

HVAC Load Calculations

for

Single Family Home

Alpine, NJ



RHVAC RESIDENTIAL
HVAC LOADS

Prepared By:

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5001 N Blazingstar Trail
Castle Rock, Co. 80109
516-410-2275
Monday, June 3, 2024

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: 23 Church St_Alpine, NJ
 Project Date: 1-24-2024
 Client Name: Beyder Residence
 Company Name: MDA Design Consulting, LLC
 Company Representative: M. Dunne
 Company Address: 5001 N Blazingstar Trail
 Company City: Castle Rock, Co. 80109
 Company Phone: 516-410-2275
 Company E-Mail Address: mdunne@mdadesignconsulting.com

Design Data

Reference City: Teterboro, New Jersey
 Building Orientation: Front door faces South
 Daily Temperature Range: Medium
 Latitude: 40 Degrees
 Elevation: 9 ft.
 Altitude Factor: 1.000

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	14	12.83	n/a	n/a	70	n/a
Summer:	89	74	50%	50%	75	38

Check Figures

Total Building Supply CFM:	794	CFM Per Square ft.:	2.596
Square ft. of Room Area:	306	Square ft. Per Ton:	314
Volume (ft ³) of Cond. Space:	2,448		

Building Loads

Total Heating Required Including Ventilation Air:	5,544 Btuh	5.544 MBH
Total Sensible Gain:	10,481 Btuh	90 %
Total Latent Gain:	1,228 Btuh	10 %
Total Cooling Required Including Ventilation Air:	11,709 Btuh	0.98 Tons (Based On Sensible + Latent)

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 1st Fl Foyer,dng Rm, Lvg Rm, Ktch Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Differenc e
Winter:	14	12.83	80%	n/a	70	n/a
Summer:	89	74	50%	50%	75	37.63

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:	0.790 AC/hr 32 CFM	0.410 AC/hr 17 CFM
Infiltration Actual:	0.790 AC/hr	0.410 AC/hr
Above Grade Volume:	X 2,448 Cu.ft. 1,934 Cu.ft./hr	X 2,448 Cu.ft. 1,004 Cu.ft./hr
	X 0.0167	X 0.0167
Total Building Infiltration:	32 CFM	17 CFM
Total Building Ventilation:	0 CFM	0 CFM

---System 1---

Infiltration & Ventilation Sensible Gain Multiplier: 15.39 = (1.10 X 1.000 X 14.00 Summer Temp. Difference)
 Infiltration & Ventilation Latent Gain Multiplier: 25.58 = (0.68 X 1.000 X 37.63 Grains Difference)
 Infiltration & Ventilation Sensible Loss Multiplier: 61.58 = (1.10 X 1.000 X 56.00 Winter Temp. Difference)
 Winter Infiltration Specified: 0.790 AC/hr (32 CFM), Construction: Average
 Summer Infiltration Specified: 0.410 AC/hr (17 CFM), Construction: Average



Load Preview Report

Scope	Has AED	Net 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		0.98	314	306	10,481	1,228	11,709	5,544	168	794	794	
System 1	Yes	0.98	314	306	10,481	1,228	11,709	5,544	168	794	794	12x12
Blower					5,118		5,118					
Zone 1				306	5,363	1,228	6,591	5,544	168	794	794	10x15
1-Mud Room				168	2,179	273	2,452	3,417	104	323	323	15x6
2-Dining Room				138	3,184	955	4,139	2,127	64	472	472	8x12
Sum of room airflows may be greater than system airflow because system room airflow option uses the greater of heating or cooling.												



