

Bertie Heating and Air Conditioning

1730 NE 23rd Ave, Gainesville, FL 32609 Phone: 352-331-2005 Email: ryanj@bertieair.com Web: www.bertieair.com License: CAC058522

Project Information

For: T. Adams Residence, Southtrust Construction
Gainesville, FL

Design Information

	Htg	Clg	Infiltration	
Outside db (°F)	33	92	Method	Simplified
Inside db (°F)	70	75	Construction quality	Semi-tight
Design TD (°F)	37	17	Fireplaces	0
Daily range	-	M		
Inside humidity (%)	50	50		
Moisture difference (gr/lb)	32	47		

HEATING EQUIPMENT

Make Trane
Trade TRANE
Model 4TWR5042H1
AHRI ref 9924469

Efficiency 8.75 HSPF
Heating input
Heating output 38500 Btuh @ 47°F
Temperature rise 29 °F
Actual air flow 1225 cfm
Air flow factor 0.040 cfm/Btuh
Static pressure 0.50 in H2O
Space thermostat
Capacity balance point = 31 °F

Backup:
Input = 10 kW, Output = 33508 Btuh, 100 AFUE

COOLING EQUIPMENT

Make Trane
Trade TRANE
Cond 4TWR5042H1
Coil TEM6A0C42H41++TDR
AHRI ref 9924469

Efficiency 12.5 EER, 15 SEER
Sensible cooling 29520 Btuh
Latent cooling 11480 Btuh
Total cooling 41000 Btuh
Actual air flow 1225 cfm
Air flow factor 0.042 cfm/Btuh
Static pressure 0.50 in H2O
Load sensible heat ratio 0.80

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Toilet	22	1155	351	46	15
M Bath	151	3011	1353	120	57
WIC 2	39	306	177	12	7
WIC	42	883	306	35	13
Laundry	56	603	996	24	42
Entry	49	561	458	22	19
M Bed	232	3967	5279	158	223
Dining Room	94	3532	3616	141	153
Kitchen	225	656	2191	26	93
Pantry	44	1023	389	41	16
Office	139	2397	1791	96	76
Foyer	55	1409	954	56	40
Great Room	311	2617	5345	104	226
Bed 2	139	2402	1798	96	76

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

WIC 3	36	1528	475	61	20
Bath	56	815	356	33	15
Hall	26	0	0	0	0
Bed 3	156	3833	3178	153	134
Entire House	1871	30697	29013	1225	1225
Other equip loads		3678	1699		
Equip. @ 0.97 RSM			29760		
Latent cooling			7568		
TOTALS	1871	34376	37328	1225	1225

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Notes:

Design Information

Weather: Gainesville Rgnl, FL, US

Winter Design Conditions

Outside db	33 °F
Inside db	70 °F
Design TD	37 °F

Summer Design Conditions

Outside db	92 °F
Inside db	75 °F
Design TD	17 °F
Daily range	M
Relative humidity	50 %
Moisture difference	47 gr/lb

Heating Summary

Structure	23328 Btuh
Ducts	7369 Btuh
Central vent (92 cfm)	3678 Btuh
Outside air	
Humidification	0 Btuh
Piping	0 Btuh
Equipment load	34376 Btuh

Sensible Cooling Equipment Load Sizing

Structure	21071 Btuh
Ducts	7942 Btuh
Central vent (92 cfm)	1699 Btuh
Outside air	
Blower	0 Btuh
Use manufacturer's data	n
Rate/swing multiplier	0.97
Equipment sensible load	29760 Btuh

Infiltration

Method	Simplified
Construction quality	Semi-tight
Fireplaces	0

Latent Cooling Equipment Load Sizing

Structure	3167 Btuh
Ducts	1487 Btuh
Central vent (92 cfm)	2915 Btuh
Outside air	
Equipment latent load	7568 Btuh

	Heating	Cooling
Area (ft²)	1871	1871
Volume (ft³)	18467	18467
Air changes/hour	0.26	0.14
Equiv. AVF (cfm)	80	43

Equipment Total Load (Sen+Lat)	37328 Btuh
Req. total capacity at 0.72 SHR	3.4 ton

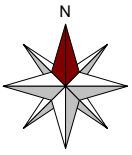
Heating Equipment Summary

Make	Trane
Trade	TRANE
Model	4TWR5042H1
AHRI ref	9924469
Efficiency	8.75 HSPF
Heating input	
Heating output	38500 Btuh @ 47°F
Temperature rise	29 °F
Actual air flow	1225 cfm
Air flow factor	0.040 cfm/Btuh
Static pressure	0.50 in H2O
Space thermostat	
Capacity balance point = 31 °F	
Backup:	
Input = 10 kW, Output = 33508 Btuh, 100 AFUE	

