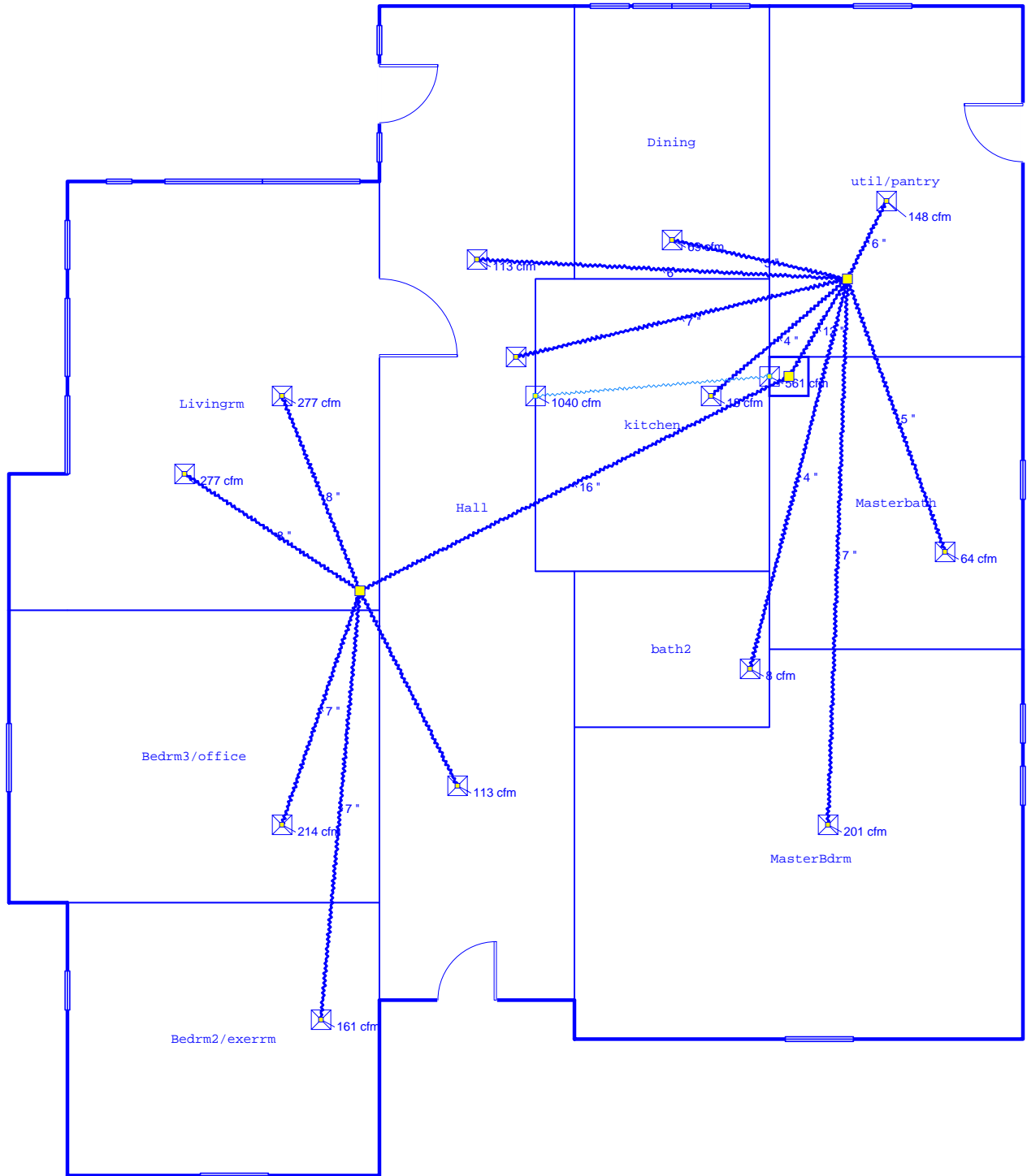


Sheet 1



Job #: Sample2 Customer
Performed by rick for:

