Sample House-No Zoning
HVAC Load Calculations

for

Sample House-No Zoning

Prepared By:

Carl Breen
Breen Design

970-596-4479
Wednesday, September 26, 2018

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:	Sample House-No Zoning
Designed By:	Carl Breen
Project Date:	9/26/18
Client Name:	Sample House-No Zoning
Company Name:	Breen Design
Company Representative:	Carl Breen
Company Phone:	970-596-4479
Company E-Mail Address:	breenhvacdesign@gmail.com
Company Website:	breenhvacdesign.com
Company Comment:	

Design Data

Reference City:		Littleton, Colorado
Building Orientation:		Front door faces Northeast
Daily Temperature Range:		High
Latitude:	39	Degrees
Elevation:	5921	ft.
Altitude Factor:	0.804	

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-3	-3.7	80%	30%	70	35.89
Summer:	90	59	17%	50%	75	-37

Check Figures

Total Building Supply CFM:	3,061	CFM Per Square ft.:	0.453
Square ft. of Room Area:	6,765	Square ft. Per Ton:	1,330
Volume (ft^3) of Cond. Space:	75,737		

Building Loads

Total Heating Required Including Ventilation Air:	110,044	Btuh	110.044	MBH
Total Sensible Gain:	54,925	Btuh	100	%
Total Latent Gain:	-3,745	Btuh	0	%
Total Cooling Required Including Ventilation Air:	54,925	Btuh	5.09	Tons (Based On 90% 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.

Miscellaneous Report

System 1 Basement Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-3	-3.7	80%	30%	70	35.89
Summer:	90	59	17%	50%	75	-37.26

System 2 Main Floor-Left Side Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-3	-3.7	80%	30%	70	35.89
Summer:	90	59	17%	50%	75	-37.26

System 3 Main Floor-Right Side Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-3	-3.7	80%	30%	70	35.89
Summer:	90	59	17%	50%	75	-37.26

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:	0.308	AC/hr	0.217	AC/hr
	279	CFM	196	CFM
Infiltration Actual:	0.330	AC/hr	0.257	AC/hr
Above Grade Volume:	X 54,415	Cu.ft.	X 54,415	Cu.ft.
	17,980	Cu.ft./hr	13,975	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	300	CFM	233	CFM
Total Building Ventilation:	0	CFM	0	CFM

---System 1---
Infiltration & Ventilation Sensible Gain Multiplier: 13.26 = (1.10 X 0.804 X 15.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: -20.37 = (0.68 X 0.804 X -37.26 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 64.54 = (1.10 X 0.804 X 73.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.250 AC/hr (66 CFM), Construction: Semi-Tight, Fireplaces: 1, 13 CFM, Semi-Tight
Summer Infiltration Specified: 0.130 AC/hr (34 CFM), Construction: Semi-Tight

---System 2---
Infiltration & Ventilation Sensible Gain Multiplier: 13.26 = (1.10 X 0.804 X 15.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: -20.37 = (0.68 X 0.804 X -37.26 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 64.54 = (1.10 X 0.804 X 73.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.310 AC/hr (135 CFM)
Summer Infiltration Specified: 0.310 AC/hr (135 CFM)

---System 3---
Infiltration & Ventilation Sensible Gain Multiplier: 13.26 = (1.10 X 0.804 X 15.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: -20.37 = (0.68 X 0.804 X -37.26 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 64.54 = (1.10 X 0.804 X 73.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.250 AC/hr (52 CFM), Construction: Semi-Tight, Fireplaces: 1, 13 CFM, Semi-Tight
Summer Infiltration Specified: 0.130 AC/hr (27 CFM), Construction: Semi-Tight

Load Preview Report

Scope	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	5.09	1,330	6,765	54,925	-3,745	54,925	110,044	2,658	2,181	3,061	
System 1	1.32	2,556	3,376	14,265	-598	14,265	45,454	734	807	807	20x10
Humidification							1,548				
Zone 1			3,376	14,265	-598	14,265	43,906	734	807	807	
1-Guest Suite			288	4,579	-68	4,579	9,597	161	259	259	6,6,6
2-GS Bath			60	0	0	0	88	1	0	1	3
3-GS Wic			88	1,124	-175	1,124	5,202	87	64	87	6
4-Bed 4			201	1,105	135	1,240	2,253	38	63	63	6
5-B4 Bath			88	29	-16	29	1,201	20	2	20	4
6-B4 Wic			74	13	-7	13	592	10	1	10	3
7-Exercise			225	3,375	-186	3,375	6,677	112	191	191	6,6
8-Rec Room/Game Area			1,352	3,880	-195	3,880	10,969	183	219	219	6,6,6
9-Pdr			94	25	-14	25	1,049	18	1	18	3
10-Mech 1			886	133	-70	133	6,107	102	7	102	6,6
26-Mech 2			20	4	-2	4	171	3	0	3	3
System 2	2.65	807	2,140	28,645	-2,448	28,645	43,040	1,575	695	1,575	25x12
Humidification							2,655				
Zone 1			2,140	28,645	-2,448	28,645	40,385	1,575	695	1,575	
11-Bed 2			250	3,742	-239	3,742	5,397	210	91	210	7,7
12-B2 Wic			32	187	-117	187	897	35	5	35	4
13-B2 Bath			65	63	0	63	95	4	2	4	3
15-Cat. Kitch/Pantry			106	762	-206	762	1,924	75	18	75	6
16-Family Dining			142	6,103	-428	6,103	7,328	286	148	286	6,6,6
17-Kitchen			371	1,665	0	1,665	541	21	40	40	5
18-OE			219	737	-262	737	2,721	106	18	106	7
19-Foyer			354	3,162	-403	3,162	5,411	211	77	211	7,7
20-Pwdr			52	51	0	51	76	3	1	3	3
21-Great Room			551	12,173	-793	12,173	15,995	624	295	624	6,6,6,6,6, 6,6,6
System 3	1.11	1,122	1,248	12,016	-699	12,016	21,551	348	679	679	16x10
Humidification							1,268				
Zone 1			1,248	12,016	-699	12,016	20,283	348	679	679	
14-Study			194	2,271	-248	2,271	4,948	85	128	128	6,6
22-Laundry			272	1,310	-108	1,310	2,462	42	74	74	6
23-Master Retreat			371	4,534	48	4,582	4,994	86	256	256	6,6,6
24-Master Spa			273	3,230	-246	3,230	5,560	95	183	183	6,6
25-Master Wic			138	670	-145	670	2,319	40	38	40	5

Sum of room airflows may be greater than system airflow because
system room airflow option uses the greater of heating or cooling.

Manual D Ductsize Data - Duct System 1 - Supply

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SMT-100, Feeds Into: Mech 1, Fitting: 1-H1, Effective Length: 120.0				
Trunk	0.0003	15.2	580	0.000
Up: Fan	55	20	0.034	0.040
Rect	0.9	10	119.1	0.257
Presize	806	4.6	0.421	0.379
---Duct Name: ST-130, Feeds Into: Mech 1, Effective Length: 2.3				
Trunk	0.0003	15.2	580	0.001
Up: SMT-100	55	20	0.034	0.000
Rect	2.3	10	0.0	0.001
Presize	806	11.2	0.420	0.380
---Duct Name: ST-140, Feeds Into: Exercise, Fittings: 8-B1C, 8-B1C, Effective Length: 37.7				
Trunk	0.0003	12	386	0.002
Up: ST-230	55	12	0.021	0.006
Rect	9.2	10	28.6	0.008
Presize	322	33.6	0.395	0.405
---Duct Name: ST-150, Feeds Into: Guest Suite, Effective Length: 1.3				
Trunk	0.0003	12	386	0.000
Up: ST-140	55	12	0.021	0.000
Rect	1.3	10	0.0	0.000
Presize	322	4.9	0.394	0.406
---Duct Name: ST-200, Feeds Into: Guest Suite, Effective Length: 0.8				
Trunk	0.0003	12	283	0.000
Up: ST-220	55	12	0.012	0.000
Rect	0.8	10	0.0	0.000
Presize	236	2.8	0.394	0.406
---Duct Name: ST-210, Feeds Into: Guest Suite, Effective Length: 5.3				
Trunk	0.0003	12	206	0.000
Up: ST-200	55	12	0.007	0.000
Rect	5.3	10	0.0	0.000
Presize	172	19.6	0.394	0.406
---Duct Name: ST-220, Feeds Into: Guest Suite, Effective Length: 1.5				
Trunk	0.0003	12	386	0.000
Up: ST-150	55	12	0.021	0.000
Rect	1.5	10	0.0	0.000
Presize	322	5.5	0.394	0.406
---Duct Name: ST-230, Feeds Into: Exercise, Fitting: 12-O1, Effective Length: 8.9				
Trunk	0.0003	12.9	331	0.000
Up: ST-240	55	14	0.014	0.001
Rect	1.4	10	7.5	0.001
Presize	322	5.7	0.402	0.398
---Duct Name: ST-240, Feeds Into: Exercise, Effective Length: 7.7				
Trunk	0.0003	12.9	429	0.002
Up: ST-250	55	14	0.023	0.000
Rect	7.7	10	0.0	0.002
Presize	417	30.7	0.404	0.396

Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-250, Feeds Into: Exercise, Effective Length: 4.4				
Trunk	0.0003	12.9	494	0.001
Up: ST-260	55	14	0.030	0.000
Rect	4.4	10	0.0	0.001
Presize	480	17.7	0.405	0.395
---Duct Name: ST-260, Feeds Into: Exercise, Effective Length: 0.7				
Trunk	0.0003	12.9	591	0.000
Up: ST-270	55	14	0.041	0.000
Rect	0.7	10	0.0	0.000
Presize	575	2.7	0.407	0.393
---Duct Name: ST-270, Feeds Into: Exercise, Fitting: 12-O1, Effective Length: 13.3				
Trunk	0.0003	15.2	415	0.001
Up: ST-280	55	20	0.018	0.002
Rect	4.0	10	9.3	0.002
Presize	577	20	0.407	0.393
---Duct Name: ST-280, Feeds Into: Rec Room/Game Area, Effective Length: 1.6				
Trunk	0.0003	15.2	468	0.000
Up: ST-290	55	20	0.023	0.000
Rect	1.6	10	0.0	0.000
Presize	650	7.9	0.409	0.391
---Duct Name: ST-290, Feeds Into: Rec Room/Game Area, Effective Length: 1.5				
Trunk	0.0003	15.2	521	0.000
Up: ST-300	55	20	0.028	0.000
Rect	1.5	10	0.0	0.000
Presize	723	7.5	0.410	0.390
---Duct Name: ST-300, Feeds Into: Rec Room/Game Area, Effective Length: 13.4				
Trunk	0.0003	15.2	521	0.004
Up: ST-310	55	20	0.028	0.000
Rect	13.4	10	0.0	0.004
Presize	724	67.1	0.410	0.390
---Duct Name: ST-310, Feeds Into: Rec Room/Game Area, Effective Length: 13.3				
Trunk	0.0003	15.2	574	0.004
Up: ST-320	55	20	0.033	0.000
Rect	13.3	10	0.0	0.004
Presize	797	66.2	0.414	0.386
---Duct Name: ST-320, Feeds Into: Mech 1, Effective Length: 0.5				
Trunk	0.0003	15.2	577	0.000
Up: ST-610	55	20	0.033	0.000
Rect	0.5	10	0.0	0.000
Presize	801	2.5	0.418	0.382
---Duct Name: ST-600, Feeds Into: Guest Suite, Effective Length: 4.5				
Trunk	0.0003	12	103	0.000
Up: ST-210	55	12	0.002	0.000
Rect	4.5	10	0.0	0.000
Presize	86	16.5	0.393	0.407

Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-610, Feeds Into: Mech 1, Effective Length: 5.3				
Trunk	0.0003	15.2	577	0.002
Up: ST-130	55	20	0.033	0.000
Rect	5.3	10	0.0	0.002
Presize	802	26.7	0.418	0.382
---Duct Name: SR-170, Supplies: Exercise, Effective Length: 0.3				
Runout	0.0003	6	484	0.000
Up: ST-240	55	4.7	0.065	0.000
Rnd	0.3	6.6	0.0	0.000
Presize	95	0.4	0.404	0.396
---Duct Name: SR-110, Supplies: Guest Suite, Effective Length: 0.0				
Runout	0.0003	6	438	0.000
Up: ST-220	55	4.7	0.055	0.000
Rnd	0.0	6.6	0.0	0.000
Presize	86	0	0.394	0.406
---Duct Name: SR-560, Supplies: Guest Suite, Effective Length: 0.0				
Runout	0.0003	6	438	0.000
Up: ST-210	55	4.7	0.055	0.000
Rnd	0.0	6.6	0.0	0.000
Presize	86	0	0.394	0.406
---Duct Name: SR-100, Supplies: Guest Suite, Effective Length: 0.0				
Runout	0.0003	6	438	0.000
Up: ST-600	55	4.7	0.055	0.000
Rnd	0.0	6.6	0.0	0.000
Presize	86	0	0.393	0.407
---Duct Name: SR-120, Supplies: GS Bath, Fittings: 2-I, 4-AD, Effective Length: 29.1				
Runout	0.0003	3	20	0.000
Up: ST-150	140	2.4	0.001	0.000
Rnd	19.4	3.3	9.7	0.000
Presize	1	15.2	0.394	0.406
---Duct Name: SR-130, Supplies: GS Wic, Fittings: 2-I, 4-AD, Effective Length: 81.6				
Runout	0.0003	6	443	0.012
Up: ST-200	140	4.7	0.049	0.028
Rnd	24.8	6.6	56.8	0.040
Presize	87	38.9	0.354	0.446
---Duct Name: SR-140, Supplies: Bed 4, Fittings: 2-I, 4-AD, Effective Length: 78.5				
Runout	0.0003	6	321	0.010
Up: ST-250	55	4.7	0.031	0.015
Rnd	31.6	6.6	46.9	0.025
Presize	63	49.6	0.381	0.419
---Duct Name: SR-150, Supplies: B4 Bath, Fittings: 2-I, 4-AD, Effective Length: 58.6				
Runout	0.0003	4	229	0.009
Up: ST-270	140	3.1	0.026	0.006
Rnd	33.7	4.4	25.0	0.015
Presize	20	35.3	0.392	0.408

Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-160, Supplies: B4 Wic, Fittings: 2-I, 4-AD, Effective Length: 45.6				
Runout	0.0003	3	204	0.007
Up: ST-300	140	2.4	0.031	0.007
Rnd	24.3	3.3	21.3	0.014
Presize	10	19.1	0.396	0.404
---Duct Name: SR-550, Supplies: Mech 2, Fittings: 2-I, 4-AD, Effective Length: 34.4				
Runout	0.0003	3	61	0.001
Up: ST-290	140	2.4	0.004	0.001
Rnd	21.2	3.3	13.3	0.001
Presize	3	16.6	0.408	0.392
---Duct Name: SR-220, Supplies: Pdr, Fittings: 2-I, 4-AD, Effective Length: 37.3				
Runout	0.0003	3	367	0.009
Up: ST-610	140	2.4	0.085	0.023
Rnd	10.8	3.3	26.4	0.032
Presize	18	8.5	0.387	0.413
---Duct Name: SR-240, Supplies: Mech 1, Effective Length: 0.2				
Runout	0.0003	6	260	0.000
Up: ST-130	140	4.7	0.019	0.000
Rnd	0.2	6.6	0.0	0.000
Presize	51	0.3	0.420	0.380
---Duct Name: SR-230, Supplies: Mech 1, Fittings: 2-I, 4-AD, Effective Length: 89.1				
Runout	0.0003	6	260	0.006
Up: ST-320	140	4.7	0.019	0.011
Rnd	30.3	6.6	58.7	0.017
Presize	51	47.6	0.401	0.399
---Duct Name: SR-190, Supplies: Rec Room/Game Area, Fittings: 2-I, 4-AD, Effective Length: 79.3				
Runout	0.0003	6	372	0.009
Up: ST-310	55	4.7	0.041	0.023
Rnd	22.4	6.6	56.9	0.032
Presize	73	35.2	0.382	0.418
---Duct Name: SR-200, Supplies: Rec Room/Game Area, Fittings: 2-I, 4-AD, 8-A2, Effective Length: 79.1				
Runout	0.0003	6	372	0.010
Up: ST-290	55	4.7	0.041	0.023
Rnd	23.9	6.6	55.2	0.032
Presize	73	37.6	0.378	0.422
---Duct Name: SR-210, Supplies: Rec Room/Game Area, Fittings: 2-I, 4-AD, 8-A2, Effective Length: 65.3				
Runout	0.0003	6	372	0.005
Up: ST-280	55	4.7	0.041	0.021
Rnd	13.4	6.6	51.9	0.027
Presize	73	21.1	0.383	0.417
---Duct Name: SR-180, Supplies: Exercise, Effective Length: 0.0				
Runout	0.0003	6	484	0.000
Up: ST-260	55	4.7	0.065	0.000
Rnd	0.0	6.6	0.0	0.000
Presize	95	0	0.407	0.393

Manual D Ductsize Data - Duct System 1 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	19		
Number of active runouts:	17		
Total runout outlet airflow:	971		
Main trunk airflow:	806		
Largest trunk diameter:	15.2	SMT-100	
Largest runout diameter:	6	SR-170	
Smallest trunk diameter:	12	ST-140	
Smallest runout diameter:	3	SR-120	
Supply fan external static pressure:	0.800		
Supply fan device pressure losses:	0.217		
Supply fan static pressure available:	0.583		
Runout maximum cumulative static pressure loss:	0.446	SR-130	
Return loss added to supply:	0.122		
Total effective length of return (ft.):	460.5	GS Ceiling	
Total effective length of supply (ft.):	315.7	SR-130	
Overall total effective length (ft.):	776.2	GS Ceiling to SR-130	
Design overall friction rate per 100 ft.:	0.075	(Available SP x 100 / TEL)	
System duct surface area (Scenario 1):	678.6	Main	(Linked to duct load)
Total system duct surface area:	678.6		

Manual D Ductsize Data - Duct System 3 - Supply

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-460, Supplies: Study, Fittings: 2-I, 4-H, 8-A2, Effective Length: 62.9				
Runout	0.0003	6	326	0.006
Up: SMT-110	55	4.7	0.032	0.014
Rnd	19.0	6.6	43.9	0.020
Presize	64	29.8	0.474	0.326
---Duct Name: SR-480, Supplies: Laundry, Fittings: 2-I, 4-G, Effective Length: 64.9				
Runout	0.0003	6	377	0.004
Up: ST-530	55	4.7	0.042	0.023
Rnd	9.5	6.6	55.4	0.027
Presize	74	14.9	0.464	0.336
---Duct Name: SR-490, Supplies: Master Retreat, Fittings: 2-I, 4-G, Effective Length: 81.2				
Runout	0.0003	6	433	0.011
Up: ST-520	55	4.7	0.053	0.032
Rnd	20.7	6.6	60.6	0.043
Presize	85	32.5	0.449	0.351
---Duct Name: SR-500, Supplies: Master Retreat, Fittings: 2-I, 4-G, Effective Length: 74.3				
Runout	0.0003	6	433	0.011
Up: ST-540	55	4.7	0.053	0.029
Rnd	20.7	6.6	53.7	0.040
Presize	85	32.5	0.451	0.349
---Duct Name: SR-510, Supplies: Master Retreat, Fittings: 2-I, 4-G, Effective Length: 70.9				
Runout	0.0003	6	433	0.011
Up: ST-550	55	4.7	0.053	0.027
Rnd	20.7	6.6	50.2	0.038
Presize	85	32.5	0.451	0.349
---Duct Name: SR-520, Supplies: Master Spa, Fittings: 2-I, 4-G, Effective Length: 64.4				
Runout	0.0003	6	464	0.006
Up: ST-570	55	4.7	0.060	0.033
Rnd	9.9	6.6	54.5	0.039
Presize	91	15.6	0.449	0.351
---Duct Name: SR-530, Supplies: Master Spa, Fittings: 2-I, 4-G, Effective Length: 52.6				
Runout	0.0003	6	464	0.001
Up: ST-580	55	4.7	0.060	0.031
Rnd	1.7	6.6	50.9	0.032
Presize	91	2.6	0.456	0.344
---Duct Name: SR-540, Supplies: Master Wic, Fittings: 2-I, 4-G, Effective Length: 53.0				
Runout	0.0003	5	293	0.002
Up: ST-560	140	3.9	0.030	0.014
Rnd	6.5	5.5	46.5	0.016
Presize	40	8.5	0.472	0.328
---Duct Name: SR-470, Supplies: Study, Fittings: 2-I, 4-H, 8-A2, Effective Length: 74.4				
Runout	0.0003	6	326	0.006
Up: ST-590	55	4.7	0.032	0.018
Rnd	19.2	6.6	55.2	0.024
Presize	64	30.1	0.469	0.331

Manual D Ductsize Data - Duct System 3 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-580, Feeds Into: Guest Suite, Effective Length: 1.3				
Trunk	0.0003	12	109	0.000
Up: ST-570	55	12	0.002	0.000
Rect	1.3	10	0.0	0.000
Presize	91	4.6	0.488	0.312
---Duct Name: ST-570, Feeds Into: Guest Suite, Effective Length: 3.6				
Trunk	0.0003	12	218	0.000
Up: ST-560	55	12	0.007	0.000
Rect	3.6	10	0.0	0.000
Presize	182	13.1	0.488	0.312
---Duct Name: ST-560, Feeds Into: Guest Suite, Effective Length: 5.8				
Trunk	0.0003	12	264	0.001
Up: ST-550	55	12	0.010	0.000
Rect	5.8	10	0.0	0.001
Presize	220	21.1	0.488	0.312
---Duct Name: ST-550, Feeds Into: GS Bath, Fitting: 12-O1, Effective Length: 15.5				
Trunk	0.0003	13.7	275	0.001
Up: ST-540	55	16	0.010	0.001
Rect	7.8	10	7.7	0.002
Presize	305	33.9	0.489	0.311
---Duct Name: ST-540, Feeds Into: Bed 4, Effective Length: 0.8				
Trunk	0.0003	13.7	351	0.000
Up: ST-530	55	16	0.015	0.000
Rect	0.8	10	0.0	0.000
Presize	390	3.6	0.491	0.310
---Duct Name: ST-530, Feeds Into: Bed 4, Effective Length: 7.8				
Trunk	0.0003	13.7	418	0.002
Up: ST-520	55	16	0.020	0.000
Rect	7.8	10	0.0	0.002
Presize	464	33.6	0.491	0.309
---Duct Name: ST-520, Feeds Into: Bed 4, Effective Length: 1.4				
Trunk	0.0003	13.7	494	0.000
Up: ST-590	55	16	0.028	0.000
Rect	1.4	10	0.0	0.000
Presize	549	6.1	0.492	0.308
---Duct Name: SMT-110, Feeds Into: Mech 2, Fitting: 1-H1, Effective Length: 109.8				
Trunk	0.0003	13.7	609	0.000
Up: Fan	55	16	0.040	0.044
Rect	0.9	10	108.9	0.216
Presize	677	4	0.494	0.306
---Duct Name: ST-190, Feeds Into: Mech 2, Effective Length: 2.4				
Trunk	0.0003	13.7	552	0.001
Up: SMT-110	55	16	0.034	0.000
Rect	2.4	10	0.0	0.001
Presize	613	10.5	0.493	0.307

Manual D Ductsize Data - Duct System 3 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-590, Feeds Into: Bed 4, Effective Length: 2.5				
Trunk	0.0003	13.7	552	0.001
Up: ST-190	55	16	0.034	0.000
Rect	2.5	10	0.0	0.001
Presize	613	10.8	0.493	0.307

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	10		
Number of active runouts:	9		
Total runout outlet airflow:	679		
Main trunk airflow:	677		
Largest trunk diameter:	13.7	ST-550	
Largest runout diameter:	6	SR-460	
Smallest trunk diameter:	12	ST-580	
Smallest runout diameter:	5	SR-540	
Supply fan external static pressure:	0.800		
Supply fan device pressure losses:	0.172		
Supply fan static pressure available:	0.628		
Runout maximum cumulative static pressure loss:	0.351	SR-490	
Return loss added to supply:	0.089		
Total effective length of return (ft.):	279.0	Master 1 High	
Total effective length of supply (ft.):	197.4	SR-490	
Overall total effective length (ft.):	476.4	Master 1 High to SR-490	
Design overall friction rate per 100 ft.:	0.132	(Available SP x 100 / TEL)	
System duct surface area (Scenario 1):	340.3	Main	(Linked to duct load)
Total system duct surface area:	340.3		

Manual D Ductsize Data - Duct System 2 - Supply

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-250, Supplies: Bed 2, Fittings: 2-I, 4-G, Effective Length: 85.1				
Runout	0.0003	7	393	0.004
Up: ST-350	140	5.4	0.033	0.024
Rnd	13.3	7.7	71.8	0.028
Presize	105	24.3	0.224	0.576
---Duct Name: SR-260, Supplies: Bed 2, Fittings: 2-I, 4-H, Effective Length: 59.2				
Runout	0.0003	7	393	0.002
Up: ST-340	140	5.4	0.033	0.018
Rnd	5.9	7.7	53.3	0.019
Presize	105	10.8	0.233	0.567
---Duct Name: SR-270, Supplies: B2 Wic, Fittings: 2-I, 4-G, Effective Length: 39.9				
Runout	0.0003	4	401	0.001
Up: ST-360	140	3.1	0.069	0.026
Rnd	2.1	4.4	37.8	0.028
Presize	35	2.2	0.225	0.575
---Duct Name: SR-280, Supplies: B2 Bath, Fittings: 2-I, 4-G, Effective Length: 17.3				
Runout	0.0003	3	82	0.000
Up: ST-370	140	2.4	0.006	0.001
Rnd	2.7	3.3	14.7	0.001
Presize	4	2.1	0.252	0.548
---Duct Name: SR-290, Supplies: Cat. Kitch/Pantry, Fittings: 2-I, 4-G, Effective Length: 77.0				
Runout	0.0003	6	382	0.007
Up: ST-180	140	4.7	0.038	0.022
Rnd	18.3	6.6	58.7	0.029
Presize	75	28.7	0.224	0.576
---Duct Name: SR-300, Supplies: Family Dining, Fittings: 2-I, 4-G, Effective Length: 100.8				
Runout	0.0003	6	484	0.020
Up: ST-380	140	4.7	0.058	0.038
Rnd	34.8	6.6	65.9	0.058
Presize	95	54.7	0.194	0.606
---Duct Name: SR-310, Supplies: Family Dining, Fittings: 2-I, 4-G, Effective Length: 92.6				
Runout	0.0003	6	484	0.020
Up: ST-400	140	4.7	0.058	0.034
Rnd	34.7	6.6	58.0	0.054
Presize	95	54.5	0.196	0.604
---Duct Name: SR-320, Supplies: Family Dining, Fittings: 2-I, 4-G, Effective Length: 106.8				
Runout	0.0003	6	484	0.020
Up: ST-410	140	4.7	0.058	0.042
Rnd	34.8	6.6	71.9	0.062
Presize	95	54.7	0.185	0.615
---Duct Name: SR-330, Supplies: Kitchen, Fittings: 2-I, 4-H, Effective Length: 42.8				
Runout	0.0003	5	293	0.004
Up: ST-390	55	3.9	0.034	0.011
Rnd	11.4	5.5	31.4	0.014
Presize	40	14.9	0.238	0.562

Manual D Ductsize Data - Duct System 2 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-340, Supplies: OE, Fittings: 2-I, 4-G, 8-A2, Effective Length: 103.4				
Runout	0.0003	7	397	0.004
Up: ST-170	140	5.4	0.033	0.030
Rnd	12.8	7.7	90.5	0.035
Presize	106	23.5	0.218	0.582
---Duct Name: SR-350, Supplies: Foyer, Fittings: 2-I, 4-G, Effective Length: 76.9				
Runout	0.0003	7	397	0.003
Up: ST-450	140	5.4	0.033	0.023
Rnd	9.6	7.7	67.3	0.026
Presize	106	17.6	0.216	0.584
---Duct Name: SR-360, Supplies: Foyer, Fittings: 2-I, 4-G, Effective Length: 86.2				
Runout	0.0003	7	397	0.003
Up: ST-430	140	5.4	0.033	0.026
Rnd	9.6	7.7	76.6	0.029
Presize	106	17.6	0.217	0.583
---Duct Name: SR-370, Supplies: Pwdr, Fittings: 2-I, 4-H, Effective Length: 14.9				
Runout	0.0003	3	61	0.000
Up: ST-500	140	2.4	0.004	0.000
Rnd	3.4	3.3	11.4	0.001
Presize	3	2.7	0.240	0.560
---Duct Name: SR-380, Supplies: Great Room, Fittings: 2-I, 4-G, Effective Length: 93.3				
Runout	0.0003	6	397	0.011
Up: ST-420	140	4.7	0.041	0.027
Rnd	26.3	6.6	66.9	0.038
Presize	78	41.4	0.208	0.592
---Duct Name: SR-390, Supplies: Great Room, Fittings: 2-I, 4-G, Effective Length: 85.4				
Runout	0.0003	6	397	0.011
Up: ST-440	140	4.7	0.041	0.024
Rnd	26.2	6.6	59.3	0.035
Presize	78	41.1	0.210	0.590
---Duct Name: SR-400, Supplies: Great Room, Fittings: 2-I, 4-G, Effective Length: 98.7				
Runout	0.0003	6	397	0.011
Up: ST-460	140	4.7	0.041	0.030
Rnd	26.1	6.6	72.7	0.040
Presize	78	41	0.201	0.599
---Duct Name: SR-410, Supplies: Great Room, Fittings: 2-I, 4-H, 8-A2, Effective Length: 99.7				
Runout	0.0003	6	397	0.013
Up: ST-470	140	4.7	0.041	0.028
Rnd	30.9	6.6	68.8	0.041
Presize	78	48.6	0.200	0.600
---Duct Name: SR-420, Supplies: Great Room, Fittings: 2-I, 4-G, 8-A2, Effective Length: 101.1				
Runout	0.0003	6	397	0.010
Up: ST-480	140	4.7	0.041	0.031
Rnd	24.7	6.6	76.5	0.041
Presize	78	38.7	0.199	0.601

