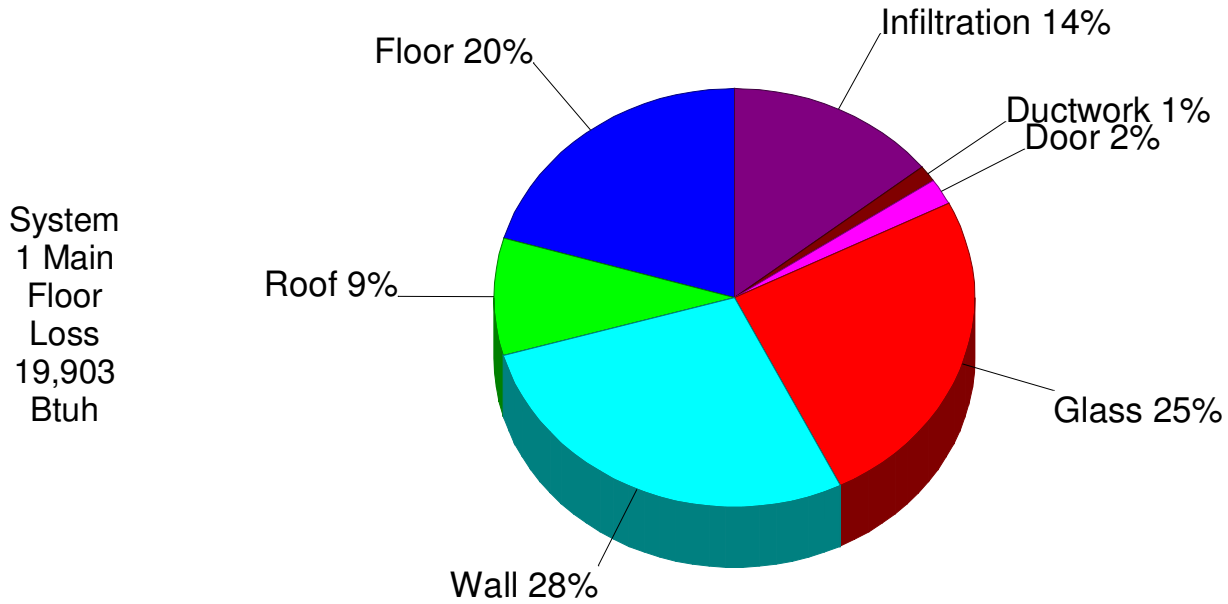
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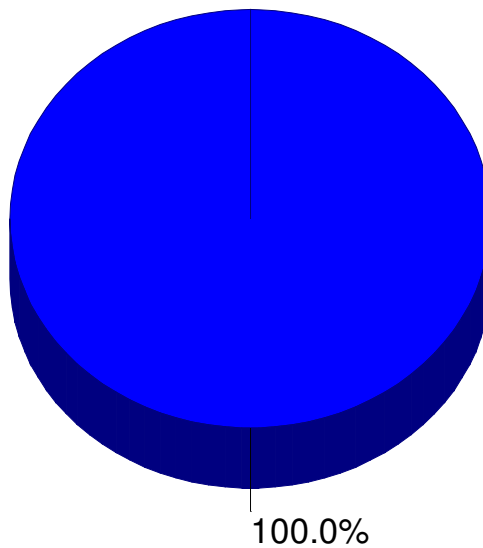
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System 1 Main Floor Pie Chart