Sample2 customer
Fitzhugh
Austin, TX

Rick's Heating & AC

Box 204433
Austin, TX 78720
Phone: 512-258-4748

Scale: 1/8" = 1'0"

Page 1
Right-Suite Residential J8
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Project Information

For: Sample2 customer
Fitzhugh, Austin, TX

Design Conditions

Location:

Austin, TX, US
Elevation: 620 ft
Latitude: 30°N

Outdoor:

	Heating	Cooling
Dry bulb (°F)	25	98
Daily range (°F)	-	20 (M)
Wet bulb (°F)	-	74
Wind speed (mph)	15.0	7.5

Indoor:

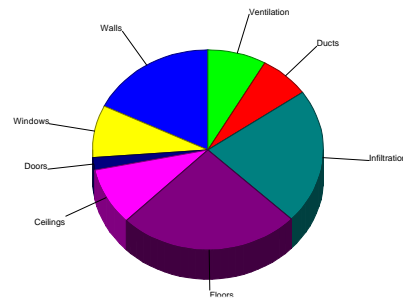
	Heating	Cooling
Indoor temperature (°F)	70	75
Design TD (°F)	45	23
Relative humidity (%)	30	50
Moisture difference (gr/lb)	17.8	24.9

Infiltration:

Method	Simplified
Construction quality	Tight
Fireplaces	1 (Average)

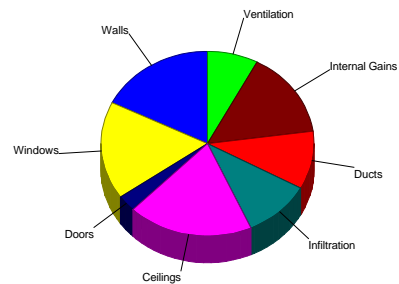
Heating

Component	Btuh/ft²	Btuh	% of load
Walls	2.9	9708	17.8
Windows	21.2	4583	8.4
Doors	17.5	1106	2.0
Ceilings	1.8	5059	9.3
Floors	5.3	13859	25.4
Infiltration	3.3	11954	21.9
Ducts		3835	7.0
Piping		0	0.0
Humidification		0	0.0
Ventilation		4483	8.2
Total		54585	100.0



Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	1.6	5282	17.6
Windows	23.8	5142	17.2
Doors	13.6	854	2.9
Ceilings	2.1	5704	19.0
Floors	0.0	0	0.0
Infiltration	0.9	3095	10.3
Ducts		3040	10.1
Ventilation		2321	7.7
Internal gains		4520	15.1
Blower		0	0.0
Total		29958	100.0



Overall U-value = 0.088 Btuh/ft²·°F

Project Information

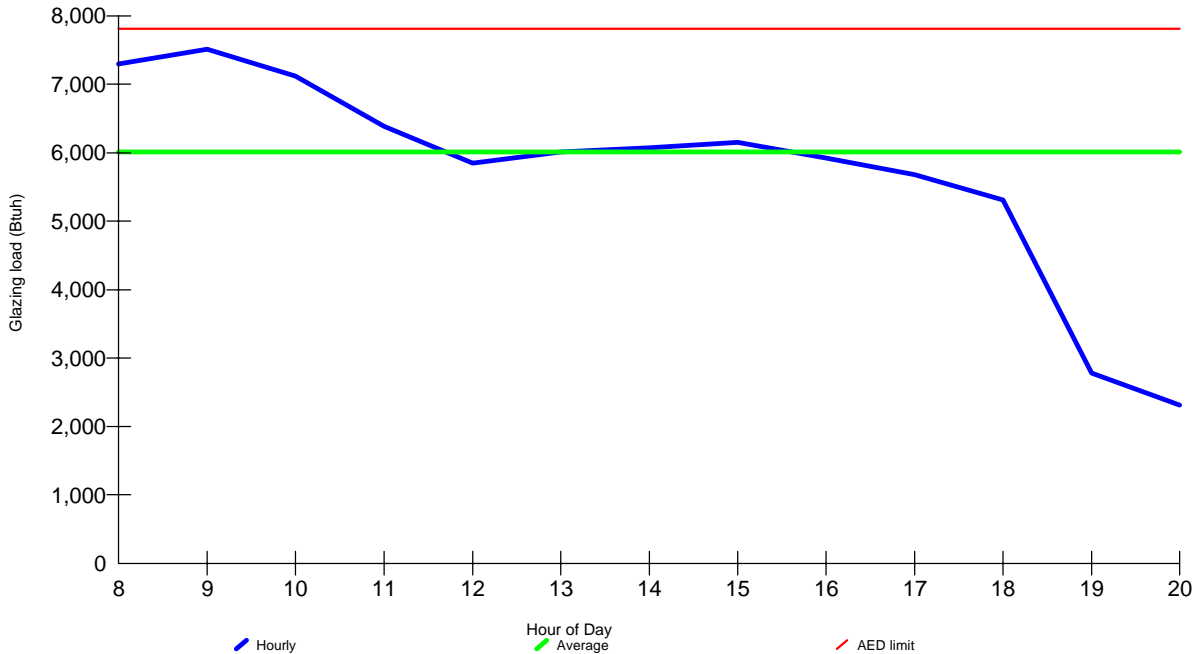
For: Sample2 customer
 Fitzhugh, Austin, TX

