DEPARTMENT OF INSPECTIONS, LICENSES & PERMITS
3430 COURT HOUSE DRIVE
ELLICOTT CITY, MD 21043
PERMITS (410) 313-2455
INSPECTIONS (410) 313-1850

HOWARD COUNTY RESIDENTIAL HEATING-VENTILATION-AIR CONDITIONING AND REFRIGERATION PERMIT APPLICATION

HVACR PERMIT # M22000205

BUILDING PERMIT #

BUILDING ADDRESS: 5402 TALON CT. SUITE/APT:

SUBDIVISION:
CENSUS TRACT: SECTION: AREA:
LOT: TAX MAP: PARCEL:
BLOCK: ZONE:

PROPERTY ID: MAP COORDINATES:

TYPE OF IMPROVEMENTS: USE:

OWNERS NAME: Ben OTTO
ADDRESS: 5402 TALON CT.
CITY: CLARKSVILLE, MD.
STATE: MD. ZIP CODE: 21029
HOME PHONE: 609-698-6886 WORK PHONE:

	CHECK ONE	HOW MANY
SINGLE FAMILY DWELLING	✓	2 ZONES
SINGLE FAMILY TOWNHOUSE	□	____ ZONES
MULTI-FAMILY / HOTEL/MOTEL	□	____ ROOMS
ASSISTED LIVING HOMES (16 OR FEWER RESIDENTS)	□	____ ROOMS

COMPANY NAME: WATERVALE HEATING & A.C.
LICENSEE NAME: Joseph F. Opdyke
ADDRESS: 2116 WATERVALE RD.
CITY: FALLSTON
STATE: MD. ZIP CODE: 21047
PHONE: 410-879-0292 HVACR LICENSE NO: 7629

New
- □ Heating and Air Conditioning
- □ Geo Thermal System
- □ Heating System Only
- □ Ductless Mini Splits
- □ Other Work (Describe):
- □ Thru The Wall Systems

Replace existing HEAT PUMPS with Two 3-TON WATERFURNACE Geothermal systems, HOZ-Loop field.

Replacement
- □ Heating
- □ Air Conditioning
- ☒ Heating and Air Conditioning

Additions and Alterations
- □ Heating
- □ Air Conditioning
- □ Heating and Air Conditioning

****Replacement Geo Thermal Systems are not required; However, if a tax credit is being sought a permit is required****

Zones

Permit Fee = # of Zones x $40 =	80
Technology Fee (10% of Permit Fee) =	8
Plus Application Fee	$50.00
Total Fees Due =	138

Rooms

Permit Fee = # of Rooms x $80 =	____
Technology Fee (10% of Permit Fee) =	____
Plus Application Fee $50	$50.00
Total Fees Due =	____

I HAVE CAREFULLY EXAMINED AND READ THIS APPLICATION AND KNOW IT IS TRUE AND CORRECT. THE WORK DESCRIBED HEREIN WILL BE PERFORMED BY A STATE HVACR LICENSED PERSON(S), AND ALL WORK WILL BE PERFORMED IN COMPLIANCE WITH APPLICABLE CODES AND STANDARDS OF HOWARD COUNTY THE STATE OF MARYLAND.

Joseph F. Opdyke — SIGNATURE OF LICENSEE
March-3-2022 — DATE
Joseph F. Opdyke — PRINT NAME OF LICENSEE
WATERVALEgeo@gmail.com — Email Address