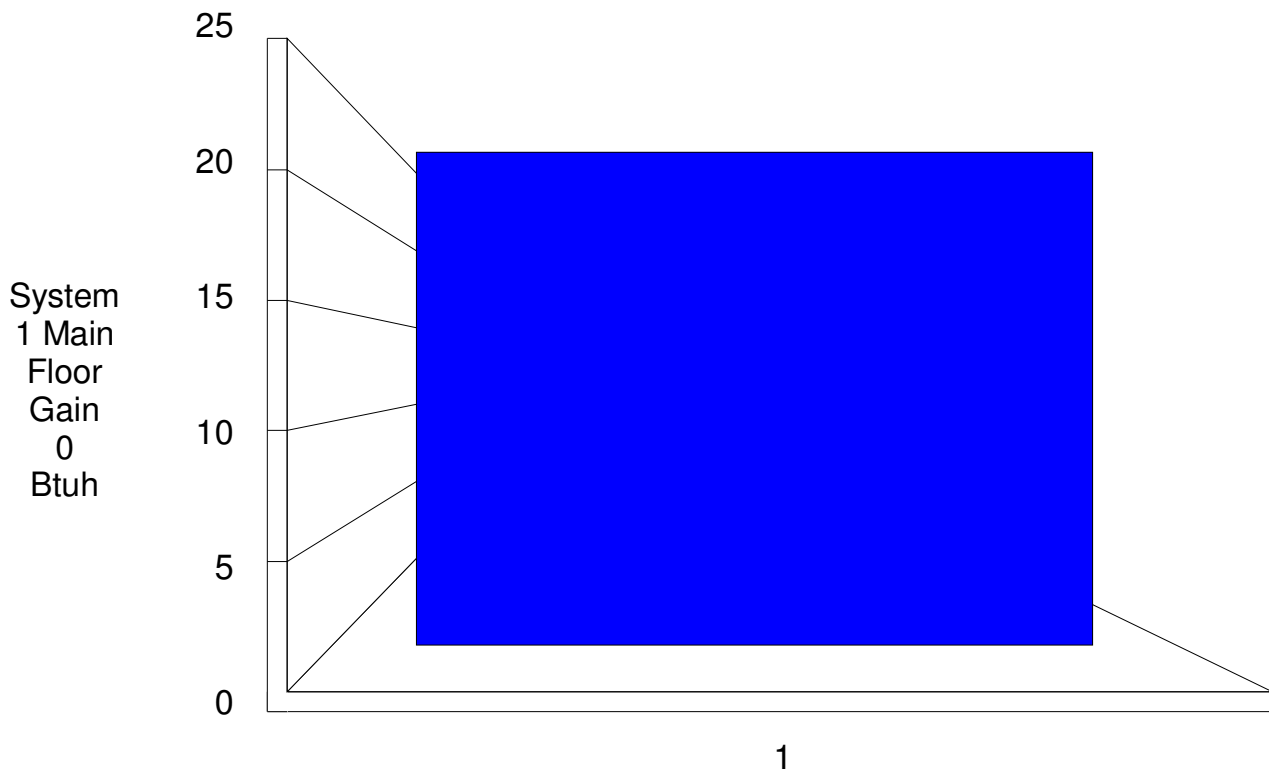
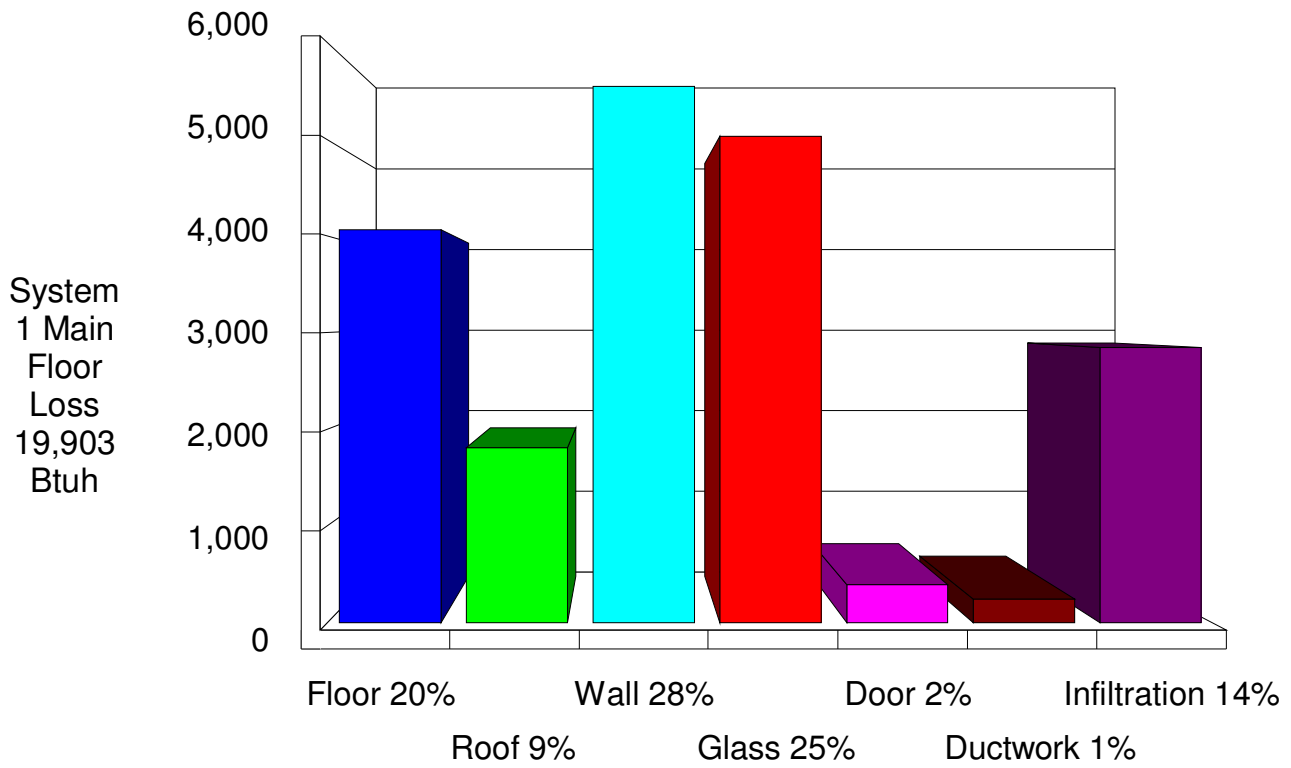