Manual D Ductsize Data - Duct System 2 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: SR-430, Supplies: Great Room, Fittings: 2-I, 4-G, 8-A2, Effective Length: 93.4				
Runout	0.0003	6	397	0.008
Up: ST-490	140	4.7	0.041	0.030
Rnd	18.8	6.6	74.6	0.038
Presize	78	29.6	0.202	0.598
---Duct Name: SR-440, Supplies: Great Room, Fittings: 2-I, 4-G, 8-A2, Effective Length: 78.9				
Runout	0.0003	6	397	0.005
Up: ST-500	140	4.7	0.041	0.027
Rnd	12.0	6.6	66.9	0.032
Presize	78	18.8	0.208	0.592
---Duct Name: SR-450, Supplies: Great Room, Fittings: 2-I, 4-G, 8-A2, Effective Length: 70.5				
Runout	0.0003	6	397	0.003
Up: ST-510	140	4.7	0.041	0.026
Rnd	7.4	6.6	63.1	0.029
Presize	78	11.7	0.212	0.589
---Duct Name: ST-510, Feeds Into: Rec Room/Game Area, Effective Length: 0.5				
Trunk	0.0003	12.9	80	0.000
Up: ST-500	140	14	0.001	0.000
Rect	0.5	10	0.0	0.000
Presize	78	2	0.240	0.560
---Duct Name: ST-500, Feeds Into: Rec Room/Game Area, Effective Length: 0.7				
Trunk	0.0003	12.9	164	0.000
Up: ST-490	140	14	0.004	0.000
Rect	0.7	10	0.0	0.000
Presize	159	2.7	0.240	0.560
---Duct Name: ST-490, Feeds Into: Rec Room/Game Area, Effective Length: 0.5				
Trunk	0.0003	12.9	244	0.000
Up: ST-480	140	14	0.007	0.000
Rect	0.5	10	0.0	0.000
Presize	237	2	0.240	0.560
---Duct Name: ST-480, Feeds Into: Rec Room/Game Area, Effective Length: 1.3				
Trunk	0.0003	12.9	324	0.000
Up: ST-470	140	14	0.012	0.000
Rect	1.3	10	0.0	0.000
Presize	315	5.3	0.240	0.560
---Duct Name: ST-470, Feeds Into: Rec Room/Game Area, Effective Length: 2.3				
Trunk	0.0003	12.9	404	0.000
Up: ST-460	140	14	0.018	0.000
Rect	2.3	10	0.0	0.000
Presize	393	9.3	0.240	0.560
---Duct Name: ST-460, Feeds Into: Rec Room/Game Area, Effective Length: 4.8				
Trunk	0.0003	12.9	485	0.001
Up: ST-450	140	14	0.025	0.000
Rect	4.8	10	0.0	0.001
Presize	471	19.3	0.241	0.559

Manual D Ductsize Data - Duct System 2 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-450, Feeds Into: Rec Room/Game Area, Fitting: 12-O1, Effective Length: 14.4				
Trunk	0.0003	15.2	415	0.001
Up: ST-440	140	20	0.016	0.002
Rect	3.9	10	10.5	0.002
Presize	577	19.6	0.242	0.558
---Duct Name: ST-440, Feeds Into: Rec Room/Game Area, Effective Length: 5.8				
Trunk	0.0003	15.2	472	0.001
Up: ST-430	140	20	0.020	0.000
Rect	5.8	10	0.0	0.001
Presize	655	28.8	0.244	0.556
---Duct Name: ST-430, Feeds Into: Rec Room/Game Area, Effective Length: 0.3				
Trunk	0.0003	15.2	548	0.000
Up: ST-420	140	20	0.027	0.000
Rect	0.3	10	0.0	0.000
Presize	761	1.7	0.246	0.554
---Duct Name: ST-420, Feeds Into: Rec Room/Game Area, Effective Length: 2.0				
Trunk	0.0003	15.2	604	0.001
Up: ST-410	140	20	0.032	0.000
Rect	2.0	10	0.0	0.001
Presize	839	10	0.246	0.554
---Duct Name: ST-410, Feeds Into: Rec Room/Game Area, Effective Length: 7.3				
Trunk	0.0003	15.2	673	0.003
Up: ST-400	140	20	0.039	0.000
Rect	7.3	10	0.0	0.003
Presize	934	36.2	0.246	0.554
---Duct Name: ST-400, Feeds Into: Rec Room/Game Area, Fitting: 12-O1, Effective Length: 19.2				
Trunk	0.0003	18.6	494	0.001
Up: ST-390	140	25	0.017	0.002
Rect	5.3	12	13.8	0.003
Presize	1,029	32.9	0.249	0.551
---Duct Name: ST-390, Feeds Into: Rec Room/Game Area, Effective Length: 1.6				
Trunk	0.0003	18.6	504	0.000
Up: ST-380	140	25	0.018	0.000
Rect	1.6	12	0.0	0.000
Presize	1,050	9.8	0.253	0.548
---Duct Name: ST-380, Feeds Into: Mech 1, Effective Length: 1.4				
Trunk	0.0003	18.6	550	0.000
Up: ST-170	140	25	0.021	0.000
Rect	1.4	12	0.0	0.000
Presize	1,145	8.7	0.253	0.547
---Duct Name: ST-370, Feeds Into: Mech 1, Fitting: 12-O1, Effective Length: 11.5				
Trunk	0.0003	18.6	120	0.000
Up: ST-180	140	25	0.001	0.000
Rect	1.4	12	10.0	0.000
Presize	249	8.7	0.253	0.547

Manual D Ductsize Data - Duct System 2 - Supply (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: ST-360, Feeds Into: Mech 1, Effective Length: 5.6				
Trunk	0.0003	12	294	0.001
Up: ST-370	140	12	0.011	0.000
Rect	5.6	10	0.0	0.001
Presize	245	20.5	0.253	0.547
---Duct Name: ST-350, Feeds Into: Mech 1, Effective Length: 2.1				
Trunk	0.0003	12	252	0.000
Up: ST-360	140	12	0.009	0.000
Rect	2.1	10	0.0	0.000
Presize	210	7.6	0.252	0.548
---Duct Name: ST-340, Feeds Into: Mech 1, Effective Length: 6.9				
Trunk	0.0003	12	126	0.000
Up: ST-350	140	12	0.003	0.000
Rect	6.9	10	0.0	0.000
Presize	105	25.4	0.252	0.548
---Duct Name: SMT-120, Feeds Into: Mech 1, Fitting: 1-O2, Effective Length: 128.5				
Trunk	0.0003	18.6	756	0.000
Up: Fan	140	25	0.038	0.048
Rect	0.9	12	127.5	0.364
Presize	1,575	5.7	0.253	0.547
---Duct Name: ST-170, Feeds Into: Mech 1, Effective Length: 1.2				
Trunk	0.0003	18.6	601	0.000
Up: SMT-120	140	25	0.025	0.000
Rect	1.2	12	0.0	0.000
Presize	1,251	7.2	0.253	0.547
---Duct Name: ST-180, Feeds Into: Mech 1, Effective Length: 2.8				
Trunk	0.0003	18.6	156	0.000
Up: SMT-120	140	25	0.002	0.000
Rect	2.8	12	0.0	0.000
Presize	324	17.5	0.253	0.547

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	21	
Number of active runouts:	21	
Total runout outlet airflow:	1,594	
Main trunk airflow:	1,575	
Largest trunk diameter:	18.6	ST-400
Largest runout diameter:	7	SR-250
Smallest trunk diameter:	12	ST-360

Manual D Ductsize Data - Duct System 2 - Supply (cont'd)

Summary

Smallest runout diameter:	3	SR-280	
Supply fan external static pressure:	0.800		
Supply fan device pressure losses:	0.316		
Supply fan static pressure available:	0.484		
Runout maximum cumulative static pressure loss:	0.615	SR-320	
Return loss added to supply:	0.182		
Total effective length of return (ft.):	521.6	Hall 5 High	
Total effective length of supply (ft.):	265.8	SR-320	
Overall total effective length (ft.):	787.4	Hall 5 High to SR-320	
Design overall friction rate per 100 ft.:	0.061	(Available SP x 100 / TEL)	
System duct surface area (Scenario 1):	859.9	Main	(Linked to duct load)
Total system duct surface area:	859.9		

Manual D Ductsize Data - Duct System 1 - Return

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: RMT-100, Feeds From: Mech 1, Fittings: 5-H1, 5-N, Effective Length: 183.9				
Trunk	0.0003	16.9	560	0.000
Up: Fan	75	25	0.028	0.051
Rect	0.9	10	183.0	0.052
Presize	973	5.3	-0.070	0.122
---Duct Name: RT-160, Feeds From: Mech 1, Effective Length: 2.8				
Trunk	0.0003	16.9	560	0.001
Up: RMT-100	75	25	0.028	0.000
Rect	2.8	10	0.0	0.001
Presize	973	16.5	-0.069	0.121
---Duct Name: GS Ceiling, Returns From: Guest Suite, Fittings: 6-C, 6-M, Effective Length: 203.7				
Runout	0.0003	12	442	0.003
Up: RT-350	75	9.3	0.023	0.043
Rnd	13.7	13.1	190.0	0.046
Presize	347	42.9	0.000	0.046
---Duct Name: Exercise Ceiling, Returns From: Exercise, Fittings: 6-C, 6-M, Effective Length: 41.4				
Runout	0.0003	10	350	0.002
Up: RT-330	75	7.8	0.019	0.006
Rnd	9.3	10.9	32.0	0.008
Presize	191	24.4	-0.039	0.008
---Duct Name: RT-330, Feeds From: Exercise, Fitting: 12-F1, Effective Length: 65.8				
Trunk	0.0003	13.7	568	0.016
Up: RT-160	75	16	0.035	0.006
Rect	47.3	10	18.5	0.023
Presize	631	205.1	-0.047	0.098
---Duct Name: RT-340, Feeds From: Exercise, Effective Length: 2.4				
Trunk	0.0003	13.7	396	0.000
Up: RT-330	75	16	0.018	0.000
Rect	2.4	10	0.0	0.000
Presize	440	10.5	-0.046	0.098
---Duct Name: RT-350, Feeds From: Exercise, Effective Length: 1.9				
Trunk	0.0003	13.7	312	0.000
Up: RT-340	75	16	0.012	0.000
Rect	1.9	10	0.0	0.000
Presize	347	8.3	-0.046	0.098
---Duct Name: Bed 4 Low, Returns From: Bed 4, Fittings: 6-C, 12-S, 6-F, Effective Length: 56.4				
Runout	0.0003	7	348	0.006
Up: RT-340	75	5.4	0.029	0.011
Rnd	20.2	7.7	36.2	0.016
Presize	93	37	-0.030	0.016
---Duct Name: Hall Low, Returns From: Mech 1, Fittings: 6-C, 6-G, 8-A2, Effective Length: 73.1				
Runout	0.0003	12	436	0.000
Up: RT-160	75	9.3	0.022	0.016
Rnd	0.0	13.1	73.1	0.016
Presize	342	0	-0.053	0.016

Manual D Ductsize Data - Duct System 1 - Return (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	5		
Number of active runouts:	4		
Total runout outlet airflow:	973		
Main trunk airflow:	973		
Largest trunk diameter:	16.9	RMT-100	
Largest runout diameter:	12	GS Ceiling	
Smallest trunk diameter:	13.7	RT-330	
Smallest runout diameter:	7	Bed 4 Low	
Runout maximum cumulative static pressure loss:	0.046	GS Ceiling	
Return loss added to supply:	0.122		
Total effective length of return (ft.):	460.5	GS Ceiling	
System duct surface area (Scenario 1):	350.1	Main	(Linked to duct load)
Total system duct surface area:	350.1		

Manual D Ductsize Data - Duct System 3 - Return

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: Study High, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 41.9				
Runout	0.0003	7	412	0.002
Up: RT-260	75	5.4	0.039	0.015
Rnd	4.3	7.7	37.6	0.016
Presize	110	7.8	-0.008	0.016
---Duct Name: Hall 6 High, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 37.3				
Runout	0.0003	7	344	0.000
Up: RT-230	75	5.4	0.028	0.010
Rnd	1.2	7.7	36.2	0.011
Presize	92	2.1	-0.013	0.011
---Duct Name: Master 3 Low, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 38.6				
Runout	0.0003	7	299	0.001
Up: RT-210	75	5.4	0.022	0.008
Rnd	3.6	7.7	35.0	0.009
Presize	80	6.6	-0.015	0.009
---Duct Name: Master 4 Low, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 38.6				
Runout	0.0003	7	299	0.001
Up: RT-220	75	5.4	0.022	0.008
Rnd	3.6	7.7	35.0	0.009
Presize	80	6.6	-0.015	0.009
---Duct Name: Master 2 High, Returns From: Master Spa, Fittings: 6-C, 12-S, 6-F, 8-A2, Effective Length: 57.3				
Runout	0.0003	7	299	0.000
Up: RT-200	75	5.4	0.022	0.012
Rnd	1.2	7.7	56.2	0.013
Presize	80	2.1	-0.011	0.013
---Duct Name: Master 1 High, Returns From: Master Spa, Fittings: 6-C, 12-S, 6-F, Effective Length: 104.7				
Runout	0.0003	7	299	0.000
Up: RT-190	75	5.4	0.022	0.023
Rnd	0.5	7.7	104.2	0.023
Presize	80	0.9	0.000	0.023
---Duct Name: Master 5 High, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 36.2				
Runout	0.0003	7	299	0.000
Up: RT-240	75	5.4	0.022	0.008
Rnd	1.2	7.7	35.0	0.008
Presize	80	2.1	-0.016	0.008
---Duct Name: Master 6 High, Returns From: Laundry, Fittings: 6-C, 12-S, 6-F, Effective Length: 36.1				
Runout	0.0003	7	296	0.000
Up: RT-250	75	5.4	0.022	0.008
Rnd	1.2	7.7	34.9	0.008
Presize	79	2.1	-0.016	0.008
---Duct Name: RT-260, Feeds From: Bed 4, Effective Length: 1.0				
Trunk	0.0003	13.7	613	0.000
Up: RT-130	75	16	0.040	0.000
Rect	1.0	10	0.0	0.000
Presize	681	4.3	-0.025	0.086