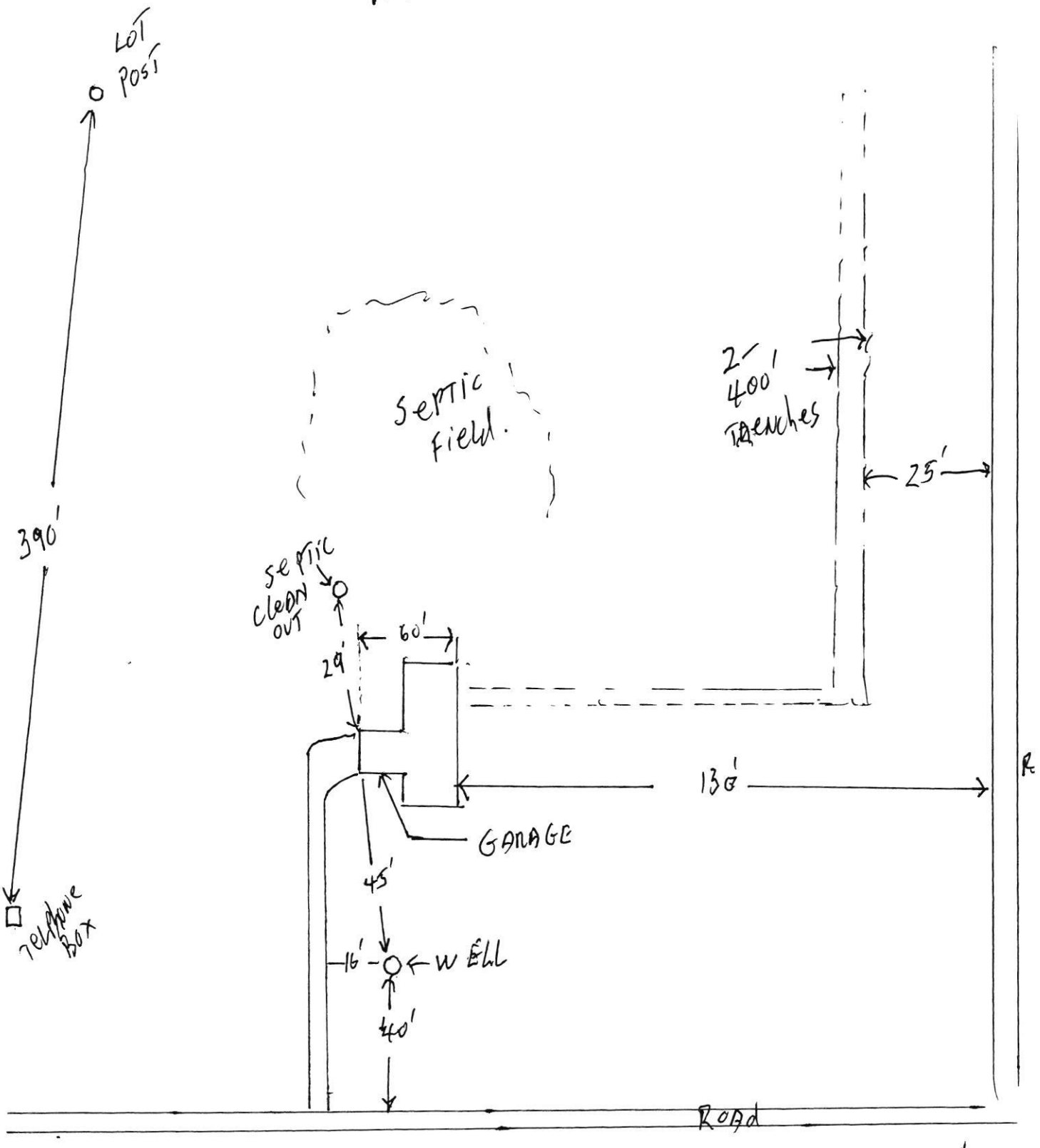
Make check payable to: DIRECTOR OF FINANCE OF HOWARD COUNTY

Word doc: T:\Updated Forms\hvac application
Rev:10.2009

Validation
Check Number: 26384
Cash: ____
Receipt Number: 605774

APPROVED
Mechanical
~~WALK-THRU BUILDING~~ PERMIT
BP# ____ A# ____
APP. SAN Susan Thomas DATE: 4/6/22
DESC. OF WORK: ____

M22000205



BEN OTTO
5402 TALON CT.
CLARKSVILLE, MD, 21029

WATERVALE GEOTHERMAL
443-528-7701
2116 WATERVALE RD.
FALLSTON, MD. 2104

M22000205

Ben Otto
HVAC Load Calculations

for

Ben Otto
5402 Talon, Ct.
Clarksville, Md. 21029

Elite Software

RHVAC RESIDENTIAL HVAC LOADS

Prepared By:

Watervale Heatimg & A.C.
2116 Watervale, Rd.
Fallston, Md. 21047
410-879-0292
Tuesday, March 1, 2022

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.