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												
1-Mud Room (SR-100)	TMDD	500	700	0.0003	0.06	0.00224	516.8	4	104	323	323	15x6
2-Dining Room (SR-110)	TMDD	650	780	0.0003	0.06	0.00863	708	10	64	472	472	8x12
Other Ducts in System 1												
Supply Main Trunk (ST-100)	TMDD	600	900	0.0003	0.08	0.00324	795	4	168	795	795	12x12

Summary

System 1					
Heating Flow:	168	Design Friction Rate:	0.085	TEL Return:	0
Cooling Flow:	794	Total Cumulative SP Loss:	0.012	TEL Supply:	14
Fan ESP:	0.012	Device SP Loss:	0	TEL Total:	14
Fan SP Available:	0.012	Return Loss Added to Supply:	0		



Tabular Manual D Ductsize Grid - System 1

Ducts	Room	Feeds Zones	Flow	Diam	Wid	Hei	Vel
☐ System 1 - 1st Fl Foyer, dng Rm, Lvg Rm, Kt							
☐ Supply							
☐ ST-10C		1	795	13.1	12	12	795
SR-10C	Mud Room	1	323	10.1	15	6	517
SR-11C	Dining Room	1	472	10.7	8	12	708



Tabular Manual D Ductsize Data - Duct System 1 - Supply

---Duct Name, etc. Type Upstream Shape Sizing	Roughness Temperature Length CFM	Diameter Width Height Area	Velocity Loss/100 Fit.Eq.Len SP.Avail	SPL.Duct SPL.Fit SPL.Tot SPL.Cumul
---Duct Name: ST-100, Effective Length: 4.0				
Trunk	0.0003	13.1	795	0.003
Up: Fan	55	12	0.081	0.000
Rect	4.0	12	0.0	0.003
Nearest Inch	795	16	0.009	0.003
---Duct Name: SR-100, Supplies: Mud Room, Effective Length: 4.0				
Runout	0.0003	10.1	517	0.002
Up: ST-100	55	15	0.056	0.000
Rect	4.0	6	0.0	0.002
Nearest Inch	323	14	0.006	0.005
---Duct Name: SR-110, Supplies: Dining Room, Effective Length: 10.0				
Runout	0.0003	10.7	708	0.009
Up: ST-100	55	8	0.086	0.000
Rect	10.0	12	0.0	0.009
Nearest Inch	472	33.3	0.000	0.012

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:	1		
Number of active runouts:	2		
Total runout outlet airflow:	795		
Main trunk airflow:	795		
Largest trunk diameter:	13.1	ST-100	
Largest runout diameter:	10.7	SR-110	
Smallest trunk diameter:	13.1	ST-100	
Smallest runout diameter:	10.1	SR-100	
Supply fan external static pressure:	0.012		
Supply fan device pressure losses:	0.000		
Supply fan static pressure available:	0.012		
Runout maximum cumulative static pressure loss:	0.012	SR-110	
Total effective length of supply (ft.):	14.0	SR-110	
Overall total effective length (ft.):	14.0	to SR-110	
Design overall friction rate per 100 ft.:	0.085	(Available SP x 100 / TEL)	
System duct surface area (Scenario 1):	63.3	main	(Not linked to duct load)
Total system duct surface area:	63.3		

Notes

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

Notes

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
4A-6-o: Glazing-Double pane low-e (e = 0.20 or less), high performance, operable window, e=0.05 on surface 2, any frame, outdoor insect screen with 50% coverage, u-value 0.33, SHGC 0.33	16	296	0	515	515
4A-6-o: Glazing-Double pane low-e (e = 0.20 or less), high performance, operable window, e=0.05 on surface 2, any frame, u-value 0.33, SHGC 0.33	20	370	0	292	292
4A-2b-o: Glazing-Double pane low-e (e = 0.20 or less), operable window, e=0.20 on surface 3, metal frame with break, outdoor insect screen with 50% coverage, u-value 0.56, SHGC 0.62	16	502	0	285	285
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	412	2,100	0	770	770
19C-19sp-v: Floor-Over enclosed unconditioned crawl space, R-11 insulation on exposed walls, sealed crawl space, passive, R-19 blanket, vinyl covering	306	291	0	73	73
Subtotals for structure:		3,559	0	1,935	1,935
People:	4		800	920	1,720
Equipment:			0	375	375
Lighting:	550			1,876	1,876
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 32, Summer CFM: 17		1,985	428	257	685
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Blower Heat Gain, 1,500 watts:		0	0	5,118	5,118
Total Building Load Totals:		5,544	1,228	10,481	11,709