Manual D Ductsize Data - Duct System 3 - Return (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: RT-250, Feeds From: Bed 4, Effective Length: 1.3				
Trunk	0.0003	13.7	514	0.000
Up: RT-260	75	16	0.029	0.000
Rect	1.3	10	0.0	0.000
Presize	571	5.8	-0.024	0.086
---Duct Name: RT-240, Feeds From: Bed 4, Effective Length: 1.0				
Trunk	0.0003	13.7	443	0.000
Up: RT-250	75	16	0.022	0.000
Rect	1.0	10	0.0	0.000
Presize	492	4.3	-0.024	0.086
---Duct Name: RT-230, Feeds From: Bed 4, Effective Length: 1.8				
Trunk	0.0003	13.7	371	0.000
Up: RT-240	75	16	0.016	0.000
Rect	1.8	10	0.0	0.000
Presize	412	7.6	-0.024	0.085
---Duct Name: RT-220, Feeds From: Bed 4, Effective Length: 4.3				
Trunk	0.0003	13.7	288	0.000
Up: RT-230	75	16	0.010	0.000
Rect	4.3	10	0.0	0.000
Presize	320	18.8	-0.023	0.085
---Duct Name: RT-210, Feeds From: Bed 4, Effective Length: 1.0				
Trunk	0.0003	13.7	216	0.000
Up: RT-220	75	16	0.006	0.000
Rect	1.0	10	0.0	0.000
Presize	240	4.3	-0.023	0.085
---Duct Name: RT-200, Feeds From: Bed 4, Effective Length: 0.9				
Trunk	0.0003	13.7	144	0.000
Up: RT-210	75	16	0.003	0.000
Rect	0.9	10	0.0	0.000
Presize	160	4	-0.023	0.085
---Duct Name: RT-190, Feeds From: Bed 4, Effective Length: 0.7				
Trunk	0.0003	13.7	72	0.000
Up: RT-200	75	16	0.001	0.000
Rect	0.7	10	0.0	0.000
Presize	80	2.9	-0.023	0.085
---Duct Name: RMT-110, Feeds From: Mech 2, Fittings: 5-H1, 5-N, Effective Length: 155.8				
Trunk	0.0003	13.7	613	0.000
Up: Fan	75	16	0.040	0.061
Rect	0.9	10	154.9	0.062
Presize	681	4	-0.028	0.089
---Duct Name: RT-130, Feeds From: Bed 4, Effective Length: 6.6				
Trunk	0.0003	13.7	613	0.003
Up: RMT-110	75	16	0.040	0.000
Rect	6.6	10	0.0	0.003
Presize	681	28.5	-0.025	0.087

Manual D Ductsize Data - Duct System 3 - Return (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	10		
Number of active runouts:	8		
Total runout outlet airflow:	681		
Main trunk airflow:	681		
Largest trunk diameter:	13.7	RT-260	
Largest runout diameter:	7	Study High	
Smallest trunk diameter:	13.7	RT-260	
Smallest runout diameter:	7	Study High	
Runout maximum cumulative static pressure loss:	0.023	Master 1 High	
Return loss added to supply:	0.089		
Total effective length of return (ft.):	279.0	Master 1 High	
System duct surface area (Scenario 1):	114.9	Main	(Linked to duct load)
Total system duct surface area:	114.9		

Manual D Ductsize Data - Duct System 2 - Return

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: Bed 2 High, Returns From: B2 Wic, Fittings: 6-C, 12-S, 6-F, Effective Length: 51.6				
Runout	0.0003	7	412	0.000
Up: RT-300	70	5.4	0.039	0.020
Rnd	0.3	7.7	51.4	0.020
Presize	110	0.5	-0.054	0.020
---Duct Name: Bed 2 High, Returns From: B2 Wic, Fittings: 6-C, 12-S, 6-F, Effective Length: 111.4				
Runout	0.0003	7	412	0.000
Up: RT-320	70	5.4	0.039	0.044
Rnd	0.3	7.7	111.1	0.044
Presize	110	0.5	-0.030	0.044
---Duct Name: Hall 3 Low, Returns From: OE, Fittings: 6-C, 6-G, 8-A2, Effective Length: 75.1				
Runout	0.0003	12	499	0.000
Up: RMT-120	70	9.3	0.028	0.021
Rnd	0.5	13.1	74.6	0.021
Presize	392	1.6	-0.060	0.021
---Duct Name: Hall 4 Low, Returns From: Foyer, Fittings: 6-C, 6-G, 8-A2, Effective Length: 105.1				
Runout	0.0003	12	498	0.001
Up: RT-140	70	9.3	0.028	0.029
Rnd	1.9	13.1	103.2	0.030
Presize	391	6	-0.036	0.030
---Duct Name: Hall 1 High, Returns From: OE, Fittings: 6-C, 12-S, 6-F, 8-A2, Effective Length: 48.4				
Runout	0.0003	7	374	0.001
Up: RT-290	70	5.4	0.033	0.015
Rnd	3.5	7.7	44.9	0.016
Presize	100	6.4	-0.059	0.016
---Duct Name: Hall 2 High, Returns From: OE, Fittings: 6-C, 12-S, 6-F, Effective Length: 38.2				
Runout	0.0003	7	374	0.001
Up: RT-150	70	5.4	0.033	0.012
Rnd	1.6	7.7	36.6	0.013
Presize	100	2.9	-0.062	0.013
---Duct Name: Hall 5 High, Returns From: Laundry, Fittings: 6-C, 6-G, 8-A2, Effective Length: 231.6				
Runout	0.0003	12	498	0.002
Up: RT-270	70	9.3	0.028	0.064
Rnd	6.8	13.1	224.8	0.065
Presize	391	21.2	0.000	0.065
---Duct Name: RT-320, Feeds From: Mech 1, Effective Length: 1.0				
Trunk	0.0003	12	132	0.000
Up: RT-300	70	12	0.003	0.000
Rect	1.0	10	0.0	0.000
Presize	110	3.7	-0.074	0.044
---Duct Name: RT-300, Feeds From: Mech 1, Effective Length: 5.0				
Trunk	0.0003	12	264	0.001
Up: RT-290	70	12	0.010	0.000
Rect	5.0	10	0.0	0.001
Presize	220	18.3	-0.074	0.044

Manual D Ductsize Data - Duct System 2 - Return (cont'd)

---Duct Name, etc.				
Type	Roughness	Diameter	Velocity	SPL.Duct
Upstream	Temperature	Width	Loss/100	SPL.Fit
Shape	Length	Height	Fit.Eq.Len	SPL.Tot
Sizing	CFM	Area	SP.Avail	SPL.Cumul
---Duct Name: RT-290, Feeds From: Mech 1, Effective Length: 0.9				
Trunk	0.0003	12	384	0.000
Up: RT-150	70	12	0.020	0.000
Rect	0.9	10	0.0	0.000
Presize	320	3.4	-0.075	0.044
---Duct Name: RT-270, Feeds From: Rec Room/Game Area, Effective Length: 2.3				
Trunk	0.0003	15.2	282	0.000
Up: RT-140	70	20	0.009	0.000
Rect	2.3	10	0.0	0.000
Presize	391	11.2	-0.065	0.166
---Duct Name: RMT-120, Feeds From: Mech 1, Fittings: 5-H2, 5-L, Effective Length: 236.6				
Trunk	0.0003	18.6	765	0.000
Up: Fan	70	25	0.043	0.100
Rect	0.9	12	235.7	0.101
Presize	1,594	5.7	-0.082	0.182
---Duct Name: RT-140, Feeds From: Rec Room/Game Area, Fitting: 12-F1, Effective Length: 51.2				
Trunk	0.0003	15.2	563	0.010
Up: RMT-120	70	20	0.031	0.006
Rect	31.0	10	20.2	0.016
Presize	782	155	-0.066	0.166
---Duct Name: RT-150, Feeds From: Mech 1, Fitting: 12-F1, Effective Length: 20.3				
Trunk	0.0003	12	504	0.002
Up: RMT-120	70	12	0.033	0.005
Rect	4.9	10	15.4	0.007
Presize	420	18	-0.075	0.045

Report Units: Pressure: in.wg, Duct lengths: feet, Duct sizes: inch, Airflow: CFM, Velocity: ft./min, Temperature: F

Notes: Static pressure available values for return ducts are at the entrance of the duct. For supply, they are at the exit. The cumulative static pressure loss value for a return trunk is with respect to the entry point of the return runout upstream with the highest static pressure available. Total and cumulative static pressure loss values for the supply main trunk include any device pressure losses entered, and the cumulative may also include the total static pressure loss of the return side.

Summary

Number of active trunks:	7	
Number of active runouts:	7	
Total runout outlet airflow:	1,594	
Main trunk airflow:	1,594	
Largest trunk diameter:	18.6	RMT-120
Largest runout diameter:	12	Hall 3 Low
Smallest trunk diameter:	12	RT-320
Smallest runout diameter:	7	Bed 2 High
Runout maximum cumulative static pressure loss:	0.065	Hall 5 High
Return loss added to supply:	0.182	
Total effective length of return (ft.):	521.6	Hall 5 High

Manual D Ductsize Data - Duct System 2 - Return (cont'd)

Summary

System duct surface area (Scenario 1):	254.3	Main	(Linked to duct load)
Total system duct surface area:	254.3		

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.

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Ster 1: Glazing-Pella Window, u-value 0.33, SHGC 0.28	352	8,480	0	8,881	8,881
Ster 3: Glazing-Pella Window, u-value 0.33, SHGC 0.25	536.5	12,922	0	12,011	12,011
Ster 13: Glazing-Pella Window, u-value 0.32, SHGC 0.31	28.2	659	0	702	702
Ster 5: Glazing-Pella Window, u-value 0.32, SHGC 0.28	292.2	6,826	0	7,505	7,505
Ster 44: Glazing-Pella Window, u-value 0.31, SHGC 0.19	54	1,222	0	1,053	1,053
Ster 43: Glazing-Pella Window, u-value 0.34, SHGC 0.3	91	2,259	0	2,218	2,218
Ster 7: Glazing-Pella Window, u-value 0.33, SHGC 0.27	180	4,336	0	3,926	3,926
Ster 4: Glazing-Pella Window, u-value 0.34, SHGC 0.24	54	1,340	0	1,085	1,085
Ster 37: Glazing-Pella Window, u-value 0.3, SHGC 0.28	10	220	0	220	220
11N: Door-Metal - Polystyrene Core	24	613	0	176	176
R24: Wall-Frame, Custom, R-24 Exterior wallInsulation In 2 x 6 Stud Cavity, no board insulation, brick or siding finish, wood studs	3596.6	17,064	0	2,407	2,407
Bsmt Frmd R13-10: Wall-Basement, Custom, Basement wall-Interior frame-R13	1265.7	4,560	0	59	59
Bsmt Drape R11-10: Wall-Basement, Custom, Bsmt wall Draped R11 Insulation	1172.3	4,422	0	60	60
Roof 16B-50: Roof/Ceiling-	3404.9	4,972	0	3,064	3,064
22A-ph: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, heavy moist soil	117	11,598	0	0	0
21A-32: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, no insulation below floor, any floor cover, shortest side of floor slab is 32' wide	2531.1	3,697	0	0	0
20P-30-c: Floor-Over open crawl space or garage, Passive, R-30 blanket insulation, carpet covering	16.7	43	0	3	3
Subtotals for structure:		85,233	0	43,370	43,370
People:	5		1,000	1,150	2,150
Equipment:			0	1,200	1,200
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 300, Summer CFM: 233		19,341	-4,745	3,087	-1,658
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 105, Summer CFM: 105					
Humidification (Winter) 14.92 gal/day :		5,470	0	0	0
AED Excursion:		0	0	6,118	6,118
Total Building Load Totals:		110,044	-3,745	54,925	51,180

Check Figures

Total Building Supply CFM:	3,061	CFM Per Square ft.:	0.453
Square ft. of Room Area:	6,765	Square ft. Per Ton:	1,330
Volume (ft^3) of Cond. Space:	75,737		

Building Loads

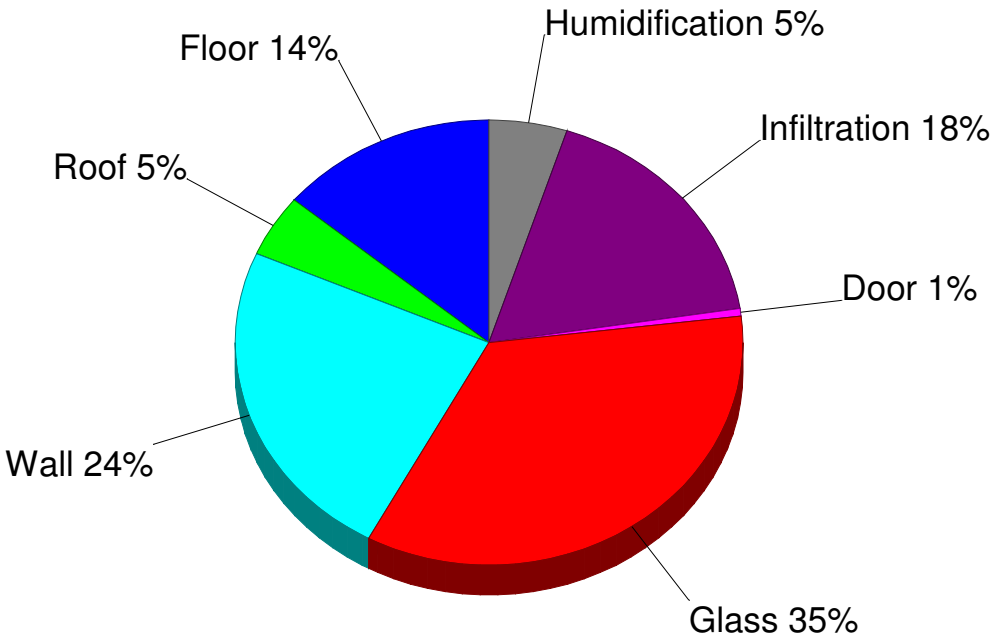
Total Heating Required Including Ventilation Air:	110,044	Btuh	110.044	MBH
Total Sensible Gain:	54,925	Btuh	100	%
Total Latent Gain:	-3,745	Btuh	0	%
Total Cooling Required Including Ventilation Air:	54,925	Btuh	5.09	Tons (Based On 90% Sensible Capacity)

