

*New Residence 45 Sunset Ave
HVAC Load Calculations*

for

New Residence 45 Sunset Ave
45 Sunset Ave
Laurence Harbor, New Jersey 08879



RHVAC RESIDENTIAL
HVAC LOADS

Prepared By:

Joseph Navarra
HVACR Comfort Pro LLC
46 Mount Ararat Lane
Toms River, New Jersey 08753
848-992-7392
Sunday, January 17, 2021



Project Report

General Project Information

Project Title: New Residence 45 Sunset Ave
 Designed By: Joseph Navarra
 Project Date: Saturday, January 16, 2021
 Project Comment: ALL DUCT WORK MUST BE SEALED WITH A MASTIC PAST TO A .04% DUCT LOSS OR LESS. DUCT WORK MUST BE TESTED AND PASS DUCT LEAKAGE TEST. ALL DUCT WORK IN UNCONDITIONED SPACES MUST BE WRAPPED WITH AN R-8 INSULATION VALUE, AND ALL FLEX DUCT MUST HAVE A R-8 INSULATION VALUE IN UNCONDITIONED SPACES. NO RETURN AIR PANNING OF BAYS, WALL CAVITIES, OR FLOOR BEAMS.
 Client Name: New Residence 45 Sunset Ave
 Client Address: 45 Sunset Ave
 Client City: Laurence Harbor, New Jersey 08879
 Client Comment: ALL RETURNS MUST BE DUCTED. NO STACK HEADS OR DUCT WORK IN OUT SIDE WALLS OF THE HOME, FLOOR BOOTS AND CEILING BOXES ONLY. HVACR CONTRACTOR TO MAKE CHANGES TO DUCT WORK AS HE SEE NEEDED. HVACR CONTRACTOR MUST TEST & BALANCE SYSTEM TO CORRECT CFM'S REQUIRED.
 Company Name: HVACR Comfort Pro LLC
 Company Representative: Joseph Navarra
 Company Address: 46 Mount Ararat Lane
 Company City: Toms River, New Jersey 08753
 Company Phone: 848-992-7392
 Company Comment:
 Permit Number(s): BLOCK # 13 - LOT # 43.12

Design Data

Reference City: Long Branch, New Jersey
 Building Orientation: Front door faces Northwest
 Daily Temperature Range: Medium
 Latitude: 40 Degrees
 Elevation: 36 ft.
 Altitude Factor: 0.999

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	13	11.86	n/a	n/a	70	n/a
Summer:	90	73	45%	50%	75	30

Check Figures

Total Building Supply CFM: 1,067 CFM Per Square ft.: 0.567
 Square ft. of Room Area: 1,881 Square ft. Per Ton: 698
 Volume (ft³): 15,993

Building Loads

Total Heating Required Including Ventilation Air: 27,641 Btuh 27.641 MBH
 Total Sensible Gain: 24,242 Btuh 87 %
 Total Latent Gain: 3,487 Btuh 13 %
 Total Cooling Required Including Ventilation Air: 27,729 Btuh 2.69 Tons (Based On 75% Sensible Capacity)

Notes

Rhvac is an ACCA approved Manual J, D and S 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.



Load Preview Report

Scope	Rec 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	2.69	698	1,881	24,242	3,487	27,729	27,641	346	1,067	1,067	
System 1 First Floor	1.50	629	941	13,462	2,771	16,233	14,119	180	613	613	12x10
Supply Duct Latent					69	69					
Return Duct				0	193	193	287				
Zone 1			941	13,462	2,509	15,971	13,831	180	613	613	
1-Entry/ Hall/ Stairs			217	1,170	145	1,315	3,302	43	53	53	5
2-Bath			47	829	61	890	1,386	18	38	38	5
3-Laundry			46	600	29	629	534	7	27	27	5
4-Dining / Living Room/ Kitchen			631	10,863	2,274	13,137	8,610	112	494	494	5,5,5,5,5,5,5
System 2 Second Floor	1.20	785	941	10,780	715	11,496	13,523	167	454	454	10x10
Supply Duct Latent					81	81					
Return Duct				799	120	919	716				
Zone 1			941	9,981	514	10,495	12,806	167	454	454	
5-Bed Room 3			203	2,477	113	2,590	2,887	38	113	113	5.5
6-W I C - 3			43	240	53	293	972	13	11	11	5
7-Hall/ Stairs			143	1,059	68	1,127	1,709	22	48	48	5
8-Bath 2			56	153	21	174	452	6	7	7	5
9-Bed Room 2 W/ Closet			151	2,214	56	2,270	1,832	24	101	101	7
10-Master Bath			62	934	67	1,001	1,541	20	43	43	5
11-M - W I C			33	50	0	50	62	1	2	2	5
12-Master Bed Room			250	2,855	136	2,991	3,352	44	130	130	5.5



Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
U.35-.40 SHGC: Glazing-U.35-.40 SHGC DOUBLE PANE LOW E, U-value 0.35, SHGC 0.4	270	5,383	0	9,086	9,086
U.35 DOOR SOLID: Door-U.35 SOLID DOOR, U-value 0.35	21	419	0	191	191
12F-0sw: Wall-Frame, R-21 insulation in 2 x 6 stud cavity, no board insulation, siding finish, wood studs, U-value 0.065	1927.5	7,145	0	1,915	1,915
16B-38: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Dark Asphalt Shingles or Dark Metal, Tar and Gravel or Membrane, R-38 insulation, U-value 0.026	940.6	1,394	0	1,222	1,222
19A-19p: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, passive, R-19 blanket, U-value 0.049	940.6	2,059	0	541	541
Subtotals for structure:		16,400	0	12,955	12,955
People:	4		800	920	1,720
Equipment:			1,131	6,994	8,125
Lighting:	0			0	0
Ductwork:		4,897	464	2,494	2,958
Infiltration: Winter CFM: 101, Summer CFM: 53		6,344	1,092	879	1,971
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		27,641	3,487	24,242	27,729

Check Figures

Total Building Supply CFM:	1,067	CFM Per Square ft.:	0.567
Square ft. of Room Area:	1,881	Square ft. Per Ton:	698
Volume (ft³):	15,993		

Building Loads

Total Heating Required Including Ventilation Air:	27,641 Btuh	27.641 MBH
Total Sensible Gain:	24,242 Btuh	87 %
Total Latent Gain:	3,487 Btuh	13 %
Total Cooling Required Including Ventilation Air:	27,729 Btuh	2.69 Tons (Based On 75% Sensible Capacity)

Notes

Rhvac is an ACCA approved Manual J, D and S computer program.
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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.



Manual S Performance Data - System 1 - First Floor

Loads and Design Conditions

Cooling:

Outdoor Dry Bulb:	90	Sensible Gain:	13.462
Outdoor Wet Bulb:	73	Latent Gain:	2.771
Indoor Dry Bulb:	75	Total Gain:	16.233
Indoor RH:	50	Load SHR:	0.83
Supply Airflow:	614	Entering Dry Bulb:	75
		Entering Wet Bulb:	62.5

Heating:

Outdoor Dry Bulb:	13	Sensible Loss:	14.119
Indoor Dry Bulb:	70	Entering Dry Bulb:	68.5
Indoor RH:	30	Supply Airflow:	180

Equipment Performance Data at System Design Conditions

Cooling:

Model Type: Standard Air Conditioner, Model: 24ACB324A003/ CNVPV2414
 Nominal Capacity: 24.000, Manufacturer: CARRIER PERFORMANCE

Entered Interpolation Data:

EWB °F	Air Flow CFM	ODB °F	Total Capacity MBtuh	Power Input kW	EDB 75 °F	
					S/T	Sensible Capacity MBtuh
62.5	614	90	18.7	0	0.829	15.5

Interpolation Results:

		<u>Load</u>	<u>Percent of Load</u>
Sensible Capacity:	15.500	13.462	115%
Latent Capacity:	3.200	2.771	115%
Total Capacity:	18.700	16.233	115%

Heating:

Model Type: Two Stage Furnace, Model: 59TP6B040V1410, Nominal Capacity: 39.000, Manufacturer: CARRIER PERFORMANCE

Results:

		<u>Load</u>	<u>Percent of Load</u>
Heating Capacity:	39.000	14.119	276%



Manual S Performance Data - System 2 - Second Floor

Loads and Design Conditions

Cooling:

Outdoor Dry Bulb:	90	Sensible Gain:	10.780
Outdoor Wet Bulb:	73	Latent Gain:	0.715
Indoor Dry Bulb:	75	Total Gain:	11.496
Indoor RH:	50	Load SHR:	0.94
Supply Airflow:	454	Entering Dry Bulb:	76.6
		Entering Wet Bulb:	63.1

Heating:

Outdoor Dry Bulb:	13	Sensible Loss:	13.523
Indoor Dry Bulb:	70	Entering Dry Bulb:	66.1
Indoor RH:	30	Supply Airflow:	167

Equipment Performance Data at System Design Conditions

Cooling:

Model Type: Standard Air Conditioner, Model: 24ACB318A003/ CNVPV2414
 Nominal Capacity: 18.000, Manufacturer: CARRIER PERFORMANCE

Entered Interpolation Data:

EWB °F	Air Flow CFM	ODB °F	Total Capacity MBtuh	Power Input kW	EDB 76.6 °F	
					S/T	Sensible Capacity MBtuh
63.1	454	90	13.2	0	0.939	12.4

Interpolation Results:

		<u>Load</u>	<u>Percent of Load</u>
Sensible Capacity:	12.400	10.780	115%
Latent Capacity:	0.800	0.715	112%
Total Capacity:	13.200	11.496	115%