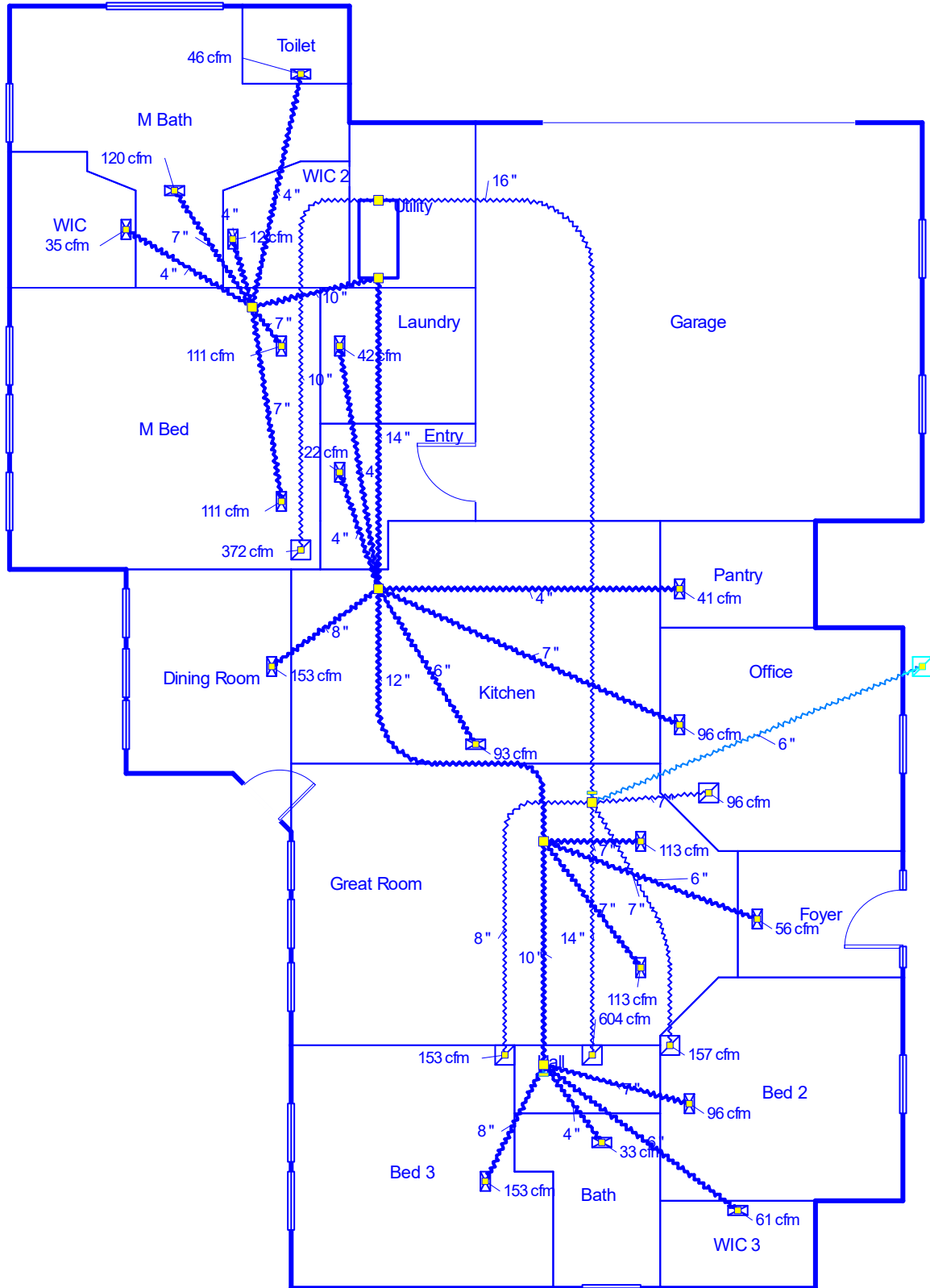
Cooling Equipment Summary

Make	Trane
Trade	TRANE
Cond	4TWR5042H1
Coil	TEM6A0C42H41++TDR
AHRI ref	9924469
Efficiency	12.5 EER, 15 SEER
Sensible cooling	29520 Btuh
Latent cooling	11480 Btuh
Total cooling	41000 Btuh
Actual air flow	1225 cfm
Air flow factor	0.042 cfm/Btuh
Static pressure	0.50 in H2O
Load sensible heat ratio	0.80

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.



Level 1



Job #:
Performed by Ryan Johnston for:
T. Adams Residence
Gainesville, FL

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Project Information

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Cooling Equipment

Design Conditions

Outdoor design DB:	91.9°F	Sensible gain:	30712	Btuh	Entering coil DB:	78.2°F
Outdoor design WB:	76.2°F	Latent gain:	7568	Btuh	Entering coil WB:	64.6°F
Indoor design DB:	75.0°F	Total gain:	38280	Btuh		
Indoor RH:	50%	Estimated airflow:	1225	cfm		

Manufacturer's Performance Data at Actual Design Conditions

Equipment type:	Split ASHP				
Manufacturer:	Trane	Model:	4TWR5042H1+TEM6A0C42H41++TDR		
Actual airflow:	1225	cfm			
Sensible capacity:	33040	Btuh	108%	of load	
Latent capacity:	6915	Btuh	91%	of load	
Total capacity:	39955	Btuh	104%	of load	SHR: 83%

