Project Report

General Project Information

Project Title:	Tyler Model Lot 31
Designed By:	Airzonehvac Inc
Project Date:	11/03/21
Client Name:	Jp Orleans
Company Name:	Airzonehvac Inc

Design Data

Reference City:		Philadelphia Northeast AP, Pennsylvania
Building Orientation:		Front door faces West
Daily Temperature Range:		Medium
Latitude:	40	Degrees
Elevation:	121	ft.
Altitude Factor:	0.996	

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	15	13.77	80%	n/a	70	n/a
Summer:	90	74	48%	50%	75	36

Check Figures

Total Building Supply CFM:	2,000	CFM Per Square ft.:	0.454
Square ft. of Room Area:	4,402	Square ft. Per Ton:	894
Volume (ft³) of Cond. Space:	39,622		

Building Loads

Total Heating Required Including Ventilation Air:	91,154 Btuh	91.154	MBH
Total Sensible Gain:	44,298 Btuh	86	%
Total Latent Gain:	7,473 Btuh	14	%
Total Cooling Required Including Ventilation Air:	51,771 Btuh	4.31	Tons (Based On Sensible + Latent)
		4.92	Tons (Based On 75% 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 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	15	13.77	80%	n/a	70	n/a
Summer:	90	74	48%	50%	75	36.26

System 2 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	15	13.77	80%	n/a	70	n/a
Summer:	90	74	48%	50%	75	36.26

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:	0.527	AC/hr	0.273	AC/hr
	348	CFM	180	CFM
Infiltration Actual:	0.442	AC/hr	0.079	AC/hr
Above Grade Volume:	X 39,622	Cu.ft.	X 39,622	Cu.ft.
	17,499	Cu.ft./hr	3,134	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	292	CFM	52	CFM
Total Building Ventilation:	186	CFM	186	CFM

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 16.43 = (1.10 X 0.996 X 15.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 24.55 = (0.68 X 0.996 X 36.26 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 60.24 = (1.10 X 0.996 X 55.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.370 AC/hr (143 CFM), Construction: Average
Summer Infiltration Specified: 0.190 AC/hr (74 CFM), Construction: Average

---System 2---

Infiltration & Ventilation Sensible Gain Multiplier: 16.43 = (1.10 X 0.996 X 15.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 24.55 = (0.68 X 0.996 X 36.26 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 60.24 = (1.10 X 0.996 X 55.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.750 AC/hr (205 CFM), Construction: Loose
Summer Infiltration Specified: 0.390 AC/hr (107 CFM), Construction: Loose

Duct Load Factor Scenarios for System 1

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Supply		Cond. Space	-	0.16	8	8	No
1	Return		Attic	16B	0.18	8	68	No

Duct Load Factor Scenarios for System 2

No.	Type	Description	Location	Attic Ceiling	Duct Leakage	Duct Insulation	Surface Area	From [T]MDD
1	Supply		Attic	16B	0.16	8	168	No
1	Return		Attic	16B	0.18	8	120	No

Load Preview Report

Scope	Has AED	Net Ton	Rec Ton	ft.²/Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Min Htg CFM	Min Clg CFM	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building		4.31	4.92	894	4,402	44,298	7,473	51,771	91,154	1,043	1,883	1,800	2,000	2,000	
System 1	No	2.14	2.54	1,014	2,579	22,890	2,766	25,657	43,721	497	975	900	1,000	1,000	12x15
Ventilation						1,528	2,283	3,811	5,602						
Duct Latent							83	83							
Zone 1 - Clg.: 94%, Htg.: 85%					1,732	22,653	400	23,053	32,357	422	1,034	764	1,034	1,034	12x15
2-Fisrt Floor					1,732	22,653	400	23,053	32,357	422	1,034	764	1,034	1,034	10--6
Zone 2 - Clg.: 6%, Htg.: 15%					847	1,462	0	1,462	5,761	75	67	136	67	67	4x4
1-Finish Basemant					847	1,462	0	1,462	5,761	75	67	136	67	67	1--5
System 2	Yes	2.18	2.38	766	1,823	21,408	4,706	26,115	47,434	546	908	900	1,000	1,000	12x15
Ventilation						1,528	2,283	3,811	5,602						
Duct Latent							141	141							
Zone 1					1,823	19,880	2,282	22,162	41,832	546	908	900	1,000	1,000	12x15
3-Second Floor					1,823	19,880	2,282	22,162	41,832	546	908	900	1,000	1,000	10--6
Sum of room airflows may be greater than system airflow because															
system has multiple zones.															