Design Conditions

Location:		Indoor:		Heating	Cooling
Austin, TX, US		Indoor temperature (°F)		70	75
Elevation:	620 ft	Design TD (°F)		45	23
Latitude:	30°N	Relative humidity (%)		30	50
Outdoor:		Moisture difference (gr/lb)		17.8	24.9
		Heating	Cooling		
Dry bulb (°F)		25	98		
Daily range (°F)		-	20 (M)		
Wet bulb (°F)		-	74		
Wind speed (mph)		15.0	7.5		
		Infiltration:			
		Method		Simplified	
		Construction quality		Tight	
		Fireplaces		1 (Average)	

Test for Adequate Exposure Diversity

Hourly Glazing Load



Maximum hourly glazing load exceeds average by 25.1%.

House has adequate exposure diversity (AED), based on AED limit of 30%.

Recommended procedure: Average

Selected procedure: Average (auto)



Operating Cost Details
Entire House
Rick's Heating & AC

Job: Sample2 Customer
 Date: 6/15/03
 By: rick

Box 204433, Austin, TX 78720 Phone: 512-258-4748 Email: austintexasrick@yahoo.com Web: www.ricksair.com

Design Conditions

Weather Location: Austin, TX, US
 Heating Hours: 1735 Cooling Hours: 2862
 Heating Load (Btuh): 54585 Cooling Load (Btuh): 35714

Equipment

Base System: 12 seer non-heatpump w/electric heat
 Cooling: Goodman Mfg. Janitrol, GMC, Franklin CKJ42-1D
 Heating: Elec strip

Investment 1: 15 seer heatpump w/var speed blower
 Heat pump: Amana TempAssure Ultra RHF42A2A
 Backup: Elec strip

Investment 2: 15 seer heatpump 3ton w/variable speed blower
 Heat pump: Amana TempAssure Ultra RHF36A2A
 Backup: Elec strip

Investment 3: Heat pump: Amana TempAssure II RHE60A2*
 Backup: Elec strip

Equipment Specifications

	Base System	Investment 1	Investment 2	Investment 3
System type	AC	ASHP	ASHP	ASHP
Clg Capacity (Btuh)	40500	41500	36400	58000
Htg Capacity (Btuh)	0	54585	54585	54585
Clg Efficiency	12 SEER	15 SEER	15 SEER	13.1 SEER
Htg Efficiency	100 EFF	8.5 HSPF	8.5 HSPF	7.8 HSPF
BU Efficiency		100 EFF	100 EFF	100 EFF
DWH Efficiency				