System
1 Main
Floor
Gain
0
Btuh





System 1 Main Floor Bar Graph





Equipment Data - System 1 - Main Floor

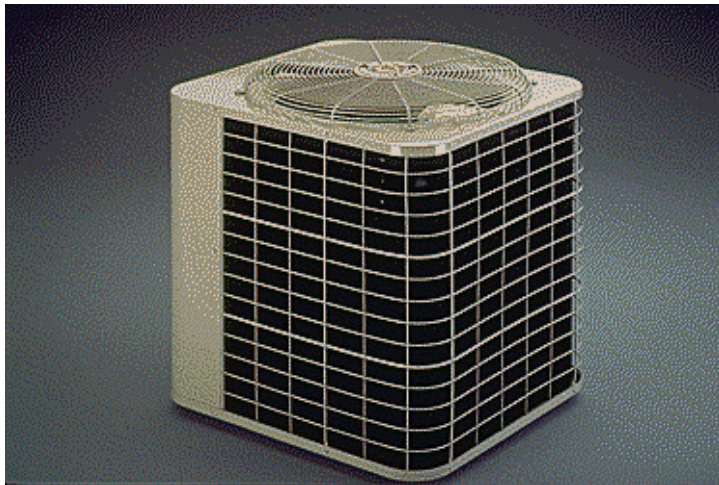
Cooling

System Type:	Standard Air Conditioner
Outdoor Model:	QC-C12
Indoor Model:	S12
Tradename:	Quikcool AS Series
Outdoor Manufacturer:	Quikcool HVAC Manufacturing
Indoor Manufacturer:	Quikcool Coils
Description:	Standard Efficiency Air Condit
Nominal Capacity:	12,000 Btuh
Efficiency:	12.4 SEER

Heating

System Type:	Natural Gas Furnace
Model:	QC-F38-E78-G
Tradename:	Quikcool FE Series
Manufacturer:	Quikcool HVAC Manufacturing
Description:	Hi Efficiency Furnace
Capacity:	38,000 Btuh
Efficiency:	78.3 AFUE

Cooling Equipment Picture



Heating Equipment Picture





System 1, Zone 1 Summary Loads (Average Load Procedure for Rooms)