Notes

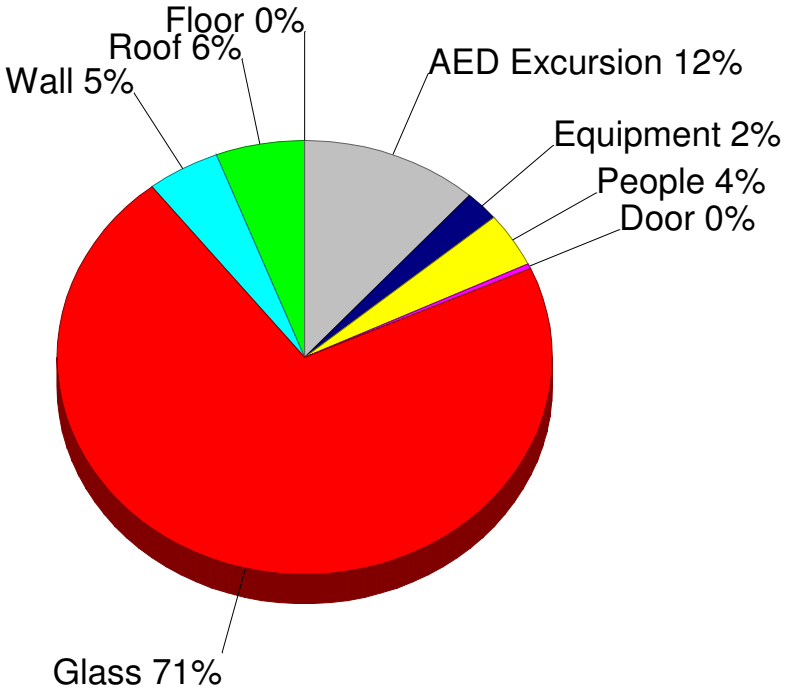
Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
All computed results are estimates as building use and weather may vary.
Be sure to select a unit that meets both sensible and latent loads according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

Building Pie Chart

Building Loss 110,044 Btuh

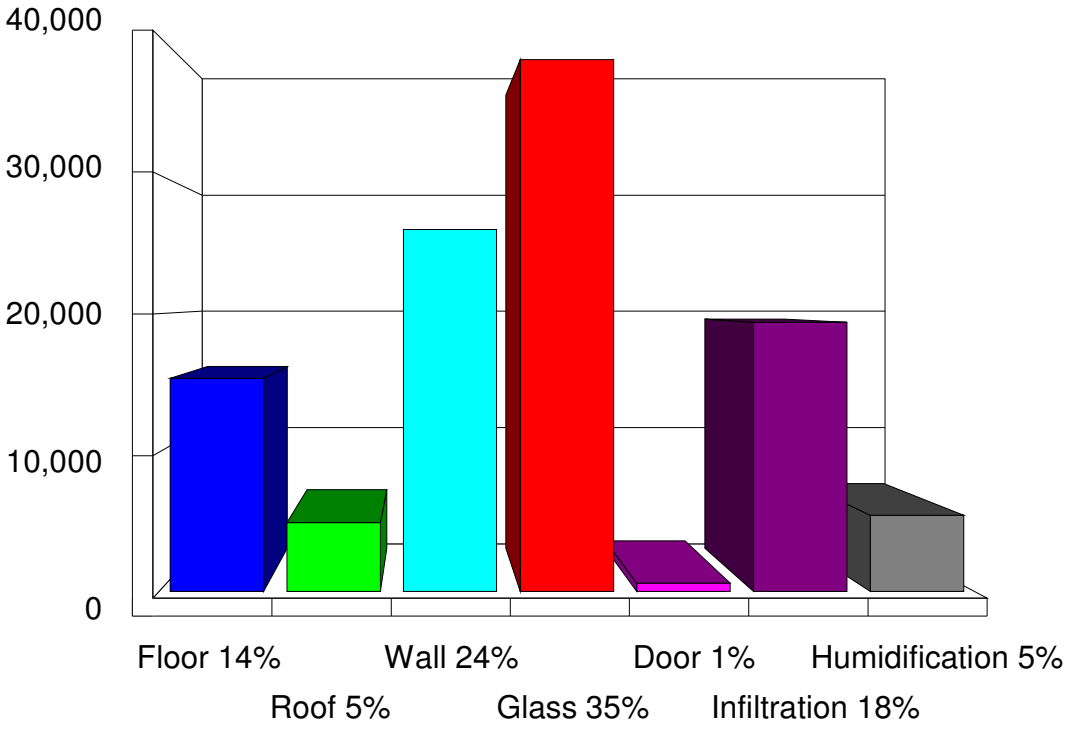


Building Gain 51,180 Btuh

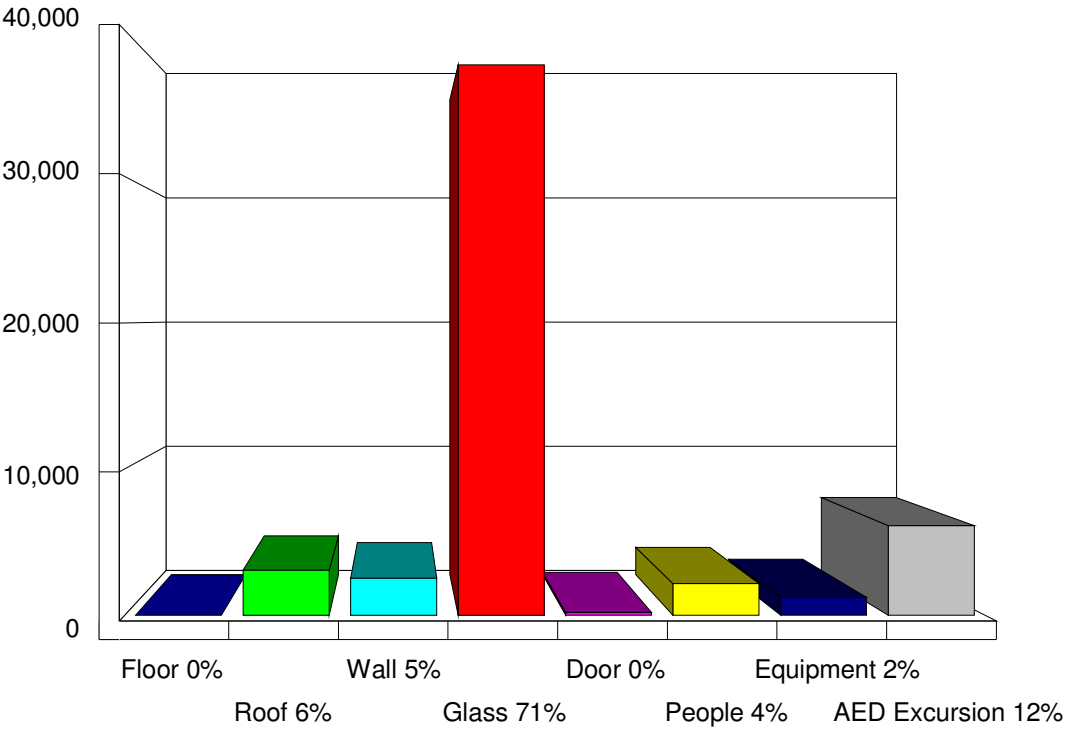


Building Bar Graph

Building Loss 110,044 Btuh



Building Gain 51,180 Btuh



System 1 Basement Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Ster 1: Glazing-Pella Window, u-value 0.33, SHGC 0.28	272	6,553	0	6,735	6,735
Ster 3: Glazing-Pella Window, u-value 0.33, SHGC 0.25	138.5	3,335	0	2,846	2,846
R24: Wall-Frame, Custom, R-24 Exterior wallInsulation In 2 x 6 Stud Cavity, no board insulation, brick or siding finish, wood studs	873.6	4,145	0	584	584
Bsmt Frmd R13-10: Wall-Basement, Custom, Basement wall-Interior frame-R13	1265.7	4,560	0	59	59
Bsmt Drape R11-10: Wall-Basement, Custom, Bsmt wall Draped R11 Insulation	1172.3	4,422	0	60	60
Roof 16B-50: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Custom, Any roofing material including, tile, metal or asphalt.	16.8	24	0	15	15
22A-ph: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, heavy moist soil	117	11,598	0	0	0
21A-32: Floor-Basement, Concrete slab, any thickness, 2 or more feet below grade, no insulation below floor, any floor cover, shortest side of floor slab is 32' wide	2531.1	3,697	0	0	0
Subtotals for structure:		38,334	0	10,299	10,299
People:	2		400	460	860
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 86, Summer CFM: 49		5,572	-998	650	-348
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 35, Summer CFM: 35					
Humidification (Winter) 4.22 gal/day :		1,548	0	0	0
AED Excursion:		0	0	2,856	2,856
System 1 Basement Load Totals:		45,454	-598	14,265	13,667

Check Figures

Supply CFM:	807	CFM Per Square ft.:	0.239
Square ft. of Room Area:	3,376	Square ft. Per Ton:	2,556
Volume (ft³) of Cond. Space:	37,141		

System Loads

Total Heating Required Including Ventilation Air:	45,454	Btuh	45.454	MBH
Total Sensible Gain:	14,265	Btuh	100	%
Total Latent Gain:	-598	Btuh	0	%
Total Cooling Required Including Ventilation Air:	14,265	Btuh	1.32	Tons (Based On 90% 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.

System 2 Main Floor-Left Side Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Ster 3: Glazing-Pella Window, u-value 0.33, SHGC 0.25	313	7,539	0	7,239	7,239
Ster 1: Glazing-Pella Window, u-value 0.33, SHGC 0.28	80	1,927	0	2,146	2,146
Ster 13: Glazing-Pella Window, u-value 0.32, SHGC 0.31	22	513	0	551	551
Ster 5: Glazing-Pella Window, u-value 0.32, SHGC 0.28	174	4,064	0	4,351	4,351
Ster 44: Glazing-Pella Window, u-value 0.31, SHGC 0.19	54	1,222	0	1,053	1,053
Ster 43: Glazing-Pella Window, u-value 0.34, SHGC 0.3	17.5	434	0	417	417
Ster 7: Glazing-Pella Window, u-value 0.33, SHGC 0.27	180	4,336	0	3,926	3,926
11N: Door-Metal - Polystyrene Core	24	613	0	176	176
R24: Wall-Frame, Custom, R-24 Exterior wallInsulation In 2 x 6 Stud Cavity, no board insulation, brick or siding finish, wood studs	1599.1	7,588	0	1,070	1,070
Roof 16B-50: Roof/Ceiling-	2139.6	3,124	0	1,926	1,926
Subtotals for structure:		31,360	0	22,855	22,855
People:	2		400	460	860
Equipment:			0	1,200	1,200
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 140, Summer CFM: 140		9,025	-2,848	1,853	-995
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 35, Summer CFM: 35					
Humidification (Winter) 7.24 gal/day :		2,655	0	0	0
AED Excursion:		0	0	2,277	2,277
System 2 Main Floor-Left Side Load Totals:		43,040	-2,448	28,645	26,197

Check Figures

Supply CFM:	1,575	CFM Per Square ft.:	0.736
Square ft. of Room Area:	2,140	Square ft. Per Ton:	807
Volume (ft³) of Cond. Space:	26,200		

System Loads

Total Heating Required Including Ventilation Air:	43,040	Btuh	43.040	MBH
Total Sensible Gain:	28,645	Btuh	100	%
Total Latent Gain:	-2,448	Btuh	0	%
Total Cooling Required Including Ventilation Air:	28,645	Btuh	2.65	Tons (Based On 90% 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.

System 3 Main Floor-Right Side Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
Ster 4: Glazing-Pella Window, u-value 0.34, SHGC 0.24	54	1,340	0	1,085	1,085
Ster 3: Glazing-Pella Window, u-value 0.33, SHGC 0.25	85	2,048	0	1,926	1,926
Ster 5: Glazing-Pella Window, u-value 0.32, SHGC 0.28	118.2	2,762	0	3,154	3,154
Ster 13: Glazing-Pella Window, u-value 0.32, SHGC 0.31	6.2	146	0	151	151
Ster 43: Glazing-Pella Window, u-value 0.34, SHGC 0.3	73.5	1,825	0	1,801	1,801
Ster 37: Glazing-Pella Window, u-value 0.3, SHGC 0.28	10	220	0	220	220
R24: Wall-Frame, Custom, R-24 Exterior wallInsulation In 2 x 6 Stud Cavity, no board insulation, brick or siding finish, wood studs	1123.8	5,331	0	753	753
Roof 16B-50: Roof/Ceiling-	1248.4	1,824	0	1,123	1,123
20P-30-c: Floor-Over open crawl space or garage, Passive, R-30 blanket insulation, carpet covering	16.7	43	0	3	3
Subtotals for structure:		15,539	0	10,216	10,216
People:	1		200	230	430
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 74, Summer CFM: 44		4,744	-899	584	-315
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 35, Summer CFM: 35					
Humidification (Winter) 3.46 gal/day :		1,268	0	0	0
AED Excursion:		0	0	986	986
System 3 Main Floor-Right Side Load Totals:		21,551	-699	12,016	11,317

Check Figures

Supply CFM:	679	CFM Per Square ft.:	0.544
Square ft. of Room Area:	1,248	Square ft. Per Ton:	1,122
Volume (ft³) of Cond. Space:	12,396		

System Loads

Total Heating Required Including Ventilation Air:	21,551	Btuh	21.551	MBH
Total Sensible Gain:	12,016	Btuh	100	%
Total Latent Gain:	-699	Btuh	0	%
Total Cooling Required Including Ventilation Air:	12,016	Btuh	1.11	Tons (Based On 90% 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.

