

Project1



Building Owner:

Location:

Created by:

File name: Project1.mdfz

Simulated by: TRACE 3D Plus 6.10.289

System Component Selection Summary

Primary

System Name: VAV PTHP

System Type: Variable Air Volume (VAV)
 Number of Zones: 1
 Number of Rooms: 5

Component	Quantity
Cooling Coils	1
Heating Coils	2
Fans	1

Cooling Coils

Coil Location			Coil Selection at Design					Airflow Conditions at Design				Water Flow Conditions						
System	Zone	Type	Sizing Method	Time of Peak Mo/D/Hr	Total capacity (tons)	Sensible capacity (MBh)	Vent Load (MBh)	Ov/undr sizing (MBh)	Airflow (cfm)	Vent (cfm)	Enter DB/WB (°F)	Leave DB/WB (°F)	Enter DB/WB (°F)	Leave DB/WB (°F)	Flow (gpm)	Enter Temp (°F)	Leave Temp (°F)	
	PTHP-1 Zone -01-00	DX	Peak		0.7	8.3	5.4	0.0	N/A	189	0	75.7	63.52	48.0	47.34	N/A	N/A	N/A

*Values do not include effects of plenum loads, heat exchangers such as evaporative cooling devices and similar components.

Heating Coils

Coil Location			Coil Selection at Design					Airflow Conditions at Design				Water Flow Conditions		
System	Zone	Type	Sizing Method	Time of Peak Mo/D/Hr	Total capacity (MBh)	Vent Load (MBh)	Ov/undr sizing (MBh)	Airflow (cfm)	Vent (cfm)	Enter DB (°F)	Leave DB (°F)	Flow (gpm)	Enter Temp (°F)	Leave Temp (°F)
	PTHP-1 Zone -01-00	DX	Peak	1/21 19:00	8.1	0.0	N/A	189	0	72.0	114.3	N/A	N/A	N/A
	PTHP-1 Zone -01-00	Electric	Peak	1/21 19:00	4.4	0.0	N/A	189	0	72.0	95.0	N/A	N/A	N/A

Load/Airflows

Location			Cooling					Heating					
System	Zone	Room	Area (ft ²)	Time of Peak Mo/D/Hr	Supply Airflow (cfm)	Sensible Load (Btu/h)	Minimum Airflow (cfm)	SAT (°F)	Time of Peak Mo/D/Hr	Supply Airflow (cfm)	Sensible Load (Btu/h)	Minimum Airflow (cfm)	SAT (°F)
VAV PTHP			966	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Zone -01-00		966	7/21 20:00	189	3,073	N/A	48.0	1/21 19:00	189	4,393	N/A	111.0
		BEDROOM 1 - 101	132	7/21 20:00	26	485	N/A	48.0	1/21 19:00	26	612	N/A	106.4
		BEDROOM 2 - 102	132	7/21 20:00	26	485	N/A	48.0	1/21 19:00	26	612	N/A	106.4
		BEDROOM 3 - 103	132	7/21 20:00	26	481	N/A	48.0	1/21 19:00	26	614	N/A	106.9
		MAIN ROOM - 100	495	7/21 20:00	93	1,258	N/A	48.0	1/21 19:00	93	2,175	N/A	119.1
		RESTROOM - 104	75	7/21 20:00	16	365	N/A	48.0	1/21 19:00	16	370	N/A	99.7

Fans

System	Zone	Type	Efficiency		Static Pressure (in. Wg)	Flow Rate (cfm)	Power (kW)	Power with PRM Fan	
			with PRM (%)	Fan Override (%)				Override (kW)	Motor Heat in Air (%)
	Zone -01-00_PTHP-1_SUPPLY FAN	Zone	5.00	N/A	0.10	189	.04	N/A	100.00

Outside Air / ASHRAE Standard 62.1 Summary

System Ventilation Requirements

System	Mode	ΣV_{pz} (cfm)	P_s People	ΣP_z People	D $P_s / \Sigma P_z$	V_{ou} (cfm)	V_{ps} (cfm)	X_s	E_v	V_{ot} (cfm)	%OA V_{ot} / V_{ps}
None	Cooling	0	0	0	0	0	0	0	0	0	0.0%
	Heating	0	0	0	0	0	0	0	0	0	0.0%

Ventilation Parameters

System Zone	R_p cfm/person	P_z People	R_a cfm/ft ²	A_z (ft ²)	V_{bz} (cfm)	Cooling		Heating	
						E_z	V_{oz} (cfm)	E_z	V_{oz} (cfm)
None	0.00	N/A	0.00	0	0		0		0
		N/A							