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
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1A-cw-o: Glazing-Single pane, operable window, clear, wood frame, u-value 0.9, SHGC 0.64	3.9	241	0	0	0
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1C-cm: Glazing-Single pane window with storm, clear, metal frame no break, light color drapes with medium weave with 100% coverage, u-value 0.87, SHGC 0.67	24	1,420	0	0	0
11F: Door-Wood - Solid Core With Metal Storm	21	400	0	0	0
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12B-0sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	479	3,158	0	0	0
15B0-15sf-6: Wall-Basement, , R-15 board insulation to floor, no interior finish, 6' floor depth	400	1,177	0	0	0
16CR-19-ad: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), vented attic with radiant barrier, R-19 insulation, dark asphalt	380.7	1,269	0	0	0
16B-21: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-21 insulation	180	539	0	0	0
22C-10ph: Floor-Slab on grade, Horizontal board insulation extends 4' under slab, any floor cover, R-10 insulation, passive, heavy moist soil	35	2,906	0	0	0
20P-19-v: Floor-Over open crawl space or garage, Passive, R-19 blanket insulation, vinyl covering	158.7	539	0	0	0
21B-28: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, R-3 or higher insulation installed below floor, any floor cover, shortest side of floor slab is 28' wide	600	612	0	0	0
Subtotals for structure:		16,817	0	0	0
People:	3		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		247	0	0	0
Infiltration: Winter CFM: 38, Summer CFM: 0		2,839	0	0	0
System 1, Zone 1 Load Totals:		19,903	0	0	0

Check Figures

Supply CFM:	261	CFM Per Square ft.:	0.261 *
Square ft. of Room Area:	1,000	Square ft. Per Ton:	0 **
Volume (ft³) of Cond. Space: (htg.)	8,717	Air Turnover Rate (per hour):	1.8

* Based on area of rooms being heated or cooled (whichever governs system) rather than entire floor area.

** Based on area of rooms being cooled.

Zone Loads



System 1, Zone 1 Summary Loads (Average Load Procedure for Rooms) (cont'd)

Zone Loads

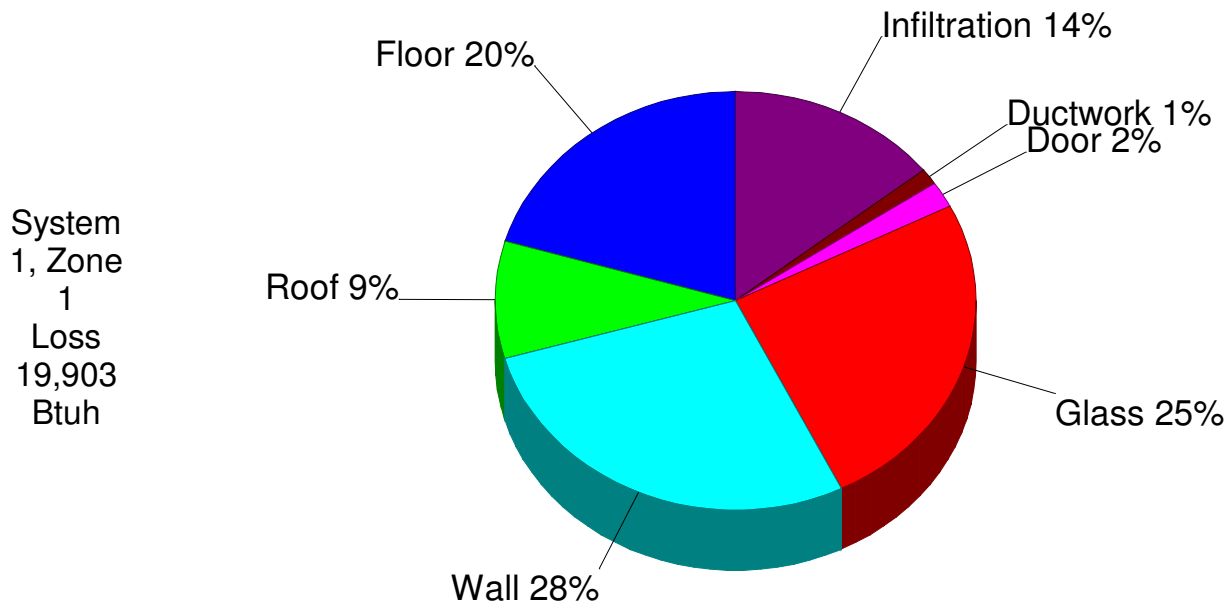
Total Heating Required:	19,903 Btuh	19.903 MBH
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Notes