Project Report

General Project Information

Project Title:	Ben Otto
Project Date:	Tuesday, February 22, 2022
Client Name:	Ben Otto
Client Address:	5402 Talon, Ct.
Client City:	Clarksville, Md. 21029
Company Name:	Watervale Heatimg & A.C.
Company Address:	2116 Watervale, Rd.
Company City:	Fallston, Md. 21047
Company Phone:	410-879-0292

Design Data

Reference City:		Frederick, Maryland
Building Orientation:		Front door faces North
Daily Temperature Range:		Medium
Latitude:	39	Degrees
Elevation:	313	ft.
Altitude Factor:	0.989	

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	14	10.9	n/a	n/a	70	n/a
Summer:	91	75	48%	50%	75	41

Check Figures

Total Building Supply CFM:	1,411	CFM Per Square ft.:	0.328
Square ft. of Room Area:	4,305	Square ft. Per Ton:	1,359
Volume (ft³):	26,133		

Building Loads

Total Heating Required Including Ventilation Air:	52,350	Btuh	52.350	MBH
Total Sensible Gain:	34,338	Btuh	90	%
Total Latent Gain:	3,680	Btuh	10	%
Total Cooling Required Including Ventilation Air:	38,018	Btuh	3.17	Tons (Based On Sensible + Latent)

Notes

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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:	14	10.9	48%	n/a	70	n/a
Summer:	91	75	48%	50%	75	41.17

System 2 Copy of system 1 Input Data	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	14	10.9	48%	n/a	70	n/a
Summer:	91	75	48%	50%	75	41.17

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:	0	ft./min	0	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:	0.310	AC/hr	0.160	AC/hr
	135	CFM	70	CFM
Infiltration Actual:	0.310	AC/hr	0.160	AC/hr
Above Grade Volume:	X 26,133	Cu.ft.	X 26,133	Cu.ft.
	8,101	Cu.ft./hr	4,181	Cu.ft./hr
	X 0.0167		X 0.0167	
Total Building Infiltration:	135	CFM	70	CFM
Total Building Ventilation:	0	CFM	0	CFM

---System 1---
Infiltration & Ventilation Sensible Gain Multiplier: 17.40 = (1.10 X 0.989 X 16.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 27.68 = (0.68 X 0.989 X 41.17 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 60.91 = (1.10 X 0.989 X 56.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.310 AC/hr (73 CFM), Construction: Semi-Tight
Summer Infiltration Specified: 0.160 AC/hr (38 CFM), Construction: Semi-Tight

---System 2---
Infiltration & Ventilation Sensible Gain Multiplier: 17.40 = (1.10 X 0.989 X 16.00 Summer Temp. Difference)
Infiltration & Ventilation Latent Gain Multiplier: 27.68 = (0.68 X 0.989 X 41.17 Grains Difference)
Infiltration & Ventilation Sensible Loss Multiplier: 60.91 = (1.10 X 0.989 X 56.00 Winter Temp. Difference)
Winter Infiltration Specified: 0.310 AC/hr (62 CFM), Construction: Semi-Tight
Summer Infiltration Specified: 0.160 AC/hr (32 CFM), Construction: Semi-Tight

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	0.12	4	406	No
1	Return		Attic	16B	0.12	4	301	No

Load Preview Report

Scope	Net Ton	ft²/Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	3.17	1,359	4,305	34,338	3,680	38,018	52,350	648	1,411	1,411	
System 1	1.13	2,487	2,800	11,871	1,641	13,512	24,023	316	546	546	9x13
Zone 1 - Clg.: 8%, Htg.: 40%			1,400	1,010	214	1,224	9,511	125	46	46	4x5
1-Basement			1,400	1,010	214	1,224	9,511	125	46	46	1--5
Zone 2 - Clg.: 92%, Htg.: 60%			1,400	11,671	1,427	13,098	14,512	191	537	537	9x13
2-First Floor			1,400	11,671	1,427	13,098	14,512	191	537	537	5--7
System 2	2.04	737	1,505	22,467	2,039	24,506	28,327	332	865	865	10x16
Supply Duct Latent					351	351					
Return Duct				3,641	799	4,440	3,014				
Zone 1			1,505	18,826	889	19,715	25,313	332	865	865	10x16
3-Second Floor			1,505	18,826	889	19,715	25,313	332	865	865	8--7