Heating:

Model Type: Two Stage Furnace, Model: 59TP6B040V1410, Nominal Capacity: 39.000, Manufacturer: CARRIER

Results:

		<u>Load</u>	<u>Percent of Load</u>
Heating Capacity:	39.000	13.523	288%



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 Joseph Navarra
Mechanical License # 19HC00194800
Building Plan # A19-59 Sys. 1
Home Address (Street or Lot#, Block, Subdivision) 45 SUNSET AVE LAURENCE HARBOR NJ 08879 BLOCK # 13 - LOT 43.12

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 13 °F
Indoor temperature 70 °F
Total heat loss 14119 Btu/h

Summer Design Conditions

Outdoor temperature 90 °F
Indoor temperature 75 °F
Grains difference 30 Δ Gr @ 50 % Rh
Sensible heat gain 13462 Btu/h
Latent heat gain 2771 Btu/h
Total heat gain 16233 Btu/h

Building Construction Information

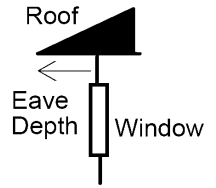
Building

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

Number of bedrooms 0
Conditioned floor area 941 Sq Ft
Number of occupants 4

Windows

Eave overhang depth 16" Ft
Internal shade NEW CONSTRUCTION
Blinds, drapes, etc
Number of skylights 0



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data

Equipment type Furnace
Furnace, Heat pump, Boiler, etc.
Model 59TP6B040V1410
Heating output capacity 39000 Btu/h
Heat pumps - capacity at winter design outdoor conditions
Auxiliary heat output capacity _____ Btu/h

Cooling Equipment Data

Equipment type Standard Air Conditioner
Air Conditioner, Heat pump, etc
Model 4TTR3024W/ 4TXCB003DS3HCA
Sensible cooling capacity 15,500 Btu/h
Latent cooling capacity 3,200 Btu/h
Total cooling capacity 18,700 Btu/h

Blower Data

Heating CFM 613 CFM
Cooling CFM 613 CFM

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow 615 CFM
External Static Pressure (ESP) 0.52 IWC
Component Pressure Losses (CPL) 0.29 IWC
Available Static Pressure (ASP) 0.233 IWC
ASP = ESP - CPL

Longest supply duct: 109 Ft
Longest return duct: 226 Ft
Total Effective Length (TEL) 335 Ft
Friction Rate: 0.07 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 Joseph Navarra

Date 01/05/2021

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.



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 Joseph Navarra
Mechanical License # 19HC00194800
Building Plan # A19-59 Sys. 2
Home Address (Street or Lot#, Block, Subdivision) 45 SUNSET AVE LAURENCE HARBOR NJ 08879 BLOCK # 13 - LOT 43.12

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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 13 °F
Indoor temperature 70 °F
Total heat loss 13523 Btu/h

Summer Design Conditions

Outdoor temperature 90 °F
Indoor temperature 75 °F
Grains difference 30 Δ Gr @ 50 % Rh
Sensible heat gain 10780 Btu/h
Latent heat gain 715 Btu/h
Total heat gain 11496 Btu/h

Building Construction Information

Building

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

Number of bedrooms 3

Conditioned floor area 941 Sq Ft

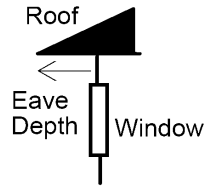
Number of occupants 0

Windows

Eave overhang depth 16" Ft

Internal shade NEW CONSTRUCTION
Blinds, drapes, etc

Number of skylights 0



HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data

Equipment type Furnace
Furnace, Heat pump, Boiler, etc.
Model 59TP6B040V1410
Heating output capacity 39000 Btu/h
Heat pumps - capacity at winter design outdoor conditions
Auxiliary heat output capacity _____ Btu/h

Cooling Equipment Data

Equipment type Standard Air Conditioner
Air Conditioner, Heat pump, etc.
Model 4TTR3018 W/ 4TXCB003DS3HCA
Sensible cooling capacity 12,400 Btu/h
Latent cooling capacity 800 Btu/h
Total cooling capacity 13,200 Btu/h

Blower Data

Heating CFM 454 CFM
Cooling CFM 454 CFM

HVAC DUCT DISTRIBUTION SYSTEM DESIGN (IRC M1601.1)

Design airflow 454 CFM

External Static Pressure (ESP) 0.51 IWC

Component Pressure Losses (CPL) 0.29 IWC

Available Static Pressure (ASP) 0.217 IWC

ASP = ESP - CPL

Longest supply duct: 108 Ft

Longest return duct: 162 Ft

Total Effective Length (TEL) 270 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 Joseph Navarra

Date 01/05/2021

Contractor's Signature _____

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