Fuel Unit Costs

		0.10 \$/kWh	0.10 \$/kWh	0.10 \$/kWh	0.10 \$/kWh
Cooling	Unit cost:	0.10 \$/kWh	0.10 \$/kWh	0.10 \$/kWh	0.10 \$/kWh
	Escalation:	0.00 %	0.00 %	0.00 %	0.00 %
Heating	Unit cost:		0.08 \$/kWh	0.08 \$/kWh	0.08 \$/kWh
	Escalation:		0.00 %	0.00 %	0.00 %
Backup	Unit cost:				
	Escalation:				
HotWater	Unit cost:				
	Escalation:				



Operating Cost Summary
Entire House
Rick's Heating & AC

Job: Sample2 Customer
 Date: 6/15/03
 By: rick

Box 204433, Austin, TX 78720 Phone: 512-258-4748 Email: austinTEXASrick@yahoo.com Web: www.ricksair.com

Project Information

For: Sample2 customer
 Fitzhugh, Austin, TX

Notes: Quality Service saves you \$\$\$

System Annual Fuel Cost Comparison

	Base System	Investment 1	Investment 2	Investment 3
System Name:	AC	ASHP	ASHP	ASHP
Cooling \$:	797.37	656.24	650.85	749.19
Heating \$:	1757.56	587.85	573.01	620.41
Hot Water \$:	0.00	0.00	0.00	0.00
Total \$:	2554.93	1244.09	1223.86	1369.61

Long-term Operating Cost Comparison

REFERENCE

	Cost	Savings	Cost	Savings	Cost	Savings	Cost	Savings
Year 1 \$:	2555	0	1244	1311	1224	1331	1370	1185
Year 2 \$:	5110	0	2488	2622	2448	2662	2739	2371
Year 3 \$:	7665	0	3732	3933	3672	3993	4109	3556
Year 4 \$:	10220	0	4976	5243	4895	5324	5478	4741
Year 5 \$:	12775	0	6220	6554	6119	6655	6848	5927
Year 10 \$:	25549	0	12441	13108	12239	13311	13696	11853
Payback: yrs	0.0		0.8		0.5		1.1	
ROI: %	0.0		29.3		34.2		24.7	
Savings: \$/mo	0.00		109.24		110.92		98.78	

Note: Actual costs and savings may differ due to weather, operating conditions, maintenance, and construction.

Financing

		Base System	Investment 1	Investment 2	Investment 3
Total cost	\$:	4000.00	5000.00	4700.00	5300.00
Down payment	\$:	0.00	0.00	0.00	0.00
Amount financed	\$:	0.00	0.00	0.00	0.00
Interest	%:	0.0	0.0	0.0	0.0
Term	mo:	0.0	0.0	0.0	0.0
Monthly payment	\$:	0.00	0.00	0.00	0.00

Operating Costs

Sys	Yr	Cooling Electr.	Cl g Fan El ectr.	Heating Fuel	Htg BU Fuel	Htg Fan Electr.	Hot Water	Maint. Cost	Intrst Cost	Total Cost
B	1	694	104	1709	0	48	0	0	0	2555
A	2	1387	208	3419	0	97	0	0	0	5110
S	3	2081	311	5128	0	145	0	0	0	7665
E	4	2774	415	6837	0	193	0	0	0	10220
	5	3468	519	8546	0	242	0	0	0	12775
S	6	4162	623	10256	0	290	0	0	0	15330
Y	7	4855	726	11965	0	338	0	0	0	17885
S	8	5549	830	13674	0	386	0	0	0	20439
.	10	6936	1038	17093	0	483	0	0	0	25549
I	1	552	104	407	102	79	0	0	0	1244
N	2	1105	208	813	203	159	0	0	0	2488
V	3	1657	311	1220	305	238	0	0	0	3732
E	4	2210	415	1627	407	318	0	0	0	4976
S	5	2762	519	2034	508	397	0	0	0	6220
T	6	3315	623	2440	610	477	0	0	0	7465
.	7	3867	727	2847	712	556	0	0	0	8709
	8	4420	830	3254	814	636	0	0	0	9953
1	10	5524	1038	4067	1017	795	0	0	0	12441
I	1	548	103	402	99	72	0	0	0	1224
N	2	1095	207	804	197	145	0	0	0	2448
V	3	1643	310	1206	296	217	0	0	0	3672
E	4	2190	413	1607	395	290	0	0	0	4895
S	5	2738	516	2009	493	362	0	0	0	6119
T	6	3286	620	2411	592	435	0	0	0	7343
.	7	3833	723	2813	691	507	0	0	0	8567
	8	4381	826	3215	789	580	0	0	0	9791
2	10	5476	1033	4019	987	725	0	0	0	12239
I	1	644	105	534	8	79	0	0	0	1370
N	2	1289	210	1067	15	158	0	0	0	2739
V	3	1933	314	1601	23	237	0	0	0	4109
E	4	2577	419	2135	30	317	0	0	0	5478
S	5	3222	524	2668	38	396	0	0	0	6848
T	6	3866	629	3202	46	475	0	0	0	8218
.	7	4511	734	3735	53	554	0	0	0	9587
	8	5155	839	4269	61	633	0	0	0	10957
3	10	6444	1048	5336	76	792	0	0	0	13696