Heating Equipment

Design Conditions

Outdoor design DB:	33.4°F	Heat loss:	34376	Btuh	Entering coil DB:	65.9°F
Indoor design DB:	70.0°F					

Manufacturer's Performance Data at Actual Design Conditions

Equipment type:	Split ASHP				
Manufacturer:	Trane	Model:	4TWR5042H1+TEM6A0C42H41++TDR		
Actual airflow:	1225	cfm			
Output capacity:	29672	Btuh	86%	of load	Capacity balance: 31 °F
Supplemental heat required:	4704	Btuh			Economic balance: -99 °F

Backup equipment type:	Elec strip				
Manufacturer:		Model:			
Actual airflow:	1225	cfm			
Output capacity:	9.8	kW	97%	of load	Temp. rise: 50 °F

Meets all requirements of ACCA Manual S.

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	Heating	Cooling
External static pressure	0.50 in H ₂ O	0.50 in H ₂ O
Pressure losses	0.22 in H ₂ O	0.22 in H ₂ O
Available static pressure	0.28 in H ₂ O	0.28 in H ₂ O
Supply / return available pressure	0.169 / 0.111 in H ₂ O	0.169 / 0.111 in H ₂ O
Lowest friction rate	0.074 in/100ft	0.074 in/100ft
Actual air flow	1225 cfm	1225 cfm
Total effective length (TEL)	376 ft	

Supply Branch Detail Table

Name	Design (Btuh)	Htg (cfm)	Clg (cfm)	Design FR	Diam (in)	H x W (in)	Duct Matl	Actual Ln (ft)	Ftg.Eqv Ln (ft)	Trunk
Bath	h 815	33	15	0.077	4.0	0x0	VIFx	53.9	165.0	st4
Bed 2	h 2402	96	76	0.076	7.0	0x0	VIFx	56.7	165.0	st4
Bed 3	h 3833	153	134	0.076	8.0	0x0	VIFx	55.6	165.0	st4
Dining Room	c 3616	141	153	0.122	8.0	0x0	VIFx	22.8	115.0	st1
Entry	h 561	22	19	0.123	4.0	0x0	VIFx	22.3	115.0	st1
Foyer	h 1409	56	40	0.087	6.0	0x0	VIFx	49.1	145.0	st3
Great Room	c 2672	52	113	0.088	7.0	0x0	VIFx	45.6	145.0	st3
Great Room-A	c 2672	52	113	0.090	7.0	0x0	VIFx	42.4	145.0	st3
Kitchen	c 2191	26	93	0.120	6.0	0x0	VIFx	25.4	115.0	st1
Laundry	c 996	24	42	0.117	4.0	0x0	VIFx	28.7	115.0	st1
M Bath	h 3011	120	57	0.131	7.0	0x0	VIFx	13.9	115.0	st2
M Bed	c 2639	79	111	0.128	7.0	0x0	VIFx	16.8	115.0	st2
M Bed-A	c 2639	79	111	0.136	7.0	0x0	VIFx	9.2	115.0	st2
Office	h 2397	96	76	0.114	7.0	0x0	VIFx	33.0	115.0	st1
Pantry	h 1023	41	16	0.115	4.0	0x0	VIFx	31.5	115.0	st1
Toilet	h 1155	46	15	0.126	4.0	0x0	VIFx	18.9	115.0	st2
WIC	h 883	35	13	0.130	4.0	0x0	VIFx	14.3	115.0	st2
WIC 2	h 306	12	7	0.135	4.0	0x0	VIFx	10.3	115.0	st2
WIC 3	h 1528	61	20	0.074	6.0	0x0	VIFx	61.4	165.0	st4

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
st4	Peak AVF	342	245	0.074	628	10.0	0 x 0	VinIFlx	st3 st1
st3	Peak AVF	503	511	0.074	651	12.0	0 x 0	VinIFlx	
st1	Peak AVF	853	910	0.074	851	14.0	0 x 0	VinIFlx	
st2	Peak AVF	372	315	0.126	682	10.0	0 x 0	VinIFlx	

Return Branch Detail Table

Name	Grille Size (in)	Htg (cfm)	Clg (cfm)	TEL (ft)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Stud/Joist Opening (in)	Duct Matl	Trunk
rb2	0x 0	153	134	149.5	0.074	438	8.0	0x 0		VIFx	rt1
rb3	0x 0	157	96	145.6	0.076	587	7.0	0x 0		VIFx	rt1
rb1	0x 0	448	604	140.0	0.080	565	14.0	0x 0		VIFx	rt1
rb5	0x 0	96	76	133.0	0.084	358	7.0	0x 0		VIFx	rt1
rb4	0x 0	372	315	87.0	0.128	682	10.0	0x 0		VIFx	

Return Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
rt1	Peak AVF	853	910	0.074	652	16.0	0 x 0	VinIFlx	