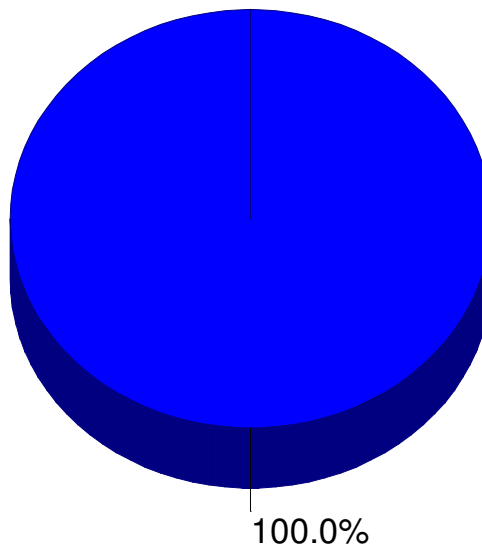
Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads.



System 1, Zone 1 Pie Chart

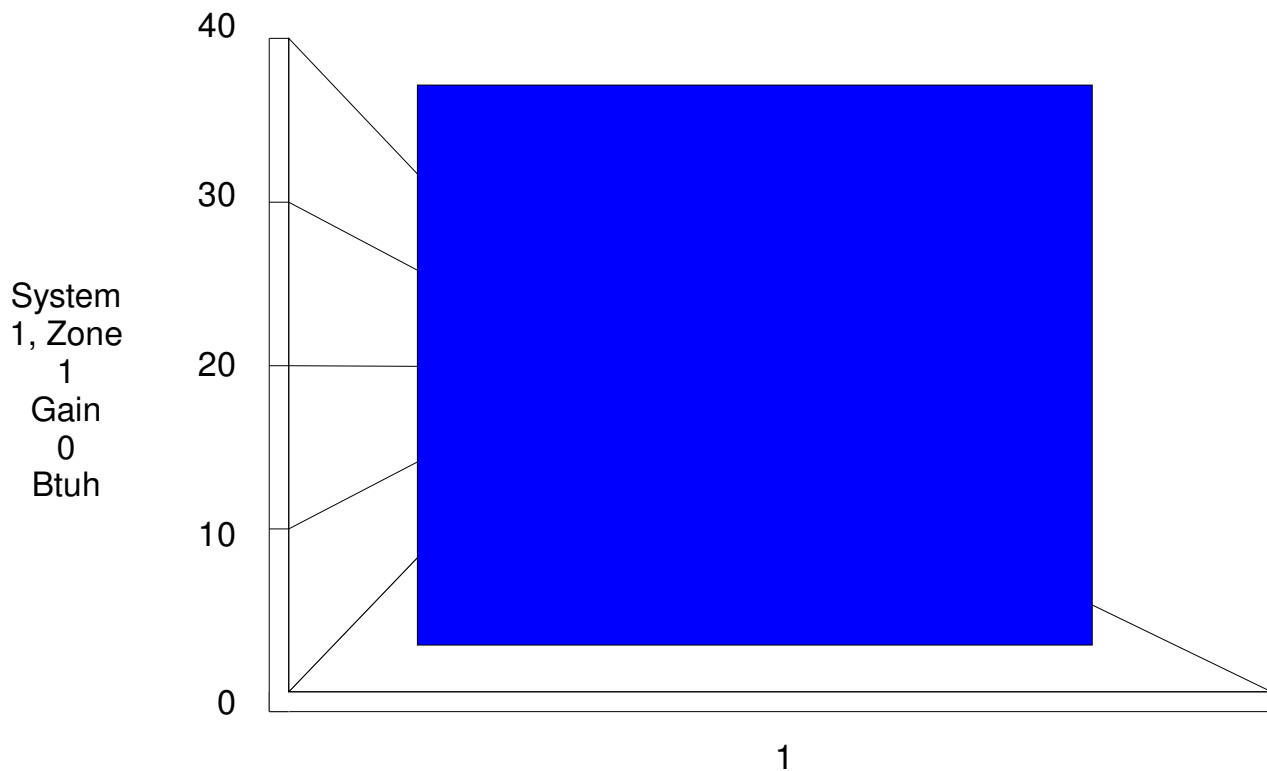
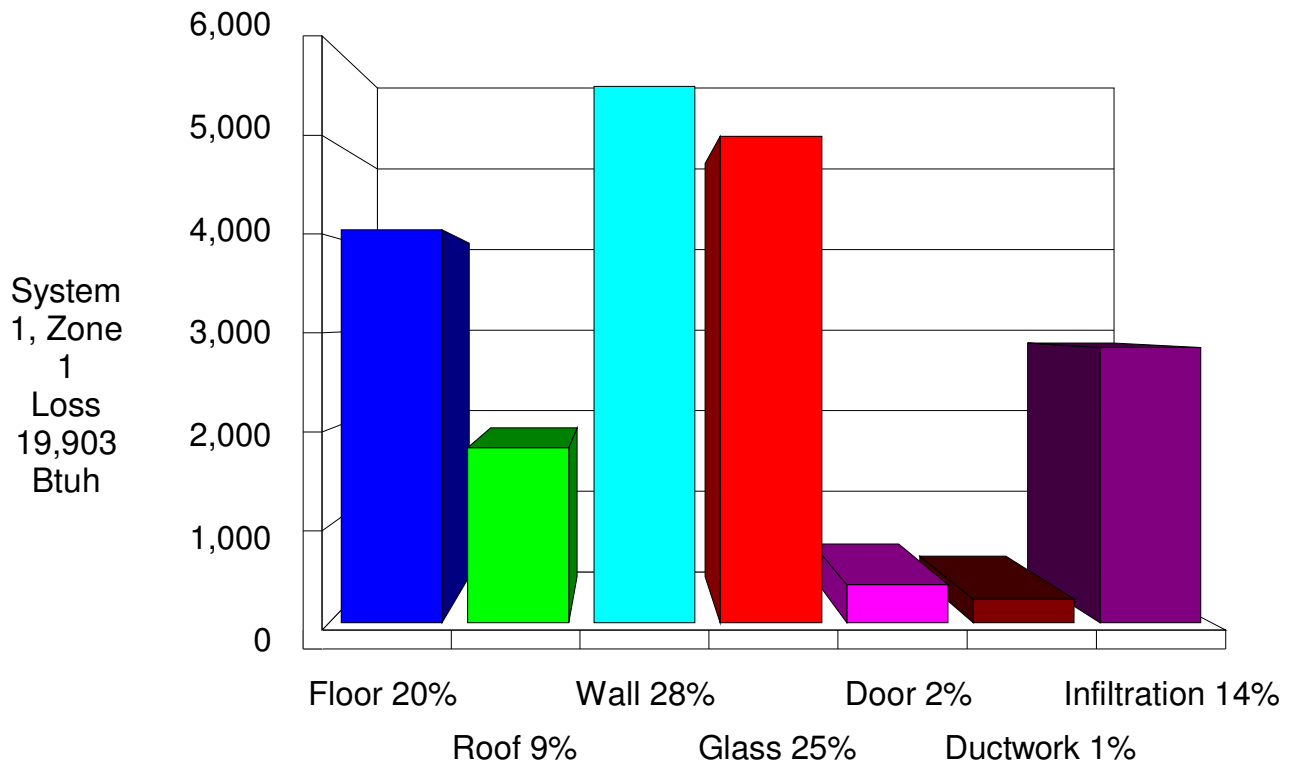