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												
1-Basement	Built-In	0	750	0.01	0.1		340.5		125	46	46	1–5
Zone 2												
2-First Floor	Built-In	0	750	0.01	0.1		401.5		191	537	537	5–7
Other Ducts in System 1												
Supply Main Trunk	Built-In	0	900	0.003	0.1		671.7		316	546	546	9x13
System 2												
Supply Runouts												
Zone 1												
3-Second Floor	Built-In	0	750	0.01	0.1		404.8		332	865	865	8–7
Other Ducts in System 2												
Supply Main Trunk	Built-In	0	900	0.003	0.1		778.9		332	865	865	10x16

Summary

System 1	
Heating Flow:	316
Cooling Flow:	546
System 2	
Heating Flow:	332
Cooling Flow:	865

Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1D-cw-o: Glazing-Double pane, operable window, clear, wood frame, U-value 0.57, SHGC 0.56	205	6,544	0	10,961	10,961
1D-cw-o: Glazing-Double pane, operable window, clear, wood frame, light color blinds at 45° with 50% coverage, U-value 0.57, SHGC 0.56	41	1,309	0	1,868	1,868
11J: Door-Metal - Fiberglass Core, U-value 0.6	42	1,411	0	680	680
15A-2sffc-6: Wall-Basement, concrete block wall, R-2 foam board to floor, no framing, no interior finish, filled core, 6' floor depth, U-value 0.084	600	3,696	0	519	519
15A-2s3oc-10: Wall-Basement, concrete block wall, R-2 foam board to 3', no framing, no interior finish, open core, 10' floor depth, U-value 0.086	280	1,348	0	0	0
15A-4s3fc-4: Wall-Basement, concrete block wall, R-4 foam board to 3', no framing, no interior finish, filled core, 4' floor depth, U-value 0.085	320	1,989	0	357	357
12B-0sw: Wall-Frame, R-11 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.097	1034	5,618	0	2,516	2,516
12C-0sw: Wall-Frame, R-13 insulation in 2 x 4 stud cavity, no board insulation, siding finish, wood studs, U-value 0.091	1126	5,738	0	2,304	2,304
16A-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Unvented Attic, No Radiant Barrier, Any Roofing Material, Any Roof Color, R-30 insulation, U-value 0.032	1505	2,697	0	3,419	3,419
21A-32: 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 32' wide, U-value 0.02	1400	1,568	0	0	0
19A-19p: Floor-Over enclosed crawl space, No insulation on exposed walls, sealed or vented space, passive, R-19 blanket, U-value 0.049	91	196	0	56	56
Subtotals for structure:		32,114	0	22,680	22,680
People:	3		600	690	1,290
Equipment:			0	1,200	1,200
Lighting:	0			0	0
Ductwork:		12,013	1,150	8,555	9,705
Infiltration: Winter CFM: 135, Summer CFM: 70		8,223	1,930	1,213	3,143
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Total Building Load Totals:		52,350	3,680	34,338	38,018

Check Figures

Total Building Supply CFM:	1,411	CFM Per Square ft.:	0.328
Square ft. of Room Area:	4,305	Square ft. Per Ton:	1,359
Volume (ft³):	26,133		

Building Loads

Total Heating Required Including Ventilation Air:	52,350 Btuh	52.350 MBH	
Total Sensible Gain:	34,338 Btuh	90 %	
Total Latent Gain:	3,680 Btuh	10 %	
Total Cooling Required Including Ventilation Air:	38,018 Btuh	3.17	Tons (Based On Sensible + Latent)

Notes

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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.