Equipment Data - System 1 - Basement

Cooling

System Type:	Standard Air Conditioner
Outdoor Model:	24ABB324(A,W)*N31*
Indoor Model:	CNPV*3617AL*+TDR
Tradename:	CARRIER
Outdoor Manufacturer:	CARRIER AIR CONDITIONING
Capacity:	23400
Efficiency:	13 SEER

Heating

System Type:	Natural Gas Furnace
Model:	59SC2C080S17--16
Tradename:	CARRIER
Manufacturer:	CARRIER CORPORATION
Description:	Natural Gas or Propane Furnace
Capacity:	75000
Efficiency:	92.1 AFUE

Equipment Data - System 2 - Main Floor-Left Side

Cooling

System Type:	Standard Air Conditioner
Outdoor Model:	24ABB342(A,W)*N30*
Indoor Model:	CNPV*4821AL*+TDR
Tradename:	CARRIER AIR CONDITIONING
Outdoor Manufacturer:	CARRIER AIR CONDITIONING
AHRI Reference No.:	9167622
Capacity:	41500
Efficiency:	13 SEER

Heating

System Type:	Natural Gas Furnace
Model:	59SC2C080S21--20
Tradename:	CARRIER
Manufacturer:	CARRIER CORPORATION
Description:	Natural Gas or Propane Furnace
Capacity:	75000
Efficiency:	92.1 AFUE

Equipment Data - System 3 - Main Floor-Right Side

Cooling

System Type:	Standard Air Conditioner
Outdoor Model:	24ABB318ABN34*
Indoor Model:	CNPV*2417AL*+TDR
Tradename:	CARRIER
Outdoor Manufacturer:	CARRIER AIR CONDITIONING
AHRI Reference No.:	9850298
Capacity:	17700
Efficiency:	13 SEER

Heating

System Type:	Natural Gas Furnace
Model:	59SC2C040S17--12
Tradename:	CARRIER
Manufacturer:	CARRIER CORPORATION
Description:	Natural Gas or Propane Furnace
Capacity:	37000
Efficiency:	92.1 AFUE

Detailed Room Loads - Room 1 - Guest Suite (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	287.5	sq.ft.	Supply Air:	259	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	4.9	AC/hr
Volume:	3,162.9	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	3		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	23	CFM
			Actual Summer Infil.:	13	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 12.7 X 11	75.4	0.065	4.7	358	0.7	0	50
NW-Wall-R24 18.5 X 11	152.5	0.065	4.7	724	0.7	0	102
NE-Wall-R24 3.7 X 11	25.4	0.065	4.7	120	0.7	0	17
NW-Wall-R24 1.8 X 11	20.1	0.065	4.7	96	0.7	0	13
SW-Gls-Ster 1 shgc-0.28 0%S	64	0.330	24.1	1,542	26.8	0	1,717
NW-Gls-Ster 3 shgc-0.25 0%S	36	0.330	24.1	867	20.6	0	740
NW-Gls-Ster 3 shgc-0.25 0%S	15	0.330	24.1	361	20.5	0	308
NE-Gls-Ster 3 shgc-0.25 0%S	15	0.330	24.1	361	20.5	0	308
UP-Ceil-Roof 16B-50 3.5 X 1	3.5	0.020	1.5	5	0.9	0	3
Floor-22A-ph 37 ft..Per.	37	1.358	99.1	3,668	0.0	0	0
Subtotals for Structure:				8,102		0	3,258
Infil.: Win.: 23.2, Sum.: 13.1	403		3.706	1,495	0.431	-268	174
Ductwork:				0			0
AED Excursion:							917
People: 200 lat/per, 230 sen/per:	1					200	230
Room Totals:				9,597		-68	4,579

Detailed Room Loads - Room 2 - GS Bath (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	5.4	ft.	System Number:	1	
Room Width:	11.1	ft.	Zone Number:	1	
Area:	60.1	sq.ft.	Supply Air:	1	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	0.1	AC/hr
Volume:	660.6	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	0	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
Floor-21A-32 1 X 60	60	0.020	1.5	88	0.0	0	0
Subtotals for Structure:				88		0	0
Infil.: Win.: 0.0, Sum.: 0.0	0		0	0	0	0	0
Ductwork:				0			0
Room Totals:				88		0	0

Detailed Room Loads - Room 3 - GS Wic (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	88.0	sq.ft.	Supply Air:	87	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	5.4	AC/hr
Volume:	967.7	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	15	CFM
			Actual Summer Infil.:	9	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NW-Wall-R24 6.7 X 11	73.4	0.065	4.7	348	0.7	0	49
NE-Wall-R24 14.8 X 11	133.1	0.065	4.7	632	0.7	0	89
SE-Wall-R24 2.4 X 11	26.6	0.065	4.7	126	0.7	0	18
NE-Gls-Ster 3 shgc-0.25 0%S	30	0.330	24.1	723	20.6	0	617
UP-Ceil-Roof 16B-50 13.3 X 1	13.3	0.020	1.5	19	0.9	0	12
Floor-22A-ph 24 ft..Per.	24	1.358	99.1	2,379	0.0	0	0
Subtotals for Structure:				4,227		0	785
Infil.: Win.: 15.1, Sum.: 8.6	263		3.706	975	0.433	-175	114
Ductwork:				0			0
AED Excursion:							225
Room Totals:				5,202		-175	1,124

Detailed Room Loads - Room 4 - Bed 4 (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	201.0	sq.ft.	Supply Air:	63	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	1.7	AC/hr
Volume:	2,211.1	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	6	CFM
			Actual Summer Infil.:	3	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-R24 8.9 X 11	70.6	0.065	4.7	335	0.7	0	47
NE-Gls-Ster 3 shgc-0.25 0%S	27.5	0.330	24.1	662	20.5	0	565
Floor-22A-ph 9 ft..Per.	9	1.358	99.1	892	0.0	0	0
Subtotals for Structure:				1,889		0	612
Infil.: Win.: 5.6, Sum.: 3.2	98		3.710	364	0.428	-65	42
Ductwork:				0			0
AED Excursion:							221
People: 200 lat/per, 230 sen/per:	1					200	230
Room Totals:				2,253		135	1,105

Detailed Room Loads - Room 5 - B4 Bath (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	88.0	sq.ft.	Supply Air:	20	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	1.2	AC/hr
Volume:	968.2	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	1	CFM
			Actual Summer Infil.:	1	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NW-Wall-Bsmt Frmd R13-10 4.4 X 11	48.7	0.045	3.6	175	0.0	0	2
NE-Wall-Bsmt Frmd R13-10 14.1 X 11	154.9	0.045	3.6	558	0.0	0	7
SE-Wall-Bsmt Frmd R13-10 6.2 X 11	68.8	0.045	3.6	248	0.0	0	3
Floor-21A-32 1 X 88	88	0.020	1.5	129	0.0	0	0
Subtotals for Structure:				1,110		0	12
Infil.: Win.: 1.4, Sum.: 0.8	25		3.712	91	0.449	-16	11
Ductwork:				0			0
AED Excursion:							6
Room Totals:				1,201		-16	29

Detailed Room Loads - Room 6 - B4 Wic (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	74.3	sq.ft.	Supply Air:	10	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	0.7	AC/hr
Volume:	817.2	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	1	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-Bsmt Frmd R13-10 2.2 X 11	24.8	0.045	3.6	89	0.0	0	1
SE-Wall-Bsmt Frmd R13-10 0.7 X 11	7.4	0.045	3.6	27	0.0	0	0
SE-Wall-Bsmt Frmd R13-10 8.2 X 11	90.8	0.045	3.6	327	0.0	0	4
Floor-21A-32 1 X 74.3	74.3	0.020	1.5	108	0.0	0	0
Subtotals for Structure:				551		0	5
Infil.: Win.: 0.6, Sum.: 0.4	11		3.708	41	0.452	-7	5
Ductwork:				0			0
AED Excursion:							3
Room Totals:				592		-7	13

Detailed Room Loads - Room 7 - Exercise (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	225.2	sq.ft.	Supply Air:	191	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	4.6	AC/hr
Volume:	2,476.9	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	16	CFM
			Actual Summer Infil.:	9	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 15.9 X 11	95.1	0.065	4.7	451	0.7	0	64
NW-Wall-R24 6.3 X 11	54.6	0.065	4.7	259	0.7	0	37
SW-Wall-R24 0.8 X 11	9.1	0.065	4.7	43	0.7	0	6
NW-Wall-R24 2.3 X 11	25.7	0.065	4.7	122	0.7	0	17
SW-Gls-Ster 1 shgc-0.28 0%S	80	0.330	24.1	1,927	26.8	0	2,146
NW-Gls-Ster 3 shgc-0.25 0%S	15	0.330	24.1	361	20.5	0	308
Floor-22A-ph 25 ft..Per.	25	1.358	99.1	2,478	0.0	0	0
Subtotals for Structure:				5,641		0	2,578
Infil.: Win.: 16.1, Sum.: 9.1	280		3.705	1,036	0.433	-186	121
Ductwork:				0			0
AED Excursion:							676
Room Totals:				6,677		-186	3,375

Detailed Room Loads - Room 8 - Rec Room/Game Area (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	1,351.6	sq.ft.	Supply Air:	219	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	0.9	AC/hr
Volume:	14,867.8	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	3		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	17	CFM
			Actual Summer Infil.:	10	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-Bsmt Frmd R13-10 23.5 X 11	258.5	0.045	3.6	931	0.0	0	12
NW-Wall-R24 21.8 X 11	111.9	0.065	4.7	531	0.7	0	75
NE-Wall-Bsmt Frmd R13-10 2.2 X 11	23.8	0.045	3.6	86	0.0	0	1
SE-Wall-Bsmt Frmd R13-10 4.7 X 11	51.4	0.045	3.6	185	0.0	0	2
NE-Wall-Bsmt Frmd R13-10 10.8 X 11	118.2	0.045	3.6	426	0.0	0	6
NW-Wall-Bsmt Frmd R13-10 4.9 X 11	54.1	0.045	3.6	195	0.0	0	3
NE-Wall-Bsmt Frmd R13-10 8.8 X 11	97.1	0.045	3.6	350	0.0	0	5
NW-Gls-Ster 1 shgc-0.28 0%S	128	0.330	24.1	3,084	22.4	0	2,872
Floor-21A-32 1 X 1308	1308	0.020	1.5	1,910	0.0	0	0
Floor-22A-ph 22 ft..Per.	22	1.358	99.1	2,181	0.0	0	0
Subtotals for Structure:				9,879		0	2,976
Infil.: Win.: 16.9, Sum.: 9.6	294		3.705	1,090	0.432	-195	127
Ductwork:				0			0
AED Excursion:							777
Room Totals:				10,969		-195	3,880

Detailed Room Loads - Room 9 - Pdr (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	94.4	sq.ft.	Supply Air:	18	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	1.0	AC/hr
Volume:	1,038.2	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	1	CFM
			Actual Summer Infil.:	1	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-Bsmt Frmd R13-10 6.4 X 11	70	0.045	3.6	252	0.0	0	3
E -Wall-Bsmt Frmd R13-10 8.8 X 11	96.6	0.045	3.6	348	0.0	0	5
SE-Wall-Bsmt Frmd R13-10 5.9 X 11	65	0.045	3.6	234	0.0	0	3
Floor-21A-32 1 X 94.4	94.4	0.020	1.5	138	0.0	0	0
Subtotals for Structure:				972		0	11
Infil.: Win.: 1.2, Sum.: 0.7	21		3.695	77	0.432	-14	9
Ductwork:				0			0
AED Excursion:							5
Room Totals:				1,049		-14	25

Detailed Room Loads - Room 10 - Mech 1 (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	1	
Room Width:	n/a		Zone Number:	1	
Area:	886.1	sq.ft.	Supply Air:	102	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	0.6	AC/hr
Volume:	9,746.9	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	6	CFM
			Actual Summer Infil.:	3	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-Bsmt Drape R11-10 13.8 X 11	151.2	0.047	3.8	571	0.0	0	8
SE-Wall-Bsmt Drape R11-10 12.8 X 11	141.1	0.047	3.8	532	0.0	0	7
SW-Wall-Bsmt Drape R11-10 6.9 X 11	76.1	0.047	3.8	287	0.0	0	4
SE-Wall-Bsmt Drape R11-10 8.5 X 11	93.5	0.047	3.8	353	0.0	0	5
SW-Wall-Bsmt Drape R11-10 16.7 X 11	183.4	0.047	3.8	692	0.0	0	9
NW-Wall-Bsmt Drape R11-10 8.5 X 11	93.4	0.047	3.8	352	0.0	0	5
NE-Wall-Bsmt Drape R11-10 14.3 X 11	157.6	0.047	3.8	595	0.0	0	8
SE-Wall-Bsmt Drape R11-10 5.3 X 11	58.6	0.047	3.8	221	0.0	0	3
NE-Wall-Bsmt Drape R11-10 4.2 X 11	46.8	0.047	3.8	176	0.0	0	2
SE-Wall-Bsmt Drape R11-10 15.5 X 11	170.5	0.047	3.8	643	0.0	0	9
Floor-21A-32 1 X 886.1	886.1	0.020	1.5	1,294	0.0	0	0
Subtotals for Structure:				5,716		0	60
Infil.: Win.: 6.1, Sum.: 3.4	106		3.706	391	0.436	-70	46
Ductwork:				0			0
AED Excursion:							27
Room Totals:				6,107		-70	133

Detailed Room Loads - Room 26 - Mech 2 (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	6.3	ft.	System Number:	1	
Room Width:	3.3	ft.	Zone Number:	1	
Area:	20.3	sq.ft.	Supply Air:	3	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	0.8	AC/hr
Volume:	223.4	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	0	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SE-Wall-Bsmt Frmd R13-10 3.2 X 11	35.8	0.045	3.6	129	0.0	0	2
Floor-21A-32 1 X 20.3	20.3	0.020	1.5	30	0.0	0	0
Subtotals for Structure:				159		0	2
Infil.: Win.: 0.2, Sum.: 0.1	3		3.730	12	0.311	-2	1
Ductwork:				0			0
AED Excursion:							1
Room Totals:				171		-2	4

Detailed Room Loads - Room 11 - Bed 2 (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	2	
Room Width:	n/a		Zone Number:	1	
Area:	250.0	sq.ft.	Supply Air:	210	CFM
Ceiling Height:	10.0	ft.	Supply Air Changes:	5.1	AC/hr
Volume:	2,499.7	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	22	CFM
			Actual Summer Infil.:	22	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 13.7 X 10	122.4	0.065	4.7	581	0.7	0	82
NE-Wall-R24 4.4 X 10	44.2	0.065	4.7	210	0.7	0	30
NE-Wall-R24 4.3 X 10	43.3	0.065	4.7	205	0.7	0	29
SE-Wall-R24 15.5 X 10	75	0.065	4.7	356	0.7	0	50
SW-Gls-Ster 3 shgc-0.25 0%S	15	0.330	24.1	361	24.5	0	367
SE-Gls-Ster 1 shgc-0.28 0%S	80	0.330	24.1	1,927	26.8	0	2,146
UP-Ceil-Roof 16B-50 250 X 1	250	0.020	1.5	365	0.9	0	225
Subtotals for Structure:				4,005		0	2,929
Infil.: Win.: 21.6, Sum.: 21.6	380		3.664	1,392	0.753	-439	286
Ductwork:				0			0
AED Excursion:							297
People: 200 lat/per, 230 sen/per:	1					200	230
Room Totals:				5,397		-239	3,742

Detailed Room Loads - Room 12 - B2 Wic (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	5.8	ft.	System Number:	2	
Room Width:	5.4	ft.	Zone Number:	1	
Area:	31.6	sq.ft.	Supply Air:	35	CFM
Ceiling Height:	9.0	ft.	Supply Air Changes:	7.4	AC/hr
Volume:	284.4	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	6	CFM
			Actual Summer Infil.:	6	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-R24 5.8 X 9	52.5	0.065	4.7	249	0.7	0	35
SE-Wall-R24 5.4 X 9	48.8	0.065	4.7	231	0.7	0	33
UP-Ceil-Roof 16B-50 31.6 X 1	31.6	0.020	1.5	46	0.9	0	28
Subtotals for Structure:				526		0	96
Infil.: Win.: 5.7, Sum.: 5.7	101		3.664	371	0.751	-117	76
Ductwork:				0			0
AED Excursion:							15
Room Totals:				897		-117	187

Detailed Room Loads - Room 13 - B2 Bath (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	6.6	ft.	System Number:	2	
Room Width:	9.8	ft.	Zone Number:	1	
Area:	64.7	sq.ft.	Supply Air:	4	CFM
Ceiling Height:	9.0	ft.	Supply Air Changes:	0.4	AC/hr
Volume:	582.1	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	0	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
UP-Ceil-Roof 16B-50 64.7 X 1	64.7	0.020	1.5	95	0.9	0	58
Subtotals for Structure:				95		0	58
Infil.: Win.: 0.0, Sum.: 0.0	0		0	0	0	0	0
Ductwork:				0			0
AED Excursion:							5
Room Totals:				95		0	63