Duct System Summary

Entire House

Rick's Heating & AC

Job: Sample2 Customer
 Date: 6/15/03
 By: rick

Box 204433, Austin, TX 78720 Phone: 512-258-4748 Email: austintexasrick@yahoo.com Web: www.ricksair.com

Project Information

For: Sample2 customer
 Fitzhugh, Austin, TX

	Heating	Cooling
External static pressure	0.80 in H2O	0.80 in H2O
Pressure losses	0.41 in H2O	0.41 in H2O
Available static pressure	0.39 in H2O	0.39 in H2O
Supply / return available pressure	0.19 / 0.19 in H2O	0.19 / 0.19 in H2O
Lowest friction rate	0.132 in/100ft	0.132 in/100ft
Actual air flow	1350 cfm	1350 cfm
Total effective length (TEL)	296 ft	

Supply Branch Detail Table

Name	Design (Btuh)	Htg (cfm)	Clg (cfm)	Design FR	Diam (in)	Rect Size (in)	Duct Matl	Actual Ln (ft)	Ftg.Eqv Ln (ft)	Trunk	
Livingrm-A	c	5472	219	267	0.236	8	0x0	VIFx	35.4	130.0	st2
Livingrm	c	5472	219	267	0.236	8	0x0	VIFx	35.4	130.0	st2
Bedrm3/office-A	c	4218	84	206	0.233	7	0x0	VIFx	37.2	130.0	st2
Bedrm2/exerrm	h	5763	155	121	0.221	7	0x0	VIFx	46.7	130.0	st2
Hall	h	4039	109	89	0.252	6	0x0	VIFx	24.9	130.0	st1
Hall-A	h	4039	109	89	0.132	7	0x0	VIFx	35.8	260.0	st2
bath2	c	166	3	8	0.249	4	0x0	VIFx	26.4	130.0	st1
MasterBdrm	h	7202	194	149	0.238	7	0x0	VIFx	33.8	130.0	st1
Masterbath	h	2281	61	46	0.259	5	0x0	VIFx	20.7	130.0	st1
Dining	c	1353	61	66	0.269	5	0x0	VIFx	15.1	130.0	st1
util/pantry	c	2914	127	142	0.278	6	0x0	VIFx	10.3	130.0	st1
kitchen	c	351	8	17	0.269	4	0x0	VIFx	15.1	130.0	st1

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	Rect Duct Size (in)	Duct Material	Trunk
st1	Peak AVF	564	518	0.238	718	12	0 x 0	VinIFlx	
st2	Peak AVF	786	951	0.132	889	14	0 x 0	VinIFlx	

Bold/italic values have been manually overridden



Project Summary
Entire House
Rick's Heating & AC

Job: Sample2 Customer
 Date: 6/15/03
 By: rick

Box 204433, Austin, TX 78720 Phone: 512-258-4748 Email: austintexasrick@yahoo.com Web: www.ricksair.com