Check Figures

Total Building Supply CFM:	794	CFM Per Square ft.:	2.596
Square ft. of Room Area:	306	Square ft. Per Ton:	314
Volume (ft ³) of Cond. Space:	2,448		

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System 1 1st Fl Foyer,dng Rm, Lvg Rm, Ktch Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
4A-6-o: Glazing-Double pane low-e (e = 0.20 or less), high performance, operable window, e=0.05 on surface 2, any frame, outdoor insect screen with 50% coverage, u-value 0.33, SHGC 0.33	16	296	0	515	515
4A-6-o: Glazing-Double pane low-e (e = 0.20 or less), high performance, operable window, e=0.05 on surface 2, any frame, u-value 0.33, SHGC 0.33	20	370	0	292	292
4A-2b-o: Glazing-Double pane low-e (e = 0.20 or less), operable window, e=0.20 on surface 3, metal frame with break, outdoor insect screen with 50% coverage, u-value 0.56, SHGC 0.62	16	502	0	285	285
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs	412	2,100	0	770	770
19C-19sp-v: Floor-Over enclosed unconditioned crawl space, R-11 insulation on exposed walls, sealed crawl space, passive, R-19 blanket, vinyl covering	306	291	0	73	73
Subtotals for structure:		3,559	0	1,935	1,935
People:	4		800	920	1,720
Equipment:			0	375	375
Lighting:	550			1,876	1,876
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 32, Summer CFM: 17		1,985	428	257	685
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Blower Heat Gain, 1,500 watts:		0	0	5,118	5,118
System 1 1st Fl Foyer,dng Rm, Lvg Rm, Ktch Load Totals:		5,544	1,228	10,481	11,709

Check Figures

Supply CFM:	794	CFM Per Square ft.:	2.596
Square ft. of Room Area:	306	Square ft. Per Ton:	314
Volume (ft³) of Cond. Space:	2,448		

System Loads

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Equipment Data - System 1 - 1st Fl Foyer, dng Rm, Lvg Rm, Ktch

Cooling

System Type:	Air Source Heat Pump
Outdoor Model:	38maq24r-3
Indoor Model:	mxz-4c24
Tradename:	Carrier
Outdoor Manufacturer:	Carrier
Indoor Manufacturer:	Carrier
Description:	Air Source Heat Pump
AHRI Reference No.:	3806470
Nominal Capacity:	24000
Efficiency:	20 SEER

Heating

System Type:	Air Source Heat Pump
Model:	38maq24r-3
Tradename:	Air Source Heat Pump
Manufacturer:	Carrier
Description:	Air Source Heat Pump
Capacity:	24000
Efficiency:	47°F: 3.73 / 17°F: 2.5 COP 10.4 HSPF

This system's equipment was selected in accordance with ACCA Manual S.
Manual S equipment sizing data: SODB: 89F, SOWB: 74F, WODB: 14F, SIDB: 75F, SIRH: 50%, WIDB: 70F, Sen. gain: 10,481 Btuh, Lat. gain: 1,228 Btuh, Sen. loss: 5,544 Btuh, Entering clg. coil DB: 75F, Entering clg. coil WB: 62.5F, Entering htg. coil DB: 70F, Clg. coil TD: 12F, Htg. coil TD: 30F, Req. clg. airflow: 794 CFM, Req. htg. airflow: 168 CFM



Detailed Room Loads - Room 1 - Mud Room (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	8.0 ft.	System Number:	1
Room Width:	21.0 ft.	Zone Number:	1
Area:	168.0 sq.ft.	Supply Air:	323 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	14.4 AC/hr
Volume:	1,344.0 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.:	21 CFM
		Actual Summer Infil.:	11 CFM