Duct Size Preview

Room or Duct Name	Source	Minimum Velocity	Maximum Velocity	Rough. Factor	Design L/100	SP Loss	Duct Velocity	Duct Length	Htg Flow	Clg Flow	Act. Flow	Duct Size
System 1												
Supply Runouts												
Zone 1												
2-Fisrt Floor	Built-In	450	750	0	0.1		526.7		764	1,034	1,034	10--6
Zone 2												
1-Finish Basemant	Built-In	450	750	0	0.1		489.4		136	67	67	1--5
Other Ducts in System 1												
Supply Main Trunk	Built-In	650	900	0	0.1		800		900	1,000	1,000	12x15
System 2												
Supply Runouts												
Zone 1												
3-Second Floor	Built-In	450	750	0	0.1		509.3		900	1,000	1,000	10--6
Other Ducts in System 2												
Supply Main Trunk	Built-In	650	900	0	0.1		800		900	1,000	1,000	12x15

Summary

System 1	
Heating Flow:	900
Cooling Flow:	1000
System 2	
Heating Flow:	900
Cooling Flow:	1000

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0.53, SHGC 0.56	153.7	4,476	0	5,435	5,435
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, u-value 0.53, SHGC 0.56	197.2	5,747	0	9,776	9,776
11J: Door-Metal - Fiberglass Core	27.4	904	0	427	427
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs	3361.2	12,570	0	2,607	2,607
12C-0bw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, brick finish, wood studs	446.2	2,233	0	488	488
16A-15-ml: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), unvented attic, no radiant barrier, R-15 insulation, light metal	1732.2	5,811	0	7,396	7,396
16BR-38-ml: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), unvented attic with radiant barrier, R-38 insulation, light metal	1823.3	2,607	0	2,370	2,370
19A-0cp: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, no floor insulation, carpet or hardwood	3555.5	21,671	0	5,910	5,910
21A-20: 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 20' wide	847	1,258	0	0	0
Subtotals for structure:		57,277	0	34,409	34,409
People:	7		1,400	1,610	3,010
Equipment:			0	2,212	2,212
Lighting:	0			0	0
Ductwork:		5,106	224	1,329	1,553
Infiltration: Winter CFM: 292, Summer CFM: 52		17,567	1,282	858	2,140
Ventilation: Winter CFM: 186, Summer CFM: 186		11,204	4,567	3,056	7,622
AED Excursion:		0	0	825	825
Total Building Load Totals:		91,154	7,473	44,298	51,771

Check Figures

Total Building Supply CFM:	2,000	CFM Per Square ft.:	0.454
Square ft. of Room Area:	4,402	Square ft. Per Ton:	894
Volume (ft³) of Cond. Space:	39,622		

Building Loads

Total Heating Required Including Ventilation Air:	91,154 Btuh	91.154	MBH
Total Sensible Gain:	44,298 Btuh	86	%
Total Latent Gain:	7,473 Btuh	14	%
Total Cooling Required Including Ventilation Air:	51,771 Btuh	4.31	Tons (Based On Sensible + Latent)
		4.92	Tons (Based On 75% 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 1 Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0.53, SHGC 0.56	137	3,990	0	4,844	4,844
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, u-value 0.53, SHGC 0.56	49.7	1,448	0	1,517	1,517
11J: Door-Metal - Fiberglass Core	27.4	904	0	427	427
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs	1083.4	4,051	0	840	840
12C-0bw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, brick finish, wood studs	446.2	2,233	0	488	488
16A-15-ml: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), unvented attic, no radiant barrier, R-15 insulation, light metal	1732.2	5,811	0	7,396	7,396
19A-0cp: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, no floor insulation, carpet or hardwood	1732.2	10,558	0	2,879	2,879
21A-20: 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 20' wide	847	1,258	0	0	0
Subtotals for structure:		30,253	0	18,391	18,391
People:	2		400	460	860
Equipment:			0	1,000	1,000
Lighting:	0			0	0
Ductwork:		1,312	83	687	770
Infiltration: Winter CFM: 109, Summer CFM: 0		6,554	0	0	0
Ventilation: Winter CFM: 93, Summer CFM: 93		5,602	2,283	1,528	3,811
AED Excursion:		0	0	825	825
System 1 Load Totals:		43,721	2,766	22,890	25,657