Project Information

For: Sample2 customer
 Fitzhugh, Austin, TX

Notes: Quality Service saves you \$\$\$

Design Information

Weather: Austin, TX, US

Winter Design Conditions

Outside db 25 °F
 Inside db 70 °F
 Design TD 45 °F

Summer Design Conditions

Outside db 98 °F
 Inside db 75 °F
 Design TD 23 °F
 Daily range M
 Relative humidity 50 %
 Moisture difference 25 gr/lb

Heating Summary

Building heat loss 50102 Btuh
 Ventilation air 93 cfm
 Ventilation air loss 4483 Btuh
 Design heat load 54585 Btuh

Infiltration

Method Simplified
 Construction quality Tight
 Fireplaces 1 (Average)

	Heating	Cooling
Area (ft²)	2611	2611
Volume (ft³)	37046	37046
Air changes/hour	0.40	0.20
Equiv. AVF (cfm)	247	123

Heating Equipment Summary

Make n/a
 Trade
 Model n/a

Efficiency 100 EFF
 Heating input 0 Btuh
 Heating output 54585 Btuh
 Temperature rise 38 °F
 Actual air flow 1350 cfm
 Air flow factor 0.027 cfm/Btuh
 Static pressure 0.80 in H2O
 Space thermostat

Sensible Cooling Equipment Load Sizing

Structure 27637 Btuh
 Ventilation 2321 Btuh
 Design temperature swing 3.0 °F
 Use mfg. data n
 Rate/swing multiplier 1.03
 Total sens. equip. load 30946 Btuh

Latent Cooling Equipment Load Sizing

Internal gains 800 Btuh
 Ventilation 1531 Btuh
 Infiltration 2042 Btuh
 Total latent equip. load 4768 Btuh

Total equipment load 35714 Btuh
 Req. total capacity at 0.70 SHR 3.7 ton

Cooling Equipment Summary

Make Goodman Mfg.
 Trade Janitrol, GMC, Franklin
 Cond CKJ42-1D
 Coil AR49-1

Efficiency 12 SEER
 Sensible cooling 28350 Btuh
 Latent cooling 12150 Btuh
 Total cooling 40500 Btuh
 Actual air flow 1350 cfm
 Air flow factor 0.049 cfm/Btuh
 Static pressure 0.80 in H2O
 Load sensible heat ratio 86 %

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Short Form
Entire House
Rick's Heating & AC

Job: Sample2 Customer
 Date: 6/15/03
 By: rick

Box 204433, Austin, TX 78720 Phone: 512-258-4748 Email: austintexasrick@yahoo.com Web: www.ricksair.com

Project Information

For: Sample2 customer
 Fitzhugh, Austin, TX

Design Information

	Htg	Clg	Method	Infiltration
Outside db (°F)	25	98		Simplified
Inside db (°F)	70	75	Construction quality	Tight
Design TD (°F)	45	23	Fireplaces	1 (Average)
Daily range	-	M		
Inside humidity (%)	-	50		
Moisture difference (gr/lb)	-	25		

HEATING EQUIPMENT

Make n/a
 Trade
 Model n/a

Efficiency 100 EFF
 Heating input 0 Btuh
 Heating output 54585 Btuh
 Temperature rise 38 °F
 Actual air flow 1350 cfm
 Air flow factor 0.027 cfm/Btuh
 Static pressure 0.80 in H2O
 Space thermostat

COOLING EQUIPMENT

Make Goodman Mfg.
 Trade Janitrol, GMC, Franklin
 Cond CKJ42-1D
 Coil AR49-1

Efficiency 12 SEER
 Sensible cooling 28350 Btuh
 Latent cooling 12150 Btuh
 Total cooling 40500 Btuh
 Actual air flow 1350 cfm
 Air flow factor 0.049 cfm/Btuh
 Static pressure 0.80 in H2O
 Load sensible heat ratio 86 %

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Eastsidezone	882	25142	17633	677	861
(Rest of House)	1729	24961	12427	673	607
Entire House	2611	50102	27637	1350	1350
Ventilation air		4483	2321		
Equip. @ 1.03 RSM			30946		
Latent cooling			4768		
TOTALS	2611	54585	35714	1350	1350

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