Item Description	Area Quantity	-U-Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12C-0sw 21 X 8	152	0.091	5.1	775	1.9	0	284
N -Wall-12C-0sw 8 X 8	54	0.091	5.1	275	1.9	0	101
S -Wall-12C-0sw 8 X 8	54	0.091	5.1	275	1.9	0	101
E -Gls-4A-6-o shgc-0.33 0%S	16	0.330	18.5	296	32.2	0	515
N -Gls-4A-6-o shgc-0.33 100%S	10	0.330	18.5	185	11.0	0	110
S -Gls-4A-6-o shgc-0.33 0%S	10	0.330	18.5	185	18.2	0	182
Floor-19C-19sp 21 X 8	168	0.049	1.0	160	0.2	0	40
Subtotals for Structure:				2,151		0	1,333
Infil.: Win.: 20.6, Sum.: 10.7	296		4.277	1,266	0.554	273	164
Lighting:	200						682
Room Totals:				3,417		273	2,179



Detailed Room Loads - Room 2 - Dining Room (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	11.5 ft.	System Number:	1
Room Width:	12.0 ft.	Zone Number:	1
Area:	138.0 sq.ft.	Supply Air:	472 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	25.6 AC/hr
Volume:	1,104.0 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.:	12 CFM
		Actual Summer Infil.:	6 CFM

Item Description	Area Quantity	-U-Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-12C-0sw 21 X 8	152	0.091	5.1	775	1.9	0	284
N -Gls-4A-2b-o shgc-0.62 100%S	16	0.560	31.4	502	17.8	0	285
Floor-19C-19sp 12 X 11.5	138	0.049	1.0	131	0.2	0	33
Subtotals for Structure:				1,408		0	602
Infil.: Win.: 11.7, Sum.: 6.1	168		4.280	719	0.554	155	93
People: 200 lat/per, 230 sen/per:	4					800	920
Equipment:						0	375
Lighting:	350						1,194
Room Totals:				2,127		955	3,184

Equipment Cooling Loads

Item Name	Continuous Output Sensible Btuh	Continuous Output Latent Btuh	Average In-Use Output	Percent Used per Hour	Sensible Load Btuh	Latent Load Btuh
Stereo	375	0	100	100	375	0
Total					375	0



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	Mud Room	168	3,417	104	15x6	-	2,179	273	323	323	
2	Dining Room	138	2,127	64	8x12	-	3,184	955	472	472	
Blower Power							5,118				
System 1 total		306	5,544	168			10,481	1,228	794	794	

System 1 Main Trunk Size: 12x12 in.
 Velocity: 795 ft./min
 Loss per 100 ft.: 0.081 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
Net Required:	0.98	90% / 10%	10,481	1,228	11,709
Actual:	2.00	75% / 25%	18,000	6,000	24,000

Equipment Data

	Heating System	Cooling System
Type:	Air Source Heat Pump	Air Source Heat Pump
Model:	38maq24r-3	38maq24r-3
Indoor Model:		mxz-4c24
Brand:	Air Source Heat Pump	Carrier
Description:	Air Source Heat Pump	Air Source Heat Pump
Efficiency:	47°F: 3.73 / 17°F: 2.5 COP 10.4 HSPF	20 SEER
Sound:	0	0
Capacity:	24,000 Btuh	24,000 Btuh
Sensible Capacity:	n/a	18,000 Btuh
Latent Capacity:	n/a	6,000 Btuh
AHRI Reference No.:	n/a	3806470

This system's equipment was selected in accordance with ACCA Manual S.
 Manual S equipment sizing data: SODB: 89F, SOWB: 74F, WODB: 14F, SIDB: 75F, SIRH: 50%, WIDB: 70F, Sen. gain: 10,481 Btuh, Lat. gain: 1,228 Btuh, Sen. loss: 5,544 Btuh, Entering clg. coil DB: 75F, Entering clg. coil WB: 62.5F, Entering htg. coil DB: 70F, Clg. coil TD: 12F, Htg. coil TD: 30F, Req. clg. airflow: 794 CFM, Req. htg. airflow: 168 CFM