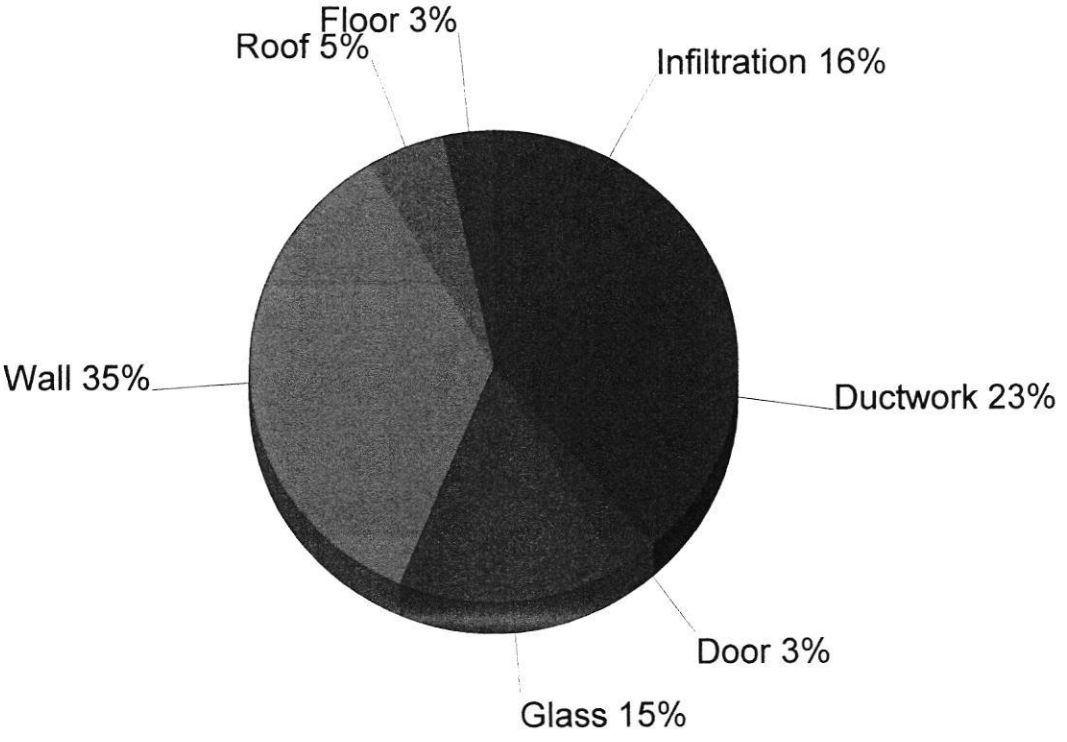
Total Building Summary Loads (cont'd)

Notes

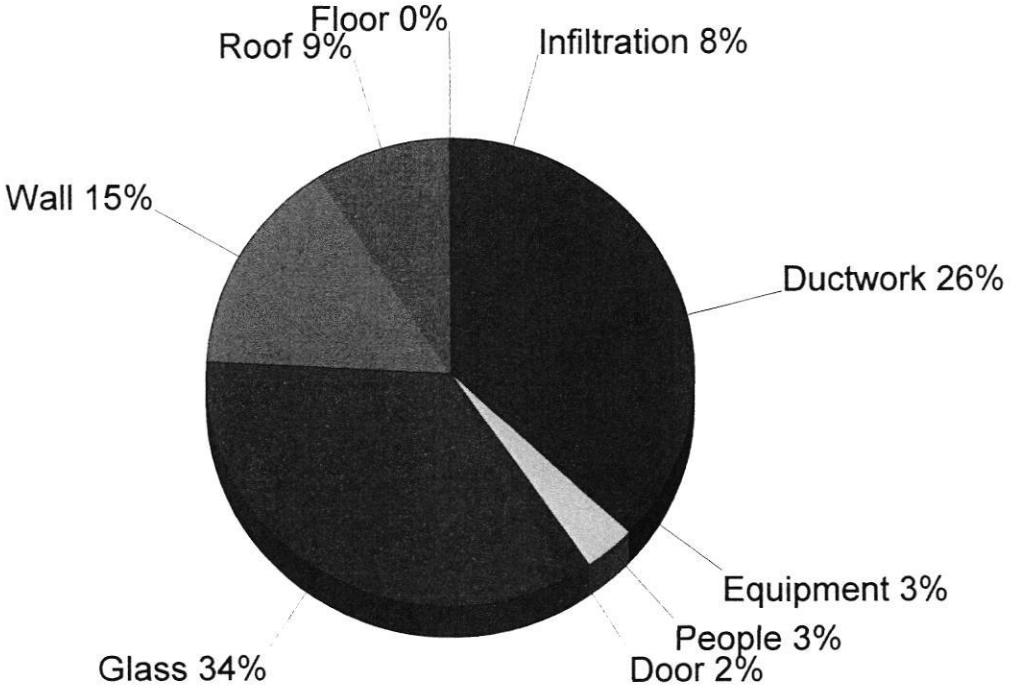
Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.