Check Figures

Supply CFM:	1,000	CFM Per Square ft.:	0.388
Square ft. of Room Area:	2,579	Square ft. Per Ton:	1,014
Volume (ft³) of Cond. Space:	23,212		

System Loads

Total Heating Required Including Ventilation Air:	43,721 Btuh	43.721	MBH
Total Sensible Gain:	22,890 Btuh	89	%
Total Latent Gain:	2,766 Btuh	11	%
Total Cooling Required Including Ventilation Air:	25,657 Btuh	2.14	Tons (Based On Sensible + Latent)
		2.54	Tons (Based On 75% Sensible Capacity)

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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 Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, outdoor insect screen with 100% coverage, light color drapes with medium weave with 50% coverage, u-value 0.53, SHGC 0.56	16.7	486	0	591	591
3A-v-o: Glazing-Double pane low-e (e = 0.40), operable window, vinyl frame, u-value 0.53, SHGC 0.56	147.5	4,299	0	8,259	8,259
12E-0bw: Wall-Frame, R-19 insulation in 2 x 6 stud cavity, no board insulation, brick finish, wood studs	2277.8	8,519	0	1,767	1,767
16BR-38-ml: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), unvented attic with radiant barrier, R-38 insulation, light metal	1823.3	2,607	0	2,370	2,370
19A-0cp: Floor-Over enclosed unconditioned crawl space, No insulation on exposed walls, sealed or vented space, passive, no floor insulation, carpet or hardwood	1823.3	11,113	0	3,031	3,031
Subtotals for structure:		27,024	0	16,018	16,018
People:	5		1,000	1,150	2,150
Equipment:			0	1,212	1,212
Lighting:	0			0	0
Ductwork:		3,795	141	642	783
Infiltration: Winter CFM: 183, Summer CFM: 52		11,013	1,282	858	2,140
Ventilation: Winter CFM: 93, Summer CFM: 93		5,602	2,283	1,528	3,811
System 2 Load Totals:		47,434	4,706	21,408	26,115

Check Figures

Supply CFM:	1,000	CFM Per Square ft.:	0.549
Square ft. of Room Area:	1,823	Square ft. Per Ton:	766
Volume (ft³) of Cond. Space:	16,410		

System Loads

Total Heating Required Including Ventilation Air:	47,434 Btuh	47.434	MBH
Total Sensible Gain:	21,408 Btuh	82	%
Total Latent Gain:	4,706 Btuh	18	%
Total Cooling Required Including Ventilation Air:	26,115 Btuh	2.18	Tons (Based On Sensible + Latent)
		2.38	Tons (Based On 75% Sensible Capacity)

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Equipment Data - System 1

Cooling

System Type:	Standard Air Conditioner
Tradename:	lennox
Nominal Capacity:	30000
Efficiency:	13 SEER

Heating

System Type:	Natural Gas Furnace
Model:	ml193uh070
Manufacturer:	lennox
Capacity:	62000
Efficiency:	93 AFUE

Equipment Data - System 2

Cooling

System Type:	Standard Air Conditioner
Tradename:	lennox
Nominal Capacity:	30000
Efficiency:	13 SEER

Heating

System Type:	Natural Gas Furnace
Model:	ml193uh070
Manufacturer:	lennox
Capacity:	62000
Efficiency:	93 AFUE