Building Rotation Duct Sizes

Room or Duct Name	Direction Front door Faces																Max Duct Size
	S		SW		W		NW		N		NE		E		SE		
	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	Htg Flow	Clg Flow	
System 1																	
Supply Runouts																	
Zone 1																	
1-Mud Room (SR-100)	104	323	104	334	104	325	104	331	104	320	104	336	104	326	104	326	15x6
2-Dining Room (SR-1)	64	472	64	503	64	533	64	518	64	497	64	546	64	559	64	508	9x13
Other Ducts in System																	
Supply Main Trunk (ST-100)	168	795	168	837	168	858	168	849	168	817	168	882	168	885	168	834	14x12
Bldg. High Dir.: East Sensible Gain: 11,673 Latent Gain: 1,228																	

Summary			
System 1			
Heating Flow:	168	Design Friction Rate:	0.085
Cooling Flow:	794	Total Cumulative SP Loss:	0.012
Fan ESP:	0.012	Device SP Loss:	0
Fan SP Available:	0.012	Return Loss Added to Supply:	0
		TEL Return:	0
		TEL Supply:	14
		TEL Total:	14



Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)

Form
RPER 1.01
8 Mar 10

County, Town, Municipality, Jurisdiction
Header Information

Contractor _____
Mechanical License # _____
Building Plan # _____
Home Address (Street or Lot#, Block, Subdivision) _____

REQUIRED ATTACHMENTS¹

Manual J1 Form (and supporting worksheets):
or MJ1AE Form² (and supporting worksheets):
OEM performance data (heating, cooling, blower):
Manual D Friction Rate Worksheet:
Duct distribution system sketch:

ATTACHED
Yes No
Yes No
Yes No
Yes No
Yes No

HVAC LOAD CALCULATION (IRC M1401.3)

Design Conditions

Winter Design Conditions

Outdoor temperature 14 °F
Indoor temperature 70 °F
Total heat loss 5544 Btu/h

Summer Design Conditions

Outdoor temperature 89 °F
Indoor temperature 75 °F
Grains difference 38 Δ Gr @ 50 % Rh
Sensible heat gain 10481 Btu/h
Latent heat gain 1228 Btu/h
Total heat gain 11709 Btu/h

Building Construction Information

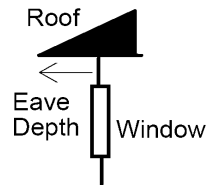
Building

Orientation (Front door faces) South
North, East, West, South, Northeast, Northwest, Southeast, Southwest

Number of bedrooms 0
Conditioned floor area 306 Sq Ft
Number of occupants 4

Windows

Eave overhang depth 0 Ft
Internal shade _____
Blinds, drapes, etc _____
Number of skylights 0



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data

Equipment type Heat pump
Furnace, Heat pump, Boiler, etc.
Model 38maq24r-3
Heating output capacity 158200 Btu/h
Heat pumps - capacity at winter design outdoor conditions
Auxiliary heat output capacity _____ Btu/h

Cooling Equipment Data

Equipment type Heat pump
Air Conditioner, Heat pump, etc.
Model 38maq24r-3
Sensible cooling capacity 18000 Btu/h
Latent cooling capacity 6000 Btu/h
Total cooling capacity 24000 Btu/h

Blower Data

Heating CFM 794 CFM
Cooling CFM 794 CFM

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow 795 CFM Longest supply duct: 14 Ft Duct Materials Used (circle)
External Static Pressure (ESP) 0.01 IWC Longest return duct: _____ Ft Trunk Duct: Duct board, Flex, Sheet metal,
Component Pressure Losses (CPL) _____ IWC Total Effective Length (TEL) 14 Ft Lined sheet metal, Other (specify) _____
Available Static Pressure (ASP) 0.012 IWC Friction Rate: 0.08 IWC Branch Duct: Duct board, Flex, Sheet metal,
Lined sheet metal, Other (specify) _____
ASP = ESP - CPL Friction Rate = (ASP × 100) ÷ TEL

I declare the load calculation, equipment selection, and duct system design were rigorously performed based on the building plan listed above. I understand the claims made on these forms will be subject to review and verification.