Ventilation Calculations for Cooling Design

System Zone	Box Type	V_{pz} (cfm)	V_{dz} (cfm)	V_{pz-min} (cfm)	V_{oz-clg} (cfm)	Z_{pz}	E_p	E_r	F_a	F_b	F_c	E_vz
None		0	0	0	0							

Ventilation Calculations for Heating Design

System Zone	Box Type	V_{pz} (cfm)	V_{dz} (cfm)	V_{pz-min} (cfm)	V_{oz-htg} (cfm)	Z_{pz}	E_p	E_r	F_a	F_b	F_c	E_vz
None		0	0	0	0							

Single-Zone System Calculations

Zone Room	Rp cfm/person	Pz People	Ra cfm/ft ²	Az (ft ²)	Vbz (cfm)	Cooling		Heating	
						Ez	Voz (cfm)	Ez	Voz (cfm)

Sum of Outdoor Air Calculations

System Zone Room	Supply (cfm)	Outdoor (cfm)	Outdoor (%)
VAV PTHP	N/A	N/A	N/A
Zone -01-00	189	0	0.00%
BEDROOM 1 - 101	26	0	N/A
BEDROOM 2 - 102	26	0	N/A
BEDROOM 3 - 103	26	0	N/A
MAIN ROOM - 100	93	0	N/A
RESTROOM - 104	16	0	N/A

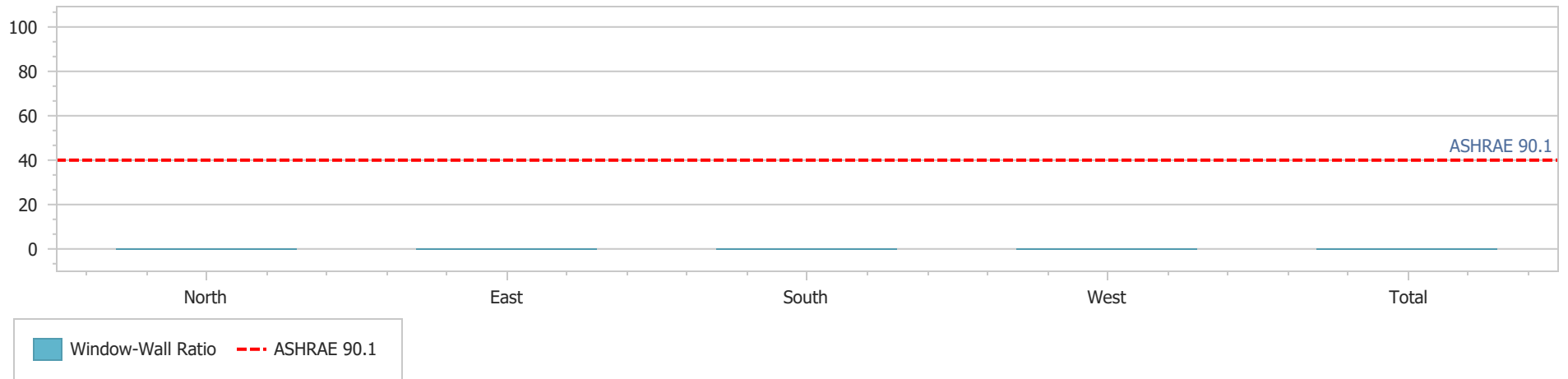
Plant Summary

This alternative does not include any cooling, heating, or VRF plants.

System Cooling Checksums

System Checksums report is not available for this alternative because its system(s) are zone level or there is no coil.

Envelope Summary



	North	East	South	West	Total
Gross Window-Wall Ratio	0	0	0	0	0

Ratios

	Units	North	East	South	West	Total
Above Ground Wall Area	ft ²	0	0	0	0	0
Above Ground Window-Wall Ratio	%	0	0	0	0	0
Gross Wall Area	ft ²	400	171	400	171	1,142
Gross Window-Wall Ratio	%	0	0	0	0	0
Window Opening Area	ft ²	0	0	0	0	0
Gross Roof Area	ft ²	0	0	0	0	1,070
Skylight Area	ft ²	0	0	0	0	0
Skylight-Roof Ratio	%	0	0	0	0	0

Opaque Exterior

	Construction	Exterior Reflectance	Gross Area (ft ²)	U-Factor With Film (BTU/h--ft ² --°F)	U-Factor No Film (BTU/h--ft ² --°F)	Azimuth	Tilt	Cardinal Direction
Roof 00-00	90.1-13 Min Roof Attic And Other Zone 8	0.3	149	0.017	0.017	180°	0°	