System 1, Zone 1
Gain
0
Btuh





System 1, Zone 1 Bar Graph





Detailed Room Loads - Room 1 - Living Room

General

Calculation Mode:	Htg. only	Occurrences:	1
Room Length:	12.0 ft.	System Number:	1
Room Width:	12.0 ft.	Zone Number:	1
Area:	144.0 sq.ft.	Supply Air:	122 CFM
Ceiling Height:	13.0 ft.	Supply Air Changes:	3.9 AC/hr
Volume:	1,872.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	122 CFM	Percent of Supply.:	0 %
Runout Duct Size:	7 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	457 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	457 ft./min.	Actual Winter Infil.:	13 CFM
Actual Loss:	0.092 in.wg./100 ft.	Actual Summer Infil.:	0 CFM

Item Description	Area Quantity	-U-Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-12B-4sw 15 X 8	108	0.073	5.0	536	0.0	0	0
E -Wall-12B-4sw 15 X 8	78	0.073	5.0	387	0.0	0	0
S -Wall-12B-4sw 10 X 8	55.1	0.073	5.0	273	0.0	0	0
S -Door-11F 3 X 7	21	0.280	19.0	400	0.0	0	0
N -Gls-1G-cm-s shgc-0.62 100%S	12	0.550	37.4	449	0.0	0	0
E -Gls-1C-cb shgc-0.67 57%S	42	0.650	44.2	1,856	0.0	0	0
S -Gls-1A-cw-o shgc-0.64 0%S	3.9	0.900	61.2	241	0.0	0	0
E -Sky-9Bc-sww shgc-0.52	12	0.880	59.8	718	0.0	0	0
E -Ceil-16CR-19 12 X 12	132	0.049	3.3	440	0.0	0	0
Floor-22C-10ph 35 ft..Per.	35	1.221	83.0	2,906	0.0	0	0
Subtotals for Structure:				8,206		0	0
Infil.: Win.: 13.2, Sum.: 0.0	320		3.047	975	0.000	0	0
Ductwork:				116			0
Room Totals:				9,297		0	0



Detailed Room Loads - Room 2 - Kitchen

General

Calculation Mode:	Htg. only	Occurrences:	1
Room Length:	10.0 ft.	System Number:	1
Room Width:	9.0 ft.	Zone Number:	1
Area:	90.0 sq.ft.	Supply Air:	30 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	2.5 AC/hr
Volume:	720.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	30 CFM	Percent of Supply.:	0 %
Runout Duct Size:	4 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	347 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	347 ft./min.	Actual Winter Infil.:	7 CFM
Actual Loss:	0.135 in.wg./100 ft.	Actual Summer Infil.:	0 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-12B-0sw 10 X 8	71	0.097	6.6	468	0.0	0	0
W -Wall-12B-0sw 12 X 8	96	0.097	6.6	633	0.0	0	0
N -Gls-1G-cm-s shgc-0.62 100%S	9	0.550	37.4	337	0.0	0	0
UP-Ceil-16CR-19 10 X 9	90	0.049	3.3	300	0.0	0	0
Subtotals for Structure:				1,738		0	0
Infil.: Win.: 7.2, Sum.: 0.0	176		3.045	536	0.000	0	0
Ductwork:				29			0
Room Totals:				2,303		0	0



Detailed Room Loads - Room 3 - Bedroom

General

Calculation Mode:	Htg. only	Occurrences:	1
Room Length:	14.0 ft.	System Number:	1
Room Width:	11.8 ft.	Zone Number:	1
Area:	166.0 sq.ft.	Supply Air:	81 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	3.7 AC/hr
Volume:	1,325.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	81 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	414 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	414 ft./min.	Actual Winter Infil.:	14 CFM
Actual Loss:	0.108 in.wg./100 ft.	Actual Summer Infil.:	0 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
W -Wall-12B-0sw 15 X 8	108	0.097	6.6	712	0.0	0	0
S -Wall-12B-0sw 15 X 8	108	0.097	6.6	712	0.0	0	0
E -Wall-12B-0sw 12 X 8	96	0.097	6.6	633	0.0	0	0
W -Gls-1C-cm shgc-0.67 68%S	12	0.870	59.2	710	0.0	0	0
S -Gls-1C-cm shgc-0.67 100%S	12	0.870	59.2	710	0.0	0	0
UP-Ceil-16CR-19 14 X 11.3	158.7	0.049	3.3	529	0.0	0	0
UP-Ceil-16B-21 15 X 12	180	0.044	3.0	539	0.0	0	0
Floor-20P-19 11.3 X 14	158.7	0.050	3.4	539	0.0	0	0
Subtotals for Structure:				5,084		0	0
Infil.: Win.: 13.8, Sum.: 0.0	336		3.045	1,023	0.000	0	0
Ductwork:				77			0
Room Totals:				6,184		0	0