Contractor's Printed Name _____ Date _____
Contractor's Signature _____

Reserved for use by County, Town, Municipality, or Authority having jurisdiction.

¹ The AHJ shall have the discretion to accept Required Attachments printed from approved ACCA software vendors, see list on page 2 of instructions.
² If abridged version of Manual J is used for load calculation, then verify residence meets requirements, see Abridged Edition Checklist on page 13 of instructions.
Form generated by ACCA-approved Manual J Eighth Edition Version 2 Elite Software Rhvac program.



Residential Plans Examiner Review Form for HVAC System Design (Loads, Equipment, Ducts)

Form
RPER 1.01
8 Mar 10

County, Town, Municipality, Jurisdiction
Header Information

Contractor _____
Mechanical License # _____
Building Plan # _____
Home Address (Street or Lot#, Block, Subdivision) _____

REQUIRED ATTACHMENTS¹

Manual J1 Form (and supporting worksheets):
or MJ1AE Form² (and supporting worksheets):
OEM performance data (heating, cooling, blower):
Manual D Friction Rate Worksheet:
Duct distribution system sketch:

ATTACHED
Yes No
Yes No
Yes No
Yes No
Yes No

HVAC LOAD CALCULATION (UMC 1106.1)

Design Conditions

Winter Design Conditions

Outdoor temperature 14 °F
Indoor temperature 70 °F
Total heat loss 5544 Btu/h

Summer Design Conditions

Outdoor temperature 89 °F
Indoor temperature 75 °F
Grains difference 38 Δ Gr @ 50 % Rh
Sensible heat gain 10481 Btu/h
Latent heat gain 1228 Btu/h
Total heat gain 11709 Btu/h

Building Construction Information

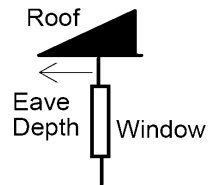
Building

Orientation (Front door faces) South
North, East, West, South, Northeast, Northwest, Southeast, Southwest

Number of bedrooms 0
Conditioned floor area 306 Sq Ft
Number of occupants 4

Windows

Eave overhang depth 0 Ft
Internal shade _____
Blinds, drapes, etc _____
Number of skylights 0



HVAC EQUIPMENT SELECTION

Heating Equipment Data

Equipment type Heat pump
Furnace, Heat pump, Boiler, etc.
Model 38maq24r-3
Heating output capacity 158200 Btu/h
Heat pumps - capacity at winter design outdoor conditions
Auxiliary heat output capacity _____ Btu/h

Cooling Equipment Data

Equipment type Heat pump
Air Conditioner, Heat pump, etc.
Model 38maq24r-3
Sensible cooling capacity 18000 Btu/h
Latent cooling capacity 6000 Btu/h
Total cooling capacity 24000 Btu/h

Blower Data

Heating CFM 794 CFM
Cooling CFM 794 CFM

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (UMC 601.2)

Design airflow 795 CFM
External Static Pressure (ESP) 0.01 IWC
Component Pressure Losses (CPL) _____ IWC
Available Static Pressure (ASP) 0.012 IWC
ASP = ESP - CPL
Longest supply duct: 14 Ft
Longest return duct: _____ Ft
Total Effective Length (TEL) 14 Ft
Friction Rate: 0.08 IWC
Friction Rate = (ASP × 100) ÷ TEL
Duct Materials Used (circle)
Trunk Duct: Duct board, Flex, Sheet metal, Lined sheet metal, Other (specify) _____
Branch Duct: Duct board, Flex, Sheet metal, Lined sheet metal, Other (specify) _____

I declare the load calculation, equipment selection, and duct system design were rigorously performed based on the building plan listed above. I understand the claims made on these forms will be subject to review and verification.

Contractor's Printed Name _____ Date _____
Contractor's Signature _____

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