Alternative: Primary

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Opaque Exterior

	Construction	Exterior Reflectance	Gross Area (ft²)	U-Factor With Film (BTU/h--ft²--°F)	U-Factor No Film (BTU/h--ft²--°F)	Azimuth	Tilt	Cardinal Direction
Roof 01-01	90.1-13 Min Roof Attic And Other Zone 8	0.3	149	0.017	0.017	180°	0 °	
Roof 02-02	90.1-13 Min Roof Attic And Other Zone 8	0.3	89	0.017	0.017	180°	0 °	
Roof 03-03	90.1-13 Min Roof Attic And Other Zone 8	0.3	149	0.017	0.017	180°	0 °	
Roof 04-04	90.1-13 Min Roof Attic And Other Zone 8	0.3	535	0.017	0.017	180°	0 °	
SLAB 00_0	4 In. Hw Concrete	0.3	149	0.249	0.323		180 °	
SLAB 01_0	4 In. Hw Concrete	0.3	149	0.249	0.323		180 °	
SLAB 02_0	4 In. Hw Concrete	0.3	89	0.249	0.323		180 °	
SLAB 03_0	4 In. Hw Concrete	0.3	149	0.249	0.323		180 °	
SLAB 04_0	4 In. Hw Concrete	0.3	535	0.249	0.323		180 °	
WALL 02-BEDROOM 1 - 101_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	111	0.078	0.082	0°	90 °	N
WALL 03-BEDROOM 1 - 101_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	86	0.078	0.082	270°	90 °	W
WALL 05-BEDROOM 2 - 102_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	111	0.078	0.082	180°	90 °	S
WALL 07-BEDROOM 2 - 102_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	86	0.078	0.082	270°	90 °	W
WALL 08-RESTROOM - 104_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	111	0.078	0.082	180°	90 °	S
WALL 09-RESTROOM - 104_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	51	0.078	0.082	90°	90 °	E
WALL 13-BEDROOM 3 - 103_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	86	0.078	0.082	90°	90 °	E
WALL 14-BEDROOM 3 - 103_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	111	0.078	0.082	0°	90 °	N
WALL 21-MAIN ROOM - 100_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	177	0.078	0.082	180°	90 °	S
WALL 22-MAIN ROOM - 100_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	34	0.078	0.082	90°	90 °	E
WALL 23-MAIN ROOM - 100_-8	4 In. Lw Concrete, R-10 Board, 4 In. Lw Concrete	0.3	177	0.078	0.082	0°	90 °	N

Opaque Exterior Door

	Construction	U-Factor With Film (BTU/h--ft²--°F)	U-Factor No Film (BTU/h--ft²--°F)	Gross Area (ft²)	Parent Surface

Alternative: Primary

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None		0	0	0	
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Fenestration

	Construction	Area of One Opening (ft²)	Area of Openings (ft²)	U-Factor (BTU/h--ft²--°F)	SHGC	Visible Transmittance	Shade Control	Parent Surface	Azimuth	Cardinal Direction
Total or Average		0	0	0	0	0			0°	
North Total or Average		0	0	0	0	0			0°	
Non-North Total or Average		0	0	0	0	0			0°	

Sunlit Fraction

* Sunlit Fraction is available for calculation timesteps of 15 minutes or less.

	March 21 9am	March 21 Noon	March 21 3pm	June 21 9am	June 21 Noon	June 21 3pm	December 21 9am	December 21 Noon	December 21 3pm
None	0	0	0	0	0	0	0	0	0

Window Controls

	Control Name	Type	Shaded	Control	Glare Control
None					

Load/Airflow Report

Primary

System Name: VAV PTHP

Location			Cooling						Heating			Percent OA			
System	Zone	Room	Area (ft ²)	People	Time of Peak Mo/D/Hr	Supply Airflow (cfm)	Sensible Load (Btu/h)	Minimum Airflow ACH	Minimum Airflow (cfm)	Minimum Airflow %	Time of Peak Mo/D/Hr	Supply Airflow (cfm)	Sensible Load (Btu/h)	Clg %	Htg %
VAV PTHP			966	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Zone -01-00		966	5.00	7/21 20:00	189	3,073	1.46	N/A	N/A	1/21 19:00	189	4,393	0	0
		BEDROOM 1 - 101	132	1.00	7/21 20:00	26	485	1.49	N/A	N/A	1/21 19:00	26	612	0	0
		BEDROOM 2 - 102	132	1.00	7/21 20:00	26	485	1.49	N/A	N/A	1/21 19:00	26	612	0	0
		BEDROOM 3 - 103	132	1.00	7/21 20:00	26	481	1.50	N/A	N/A	1/21 19:00	26	614	0	0
		MAIN ROOM - 100	495	1.00	7/21 20:00	93	1,258	1.42	N/A	N/A	1/21 19:00	93	2,175	0	0
		RESTROOM - 104	75	1.00	7/21 20:00	16	365	1.58	N/A	N/A	1/21 19:00	16	370	0	0