Detailed Room Loads - Room 15 - Cat. Kitch/Pantry (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	2	
Room Width:	n/a		Zone Number:	1	
Area:	106.2	sq.ft.	Supply Air:	75	CFM
Ceiling Height:	9.0	ft.	Supply Air Changes:	4.7	AC/hr
Volume:	956.0	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	10	CFM
			Actual Summer Infil.:	10	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 6.9 X 9	48.3	0.065	4.7	229	0.7	0	32
SE-Wall-R24 12.9 X 9	116.3	0.065	4.7	552	0.7	0	78
SW-Gls-Ster 3 shgc-0.25 0%S	10	0.330	24.1	241	24.5	0	245
SW-Gls-Ster 13 shgc-0.31 0%S	4	0.320	23.4	93	29.0	0	116
UP-Ceil-Roof 16B-50 106.2 X 1	106.2	0.020	1.5	155	0.9	0	96
Subtotals for Structure:				1,270		0	567
Infil.: Win.: 10.1, Sum.: 10.1	179		3.663	654	0.750	-206	134
Ductwork:				0			0
AED Excursion:							61
Room Totals:				1,924		-206	762

Detailed Room Loads - Room 16 - Family Dining (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	16.7	ft.	System Number:	2	
Room Width:	8.5	ft.	Zone Number:	1	
Area:	141.7	sq.ft.	Supply Air:	286	CFM
Ceiling Height:	11.0	ft.	Supply Air Changes:	11.0	AC/hr
Volume:	1,558.6	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	3		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	21	CFM
			Actual Summer Infil.:	21	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 16.7 X 11	75.4	0.065	4.7	358	0.7	0	50
NW-Wall-R24 8.5 X 11	39.5	0.065	4.7	187	0.7	0	26
SE-Wall-R24 8.5 X 11	39.5	0.065	4.7	187	0.7	0	26
SW-Gls-Ster 5 shgc-0.28 0%S	108	0.320	23.4	2,523	26.7	0	2,881
NW-Gls-Ster 3 shgc-0.25 0%S	36	0.330	24.1	867	20.6	0	740
NW-Gls-Ster 13 shgc-0.31 0%S	18	0.320	23.4	420	24.2	0	435
SE-Gls-Ster 44 shgc-0.19 0%S	54	0.310	22.6	1,222	19.5	0	1,053
UP-Ceil-Roof 16B-50 141.7 X 1	141.7	0.020	1.5	207	0.9	0	128
Subtotals for Structure:				5,971		0	5,339
Infil.: Win.: 21.0, Sum.: 21.0	370		3.664	1,357	0.753	-428	279
Ductwork:				0			0
AED Excursion:							485
Room Totals:				7,328		-428	6,103

Detailed Room Loads - Room 17 - Kitchen (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	16.2	ft.	System Number:	2	
Room Width:	22.9	ft.	Zone Number:	1	
Area:	370.6	sq.ft.	Supply Air:	40	CFM
Ceiling Height:	10.0	ft.	Supply Air Changes:	0.7	AC/hr
Volume:	3,706.2	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	0	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
UP-Ceil-Roof 16B-50 370.5 X 1	370.5	0.020	1.5	541	0.9	0	333
Subtotals for Structure:				541		0	333
Infil.: Win.: 0.0, Sum.: 0.0	0		0	0	0	0	0
Ductwork:				0			0
AED Excursion:							132
Equipment:						0	1,200
Room Totals:				541		0	1,665

Detailed Room Loads - Room 18 - OE (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	2	
Room Width:	n/a		Zone Number:	1	
Area:	218.7	sq.ft.	Supply Air:	106	CFM
Ceiling Height:	10.0	ft.	Supply Air Changes:	2.9	AC/hr
Volume:	2,186.7	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	13	CFM
			Actual Summer Infil.:	13	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-R24 3.9 X 10	38.9	0.065	4.7	185	0.7	0	26
E -Wall-R24 8.9 X 10	88.6	0.065	4.7	420	0.7	0	59
SE-Wall-R24 5.9 X 10	34.8	0.065	4.7	165	0.7	0	23
NE-Wall-R24 4 X 10	40	0.065	4.7	190	0.7	0	27
SE-Door-11N 3 X 8	24	0.350	25.6	613	7.4	0	176
UP-Ceil-Roof 16B-50 218.7 X 1	218.7	0.020	1.5	319	0.9	0	197
Subtotals for Structure:				1,892		0	508
Infil.: Win.: 12.8, Sum.: 12.8	226		3.663	829	0.751	-262	170
Ductwork:				0			0
AED Excursion:							59
Room Totals:				2,721		-262	737

Detailed Room Loads - Room 19 - Foyer (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	2	
Room Width:	n/a		Zone Number:	1	
Area:	353.6	sq.ft.	Supply Air:	211	CFM
Ceiling Height:	13.0	ft.	Supply Air Changes:	2.8	AC/hr
Volume:	4,596.4	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	20	CFM
			Actual Summer Infil.:	20	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-R24 10.6 X 13	53.5	0.065	4.7	254	0.7	0	36
NW-Wall-R24 4.9 X 13	64	0.065	4.7	303	0.7	0	43
NE-Wall-R24 8.8 X 13	96.8	0.065	4.7	459	0.7	0	65
N -Wall-R24 2.5 X 13	32.6	0.065	4.7	155	0.7	0	22
NE-Gls-Ster 3 shgc-0.25 0%S	72	0.330	24.1	1,734	20.6	0	1,481
NE-Gls-Ster 5 shgc-0.28 0%S	12	0.320	23.4	280	22.3	0	267
NE-Gls-Ster 43 shgc-0.3 0%S	17.5	0.340	24.8	434	23.8	0	417
UP-Ceil-Roof 16B-50 353.6 X 1	353.6	0.020	1.5	516	0.9	0	318
Subtotals for Structure:				4,135		0	2,649
Infil.: Win.: 19.8, Sum.: 19.8	348		3.662	1,276	0.752	-403	262
Ductwork:				0			0
AED Excursion:							251
Room Totals:				5,411		-403	3,162

Detailed Room Loads - Room 20 - Pwdr (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	7.3	ft.	System Number:	2	
Room Width:	7.1	ft.	Zone Number:	1	
Area:	51.9	sq.ft.	Supply Air:	3	CFM
Ceiling Height:	9.0	ft.	Supply Air Changes:	0.4	AC/hr
Volume:	467.1	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	0	CFM
			Actual Summer Infil.:	0	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
UP-Ceil-Roof 16B-50 51.9 X 1	51.9	0.020	1.5	76	0.9	0	47
Subtotals for Structure:				76		0	47
Infil.: Win.: 0.0, Sum.: 0.0	0		0	0	0	0	0
Ductwork:				0			0
AED Excursion:							4
Room Totals:				76		0	51

Detailed Room Loads - Room 21 - Great Room (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	2	
Room Width:	n/a		Zone Number:	1	
Area:	550.8	sq.ft.	Supply Air:	624	CFM
Ceiling Height:	17.0	ft.	Supply Air Changes:	4.0	AC/hr
Volume:	9,363.3	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	8		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	49	CFM
			Actual Summer Infil.:	49	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 23.5 X 17	219.5	0.065	4.7	1,042	0.7	0	147
NW-Wall-R24 22 X 17	194	0.065	4.7	921	0.7	0	130
NE-Wall-R24 21.3 X 4	31.3	0.065	4.7	149	0.7	0	21
SW-Gls-Ster 3 shgc-0.25 0%S	180	0.330	24.1	4,336	24.5	0	4,406
NW-Gls-Ster 7 shgc-0.27 0%S	180	0.330	24.1	4,336	21.8	0	3,926
NE-Gls-Ster 5 shgc-0.28 0%S	54	0.320	23.4	1,261	22.3	0	1,203
UP-Ceil-Roof 16B-50 550.8 X 1	550.8	0.020	1.5	804	0.9	0	496
Subtotals for Structure:				12,849		0	10,329
Infil.: Win.: 48.7, Sum.: 48.7	859		3.663	3,146	0.752	-993	646
Ductwork:				0			0
AED Excursion:							968
People: 200 lat/per, 230 sen/per:	1					200	230
Room Totals:				15,995		-793	12,173

Detailed Room Loads - Room 14 - Study (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	3	
Room Width:	n/a		Zone Number:	1	
Area:	194.5	sq.ft.	Supply Air:	128	CFM
Ceiling Height:	11.5	ft.	Supply Air Changes:	3.4	AC/hr
Volume:	2,236.3	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	20	CFM
			Actual Summer Infil.:	12	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 2.2 X 11.5	25	0.065	4.7	118	0.7	0	17
NW-Wall-R24 4.4 X 11.5	50.9	0.065	4.7	242	0.7	0	34
NE-Wall-R24 14.1 X 11.5	107.9	0.065	4.7	512	0.7	0	72
SE-Wall-R24 14.6 X 11.5	149.7	0.065	4.7	710	0.7	0	100
NE-Gls-Ster 4 shgc-0.24 0%S	54	0.340	24.8	1,340	20.1	0	1,085
SE-Gls-Ster 3 shgc-0.25 0%S	18	0.330	24.1	434	24.5	0	441
UP-Ceil-Roof 16B-50 194.5 X 1	194.5	0.020	1.5	284	0.9	0	175
Subtotals for Structure:				3,640		0	1,924
Infil.: Win.: 20.3, Sum.: 12.2	405		3.226	1,308	0.397	-248	161
Ductwork:				0			0
AED Excursion:							186
Room Totals:				4,948		-248	2,271

Detailed Room Loads - Room 22 - Laundry (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	3	
Room Width:	n/a		Zone Number:	1	
Area:	272.4	sq.ft.	Supply Air:	74	CFM
Ceiling Height:	9.0	ft.	Supply Air Changes:	1.8	AC/hr
Volume:	2,451.3	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	9	CFM
			Actual Summer Infil.:	5	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-R24 9 X 9	67	0.065	4.7	318	0.7	0	45
SE-Wall-R24 3.8 X 9	13.8	0.065	4.7	65	0.7	0	9
NE-Wall-R24 2.2 X 9	19.5	0.065	4.7	93	0.7	0	13
SE-Wall-R24 4.8 X 9	42.8	0.065	4.7	203	0.7	0	29
NE-Gls-Ster 3 shgc-0.25 0%S	14	0.330	24.1	337	20.6	0	288
SE-Gls-Ster 3 shgc-0.25 0%S	13.8	0.330	24.1	331	24.5	0	337
SE-Gls-Ster 5 shgc-0.28 0%S	6.2	0.320	23.4	146	26.7	0	167
UP-Ceil-Roof 16B-50 272.4 X 1	272.4	0.020	1.5	398	0.9	0	245
Subtotals for Structure:				1,891		0	1,133
Infil.: Win.: 8.9, Sum.: 5.3	177		3.224	571	0.395	-108	70
Ductwork:				0			0
AED Excursion:							107
Room Totals:				2,462		-108	1,310

Detailed Room Loads - Room 23 - Master Retreat (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	3	
Room Width:	n/a		Zone Number:	1	
Area:	370.9	sq.ft.	Supply Air:	256	CFM
Ceiling Height:	9.8	ft.	Supply Air Changes:	4.2	AC/hr
Volume:	3,647.5	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	3		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	12	CFM
			Actual Summer Infil.:	7	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 16 X 9.8	45.4	0.065	4.7	215	0.7	0	30
NW-Wall-R24 6.3 X 9.8	42.2	0.065	4.7	200	0.7	0	28
SW-Wall-R24 0.8 X 9.8	7.4	0.065	4.7	35	0.7	0	5
NW-Wall-R24 2.3 X 9.8	22.2	0.065	4.7	105	0.7	0	15
SW-Gls-Ster 5 shgc-0.28 0%S	112	0.320	23.4	2,616	26.7	0	2,987
NW-Gls-Ster 3 shgc-0.25 0%S	13.8	0.330	24.1	331	20.6	0	283
NW-Gls-Ster 13 shgc-0.31 0%S	6.2	0.320	23.4	146	24.2	0	151
UP-Ceil-Roof 16B-50 370.9 X 1	370.9	0.020	1.5	542	0.9	0	334
Subtotals for Structure:				4,190		0	3,833
Infil.: Win.: 12.5, Sum.: 7.5	249		3.226	804	0.397	-152	99
Ductwork:				0			0
AED Excursion:							372
People: 200 lat/per, 230 sen/per:	1					200	230
Room Totals:				4,994		48	4,534

Detailed Room Loads - Room 24 - Master Spa (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	3	
Room Width:	n/a		Zone Number:	1	
Area:	272.6	sq.ft.	Supply Air:	183	CFM
Ceiling Height:	9.8	ft.	Supply Air Changes:	4.1	AC/hr
Volume:	2,680.2	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	2		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	20	CFM
			Actual Summer Infil.:	12	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
SW-Wall-R24 12.8 X 9.8	111.8	0.065	4.7	531	0.7	0	75
NW-Wall-R24 2.3 X 9.8	22.9	0.065	4.7	109	0.7	0	15
SW-Wall-R24 1.9 X 9.8	8.4	0.065	4.7	40	0.7	0	6
NW-Wall-R24 8.3 X 9.8	29.4	0.065	4.7	139	0.7	0	20
NE-Wall-R24 1.9 X 9.8	8.4	0.065	4.7	40	0.7	0	6
NW-Wall-R24 7.9 X 9.8	72.9	0.065	4.7	346	0.7	0	49
NE-Wall-R24 5.8 X 9.8	51.7	0.065	4.7	245	0.7	0	35
SW-Gls-Ster 3 shgc-0.25 0%S	6.8	0.330	24.1	163	24.4	0	165
SW-Gls-Ster 3 shgc-0.25 0%S	6.8	0.330	24.1	163	24.4	0	165
SW-Gls-Ster 43 shgc-0.3 0%S	10.5	0.340	24.8	261	28.6	0	300
NW-Gls-Ster 43 shgc-0.3 0%S	52.5	0.340	24.8	1,303	23.8	0	1,251
NE-Gls-Ster 43 shgc-0.3 0%S	10.5	0.340	24.8	261	23.8	0	250
NW-Gls-Ster 37 shgc-0.28 0%S	5	0.300	21.9	110	22.0	0	110
NE-Gls-Ster 37 shgc-0.28 0%S	5	0.300	21.9	110	22.0	0	110
UP-Ceil-Roof 16B-50 272.6 X 1	272.6	0.020	1.5	398	0.9	0	245
Floor-20P-30 1 X 16.7	16.7	0.035	2.6	43	0.2	0	3
Subtotals for Structure:				4,262		0	2,805
Infil.: Win.: 20.1, Sum.: 12.1	402		3.225	1,298	0.398	-246	160
Ductwork:				0			0
AED Excursion:							265
Room Totals:				5,560		-246	3,230

Detailed Room Loads - Room 25 - Master Wic (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	n/a		System Number:	3	
Room Width:	n/a		Zone Number:	1	
Area:	138.1	sq.ft.	Supply Air:	40	CFM
Ceiling Height:	10.0	ft.	Supply Air Changes:	1.7	AC/hr
Volume:	1,380.8	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
			Percent of Supply.:	0	%
			Actual Summer Vent.:	0	CFM
			Percent of Supply:	0	%
			Actual Winter Infil.:	12	CFM
			Actual Summer Infil.:	7	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NW-Wall-R24 8.5 X 10	85	0.065	4.7	403	0.7	0	57
NE-Wall-R24 12.8 X 10	115.5	0.065	4.7	548	0.7	0	77
SE-Wall-R24 2.4 X 10	24.1	0.065	4.7	114	0.7	0	16
NE-Gls-Ster 3 shgc-0.25 0%S	12	0.330	24.1	289	20.6	0	247
UP-Ceil-Roof 16B-50 138.1 X 1	138.1	0.020	1.5	202	0.9	0	124
Subtotals for Structure:				1,556		0	521
Infil.: Win.: 11.8, Sum.: 7.1	237		3.225	763	0.397	-145	94
Ductwork:				0			0
AED Excursion:							55
Room Totals:				2,319		-145	670

System 1 Room Load Summary

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	Guest Suite	288	9,597	161	6,6,6	-	4,579	-68	259	259
2	GS Bath	60	88	1	3	-	0	0	0	1
3	GS Wic	88	5,202	87	6	-	1,124	-175	64	87
4	Bed 4	201	2,253	38	6	-	1,105	135	63	63
5	B4 Bath	88	1,201	20	4	-	29	-16	2	20
6	B4 Wic	74	592	10	3	-	13	-7	1	10
7	Exercise	225	6,677	112	6,6	-	3,375	-186	191	191
8	Rec Room/Game Area	1,352	10,969	183	6,6,6	-	3,880	-195	219	219
9	Pdr	94	1,049	18	3	-	25	-14	1	18
10	Mech 1	886	6,107	102	6,6	-	133	-70	7	102
26	Mech 2	20	171	3	3	-	4	-2	0	3
	Humidification		1,548							
	System 1 total	3,376	45,454	734			14,265	-598	807	807

System 1 Main Trunk Size: 20x10 in.
Velocity: 580 ft./min
Loss per 100 ft.: 0.034 in.wg

Duct size results above are from Manual D Ductsize.
Runout duct velocities are not printed with duct size results from Manual D Ductsize since they can vary within the room.
See the Manual D Ductsize report for duct velocities and other data.