Detailed Room Loads - Room 4 - Basement

General

Calculation Mode:	Htg. only	Occurrences:	1
Room Length:	30.0 ft.	System Number:	1
Room Width:	20.0 ft.	Zone Number:	1
Area:	600.0 sq.ft.	Supply Air:	28 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	0.3 AC/hr
Volume:	4,800.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	28 CFM	Percent of Supply.:	0 %
Runout Duct Size:	3 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	567 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	567 ft./min.	Actual Winter Infil.:	4 CFM
Actual Loss:	0.466 in.wg./100 ft.	Actual Summer Infil.:	0 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-15B0-15sf-6 20 X 8	160	0.038	2.9	471	0.0	0	0
E -Wall-15B0-15sf-6 30 X 8	240	0.038	2.9	706	0.0	0	0
Floor-21B-28 20 X 30	600	0.015	1.0	612	0.0	0	0
Subtotals for Structure:				1,789		0	0
Infil.: Win.: 4.1, Sum.: 0.0	100		3.050	305	0.000	0	0
Ductwork:				26			0
Room Totals:				2,120		0	0



System 1 Room Load Summary

Room No	Room 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	Living Room	144	9,297	122	1-7	457	0	0	0	122
2	Kitchen	90	2,303	30	1-4	347	0	0	0	30
3	Bedroom	166	6,184	81	1-6	414	0	0	0	81
4	Basement	600	2,120	28	1-3	567	0	0	0	28
System 1 total		1,000	19,903	261			0	0	0	261

System 1 Main Trunk Size:

7x9 in.

Velocity:

597 ft./min

Loss per 100 ft.:

0.080 in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	0.00	0% / 0%	0	0	0
Recommended:	0.00	77% / 23%	0	0	0
Actual:	1.00	77% / 23%	9,240	2,760	12,000

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:	QC-F38-E78-G	QC-C12
Indoor Model:		S12
Brand:	Quikcool FE Series	Quikcool AS Series
Description:	Hi Efficiency Furnace	Standard Efficiency Air Condit
Efficiency:	78.3 AFUE	12.4 SEER
Sound:		8.1 bels
Capacity:	38,000 Btuh	12,000 Btuh
Sensible Capacity:	n/a	9,240 Btuh
Latent Capacity:	n/a	2,760 Btuh



ACE Heating And Cooling
8724 West Halver St.
Allentown, PA 18105
(717) 555-HEAT

Heating and Air Conditioning Proposal

Thank you for this opportunity to be of service to you. After a careful inspection and survey of your home, we are pleased to submit the following proposal for the subject location in accordance with the following conditions and specifications. We are confident that the system solutions we have recommended will ensure your ultimate comfort and happiness.

Project Information

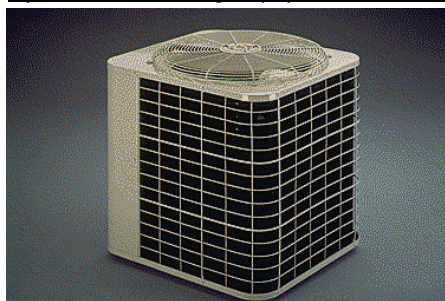
Project title: Jones Residence
Client name: Mr. and Mrs. Jeffrey Jones

HVAC Equipment

We propose to install the following HVAC equipment.

Item	System 1
Cooling Model Type	Standard Air Conditioner
Cooling Model Number	QC-C12-S12
Cooling Capacity	12,000 Btuh
Cooling Efficiency	12.4 SEER
Heating Model Type	Natural Gas Furnace
Heating Model Number	QC-F38-E78-G
Heating Capacity	38,000 Btuh
Heating Efficiency	78.3 AFUE

System 1 - Cooling Equipment Picture



System 1 - Heating Equipment Picture



Terms And Conditions

We propose hereby to furnish material and labor-complete for the sum of: \$4175.00

Payment to be made as follows: Upon completion

ACCEPTANCE OF PROPOSAL:

The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date:_____ Signature:_____



ACE Heating And Cooling
8724 West Halver St.
Allentown, PA 18105
(717) 555-HEAT

Terms And Conditions (cont'd)

OPTIONAL ACCESSORIES (to approve, circle item number):

ITEM	QUANTITY	OPTIONAL ACCESSORY	SALE PRICE
1.	2	Air Cleaner, Elec-Stat	\$200.00
2.	2	HUMD Aprilaire 445	\$287.00
3.	1	T-Stat 7i/5 Day Digital	\$170.00

Prices shown cover tax, labor, and any necessary permits required.

ACCEPTANCE OF ACCESSORIES:

You are authorized to include the above indicated accessories with the equipment I have selected for installation. Payment for accessories is to be added to the total installed price.

Date:_____ Signature:_____