Zone Summary

Zone Summary										
	Area (ft ²)	Conditioned	Volume (ft ³)	Gross Wall Area (ft ²)	Window Glass (ft ²)	People Density (ft ² /person)	Lighting (W/ft ²)	Plug and Process (W/ft ²)	Lighting (W/ft ²)	Plug and Process (W/ft ²)
									Min	Max
Zone -01-00	966	Yes	7,728	0	0	193.23	1.1	0.26	0	1.36
Conditioned Total	966		7,728	0	0	193.23	1.1	0.26	0	1.36
Not Part of Total	0		0	0	0	0	0	0	0	1.36
Total	966		7,728	0	0	193.23	1.1	0.26	0	1.36
Unconditioned Total	0		0	0	0	0	0	0	0	1.36

Design Day: Zone Cooling (1%) and Heating (99%)										
		Calculated Design Sensible Load	User Design Sensible Load	Calculated Design Air Flow (cfm)	User Design Air Flow (cfm)	Date of Peak	External Temperature at Peak (°F)	Humidity Ratio at Peak (gr/lb)	Calculated Cooling Load (tons)	Calculated Heating Load (Mbh)
									Min	Max
Zone -01-00	Cooling	0.3 tons	0.3 tons	111	111	7/21 20:00	77.4	102.9	0	0.3
	Heating	4.4 Mbh	4.4 Mbh	111	111	1/21 19:00	10.3	5.5	0	4.4

Peak Load Summary Report

Primary

System Name: VAV PTHP

Location			Cooling								Heating								
System	Zone	Room	Time of Peak (Mo/D/Hr)	OA Conditions		Room Dry Bulb (°F)	Supply Dry Bulb (°F)	Zone Airflow (cfm)	System Supply AirFlow (cfm)	Sensible Load (Btu/h)	Latent Load (Btu/h)	Time of Peak (Mo/D/Hr)	OA Conditions		Room Dry Bulb (°F)	Supply Dry Bulb (°F)	Zone Airflow (cfm)	System Supply Airflow (cfm)	Sensible Load (Btu/h)
				DB (°F)	WB (°F)								DB (°F)	WB (°F)					
VAV PTHP			N/A	N/A	N/A	N/A	N/A	111	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	111	N/A	N/A
	Zone -01-00		7/21 20:00	77.4	69.4	75.0	48.0	111	189	3,073	1,584	1/21 19:00	10.3	7.9	72.0	111.0	111	189	4,393
		BEDROOM 1 - 101	7/21 20:00	77.4	69.4	75.0	48.0	18	26	485	259	1/21 19:00	10.3	7.9	72.0	106.4	18	26	612
		BEDROOM 2 - 102	7/21 20:00	77.4	69.4	75.0	48.0	18	26	485	259	1/21 19:00	10.3	7.9	72.0	106.4	18	26	612
		BEDROOM 3 - 103	7/21 20:00	77.4	69.4	75.0	48.0	17	26	481	258	1/21 19:00	10.3	7.9	72.0	106.9	17	26	614
		MAIN ROOM - 100	7/21 20:00	77.4	69.4	75.0	48.0	45	93	1,258	580	1/21 19:00	10.3	7.9	72.0	119.1	46	93	2,175
		RESTROOM - 104	7/21 20:00	77.4	69.4	75.0	48.0	13	16	365	214	1/21 19:00	10.3	7.9	72.0	99.7	13	16	370

Engineering Checks Report

Primary

System Name: VAV PTHP

Location			Cooling				Heating				
System	Zone	Room	Area (ft ²)	% OA	cfm/ft ²	cfm/ton	ft ² /ton	Btu/h-ft ²	% OA	cfm/ft ²	Btu/h-ft ²
VAV PTHP			966	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Zone -01-00		966	0	0.20	486	2,489	4.82	0	0.20	-4.56
		BEDROOM 1 - 101	132	0	0.20	424	2,130	5.63	0	0.20	-4.65
		BEDROOM 2 - 102	132	0	0.20	424	2,130	5.63	0	0.20	-4.65
		BEDROOM 3 - 103	132	0	0.20	428	2,144	5.60	0	0.20	-4.67
		MAIN ROOM - 100	495	0	0.19	610	3,230	3.72	0	0.19	-4.41
		RESTROOM - 104	75	0	0.21	329	1,560	7.69	0	0.21	-4.94