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Recommended:	1.32	90% / 10%	14,265	1,585	15,850
Actual:	1.95	90% / 10%	21,060	2,340	23,400

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:	59SC2C080S17--16	24ABB324(A,W)*N31*
Indoor Model:		CNPV*3617AL*+TDR
Brand:	CARRIER	CARRIER
Description:	Natural Gas or Propane Furnace	
Efficiency:	92.1 AFUE	13 SEER
Sound:	0	0
Capacity:	75,000 Btuh	23,400 Btuh
Sensible Capacity:	n/a	21,060 Btuh
Latent Capacity:	n/a	2,340 Btuh

System 2 Room Load Summary

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---										
11	Bed 2	250	5,397	93	7,7	-	3,742	-239	212	210
12	B2 Wic	32	897	15	4	-	187	-117	11	35
13	B2 Bath	65	95	2	3	-	63	0	4	4
15	Cat. Kitch/Pantry	106	1,924	33	6	-	762	-206	43	75
16	Family Dining	142	7,328	126	6,6,6	-	6,103	-428	345	286
17	Kitchen	371	541	9	5	-	1,665	0	94	40
18	OE	219	2,721	47	7	-	737	-262	42	106
19	Foyer	354	5,411	93	7,7	-	3,162	-403	179	211
20	Pwdr	52	76	1	3	-	51	0	3	3
21	Great Room	551	15,995	275	6,6,6,6, 6,6,6,6	-	12,173	-793	688	624
	Humidification		2,655							
	System 2 total	2,140	43,040	695			28,645	-2,448	1,620	1,575

System 2 Main Trunk Size: 25x12 in.
Velocity: 756 ft./min
Loss per 100 ft.: 0.038 in.wg

Duct size results above are from Manual D Ductsize.
Runout duct velocities are not printed with duct size results from Manual D Ductsize since they can vary within the room.
See the Manual D Ductsize report for duct velocities and other data.

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Recommended:	2.65	90% / 10%	28,645	3,183	31,828
Actual:	3.46	90% / 10%	37,350	4,150	41,500

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:	59SC2C080S21--20	24ABB342(A,W)*N30*
Indoor Model:		CNPV*4821AL*+TDR
Brand:	CARRIER	CARRIER AIR CONDITIONING
Description:	Natural Gas or Propane Furnace	
Efficiency:	92.1 AFUE	13 SEER
Sound:	0	0
Capacity:	75,000 Btuh	41,500 Btuh
Sensible Capacity:	n/a	37,350 Btuh
Latent Capacity:	n/a	4,150 Btuh
AHRI Reference No.:	n/a	9167622

System 3 Room Load Summary

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---										
14	Study	194	4,948	85	6,6	-	2,271	-248	128	128
22	Laundry	272	2,462	42	6	-	1,310	-108	74	74
23	Master Retreat	371	4,994	86	6,6,6	-	4,534	48	256	256
24	Master Spa	273	5,560	95	6,6	-	3,230	-246	183	183
25	Master Wic	138	2,319	40	5	-	670	-145	38	40
	Humidification		1,268							
	System 3 total	1,248	21,551	348			12,016	-699	679	679

System 3 Main Trunk Size: 16x10 in.
Velocity: 609 ft./min
Loss per 100 ft.: 0.040 in.wg

Duct size results above are from Manual D Ductsize.
Runout duct velocities are not printed with duct size results from Manual D Ductsize since they can vary within the room.
See the Manual D Ductsize report for duct velocities and other data.

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Recommended:	1.11	90% / 10%	12,016	1,335	13,351
Actual:	1.48	90% / 10%	15,930	1,770	17,700

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:	59SC2C040S17--12	24ABB318ABN34*
Indoor Model:		CNPV*2417AL*+TDR
Brand:	CARRIER	CARRIER
Description:	Natural Gas or Propane Furnace	
Efficiency:	92.1 AFUE	13 SEER
Sound:	0	0
Capacity:	37,000 Btuh	17,700 Btuh
Sensible Capacity:	n/a	15,930 Btuh
Latent Capacity:	n/a	1,770 Btuh
AHRI Reference No.:	n/a	9850298

Building Rotation Report

All rotation degree values in this report are clockwise with respect to the project's original orientation.
Building orientation as entered (zero degrees rotation): Front door faces Northeast
At least one system with its System Air Type input set to Fixed was changed to Auto during the building rotation. If you want to change this behavior uncheck the option on the General tab of the Select Reports dialog called "Always use Auto for System Air Type for Building Rotation Report."

Individual Rooms

Rm. No.	Room Name	0° Rot. CFM	45° Rot. CFM	90° Rot. CFM	135° Rot. CFM	180° Rot. CFM	225° Rot. CFM	270° Rot. CFM	315° Rot. CFM	High Duct Size
System 1:										
Zone 1:										
1	Guest Suite	*259	219	195	166	206	214	229	219	6,6,6
2	GS Bath	*1	1	1	1	1	1	1	1	3
3	GS Wic	*87	87	87	87	87	87	87	87	6
4	Bed 4	63	*68	56	41	56	62	52	40	6
5	B4 Bath	*20	20	20	20	20	20	20	20	4
6	B4 Wic	*10	10	10	10	10	10	10	10	3
7	Exercise	*191	180	133	112	136	169	164	133	6,6
8	Rec Room/Game Area	219	183	183	241	207	183	218	*289	6,6,6
9	Pdr	*18	18	18	18	18	18	18	18	3
10	Mech 1	*102	102	102	102	102	102	102	102	6,6
26	Mech 2	*3	3	3	3	3	3	3	3	3
System 2:										
Zone 1:										
11	Bed 2	*212	158	191	203	172	124	175	211	7,7
12	B2 Wic	*15	15	15	15	15	15	15	15	4
13	B2 Bath	*4	3	3	3	3	3	3	3	3
15	Cat. Kitch/Pantry	43	*45	36	33	36	43	40	33	6
16	Family Dining	*345	304	291	253	295	293	321	293	6,6,6
17	Kitchen	*94	91	87	87	87	87	87	88	5
18	OE	*47	47	47	47	47	47	47	47	7
19	Foyer	179	*224	188	131	188	213	165	102	7,7
20	Pwdr	*3	3	3	3	3	3	3	3	3
21	Great Room	*688	616	607	553	650	641	677	597	6,6,6,6, 6,6,6,6
System 3:										
Zone 1:										
14	Study	128	*137	129	105	125	127	114	93	6,6
22	Laundry	*74	66	71	68	67	57	63	66	6
23	Master Retreat	256	*262	208	141	212	258	240	181	6,6,6
24	Master Spa	183	146	166	171	181	160	*183	178	6,6
25	Master Wic	40	*42	40	40	40	40	40	40	5

* Indicates highest CFM of all rotations.

Whole Building

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Recommended Tons
0°	Northeast	*3,106	*54,925	*-3,745	*5.09
45°	East	2,882	49,386	-3,745	4.57
90°	Southeast	2,801	47,600	-3,745	4.41
135°	South	2,560	42,601	-3,745	3.94
180°	Southwest	2,839	49,097	-3,745	4.55
225°	West	2,831	48,541	-3,745	4.49
270°	Northwest	2,888	50,914	-3,745	4.71
315°	North	2,658	46,949	-3,745	4.35

Building Rotation Report (cont'd)

* Indicates highest value of all rotations.

System 1

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Recommended Tons
0°	Northeast	*807	*14,265	*-598	*1.32
45°	East	734	11,406	-598	1.06
90°	Southeast	734	11,061	-598	1.02
135°	South	734	10,318	-598	0.96
180°	Southwest	734	11,881	-598	1.10
225°	West	734	11,472	-598	1.06
270°	Northwest	734	12,839	-598	1.19
315°	North	734	12,929	-598	1.20

* Indicates highest value of all rotations.

System 2

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Recommended Tons
0°	Northeast	*1,620	*28,645	*-2,448	*2.65
45°	East	1,495	26,442	-2,448	2.45
90°	Southeast	1,455	25,725	-2,448	2.38
135°	South	1,308	23,137	-2,448	2.14
180°	Southwest	1,482	26,202	-2,448	2.43
225°	West	1,455	25,725	-2,448	2.38
270°	Northwest	1,518	26,845	-2,448	2.49
315°	North	1,378	24,363	-2,448	2.26

* Indicates highest value of all rotations.

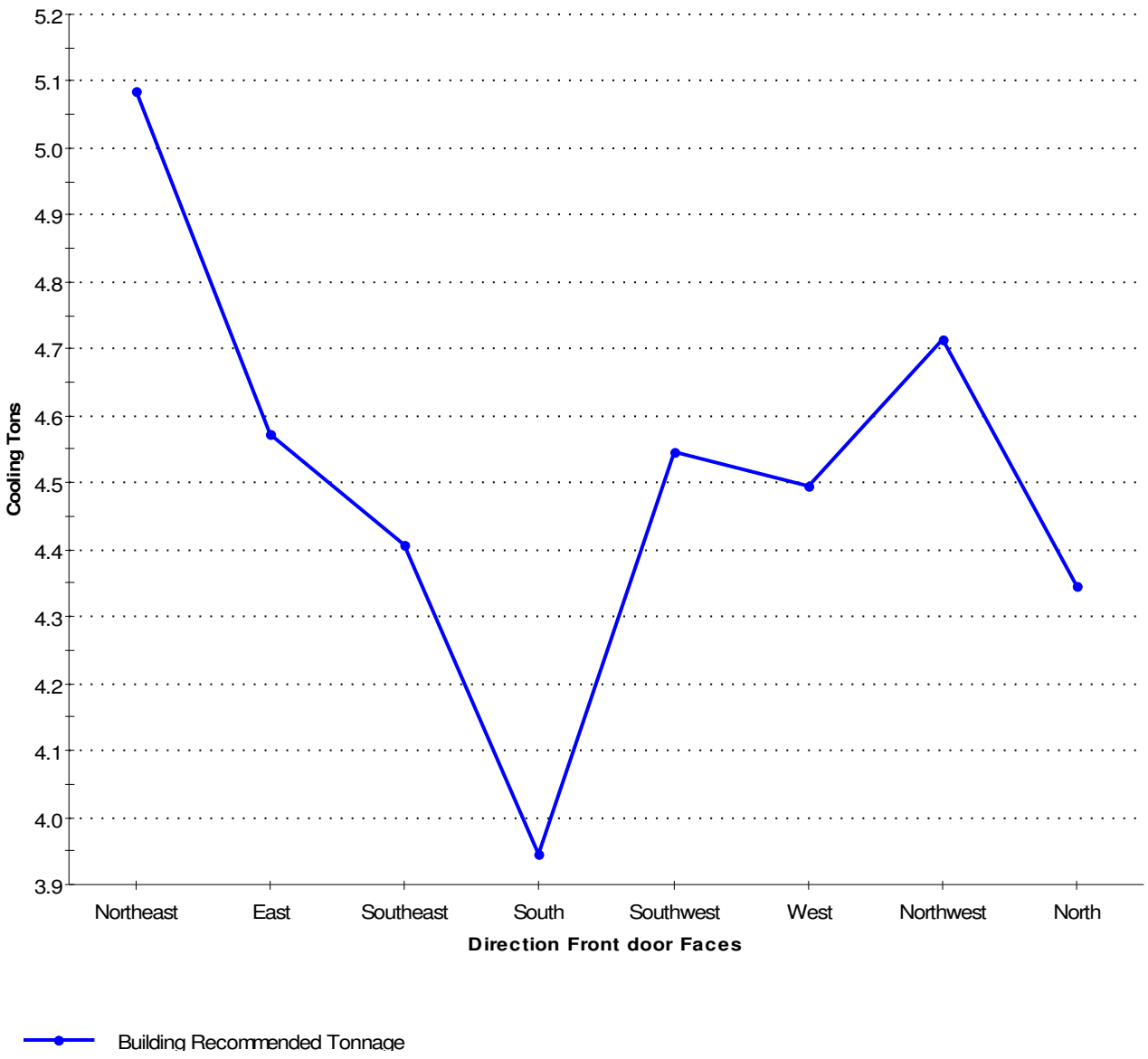
System 3

Rotation Degrees	Front door Faces	Supply CFM	Sensible Gain	Latent Gain	Recommended Tons
0°	Northeast	*679	*12,016	*-699	*1.11
45°	East	652	11,538	-699	1.07
90°	Southeast	612	10,814	-699	1.00
135°	South	517	9,146	-699	0.85
180°	Southwest	623	11,014	-699	1.02
225°	West	642	11,344	-699	1.05
270°	Northwest	635	11,230	-699	1.04
315°	North	546	9,657	-699	0.89

* Indicates highest value of all rotations.

Building Rotation Report (cont'd)

Building Rotation Tonnage



Building Rotation Report (cont'd)

Building Rotation Hourly Net Gain