Building Pie Chart

Building Loss 52,350 Btuh



Building Gain 38,018 Btuh



Detailed Room Loads - Room 1 - Basement (Peak Fenestration Gain Procedure)

General

Room is in zone 1, which peaks at 7 pm

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	40.0	ft.	System Number:	1	
Room Width:	35.0	ft.	Zone Number:	1	
Area:	1,400.0	sq.ft.	Supply Air:	46	CFM
Ceiling Height:	8.0	ft.	Supply Air Changes:	0.2	AC/hr
Volume:	11,200	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	1		Actual Winter Vent.:	0	CFM
Runout Air:	46	CFM	Percent of Supply.:	0	%
Runout Duct Size:	5	in.	Actual Summer Vent.:	0	CFM
Runout Air Velocity:	341	ft./min.	Percent of Supply:	0	%
Runout Air Velocity:	341	ft./min.	Actual Winter Infil.:	15	CFM
Actual Loss:	0.096	in.wg./100 ft.	Actual Summer Infil.:	8	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-15A-2sffc-6 40 X 8	320	0.084	6.2	1,971	0.9	0	277
N -Wall-15A-2s3oc-10 35 X 8	280	0.086	4.8	1,348	0.0	0	0
N -Wall-15A-4s3fc-4 40 X 8	320	0.085	6.2	1,989	1.1	0	357
N -Wall-15A-2sffc-6 35 X 8	280	0.084	6.2	1,725	0.9	0	242
Floor-21A-32 35 X 40	1400	0.020	1.1	1,568	0.0	0	0
Subtotals for Structure:				8,601		0	876
Infil.: Win.: 14.9, Sum.: 7.7	310		2.935	910	0.432	214	134
Room Totals:				9,511		214	1,010

Detailed Room Loads - Room 2 - First Floor (Peak Fenestration Gain Procedure)

General

Room is in zone 2, which peaks at 5 pm

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	40.0	ft.	System Number:	1	
Room Width:	35.0	ft.	Zone Number:	2	
Area:	1,400.0	sq.ft.	Supply Air:	537	CFM
Ceiling Height:	8.0	ft.	Supply Air Changes:	2.9	AC/hr
Volume:	11,200	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	5		Actual Winter Vent.:	0	CFM
Runout Air:	107	CFM	Percent of Supply.:	0	%
Runout Duct Size:	7	in.	Actual Summer Vent.:	0	CFM
Runout Air Velocity:	402	ft./min.	Percent of Supply:	0	%
Runout Air Velocity:	402	ft./min.	Actual Winter Infil.:	58	CFM
Actual Loss:	0.083	in.wg./100 ft.	Actual Summer Infil.:	30	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12B-0sw 40 X 8	279	0.097	5.4	1,516	2.4	0	679
N -Wall-12B-0sw 35 X 8	238	0.097	5.4	1,293	2.4	0	579
W -Wall-12B-0sw 40 X 8	279	0.097	5.4	1,516	2.4	0	679
S -Wall-12B-0sw 35 X 8	238	0.097	5.4	1,293	2.4	0	579
S -Door-11J 6 X 7	42	0.600	33.6	1,411	16.2	0	680
N -Gls-1D-cw-o shgc-0.56 0%S	42	0.570	31.9	1,341	25.4	0	1,068
E -Gls-1D-cw-o shgc-0.56 0%S	41	0.570	31.9	1,309	24.3	0	997
W -Gls-1D-cw-o shgc-0.56 0%S	41	0.570	31.9	1,309	97.6	0	4,000
Subtotals for Structure:				10,988		0	9,261
Infil.: Win.: 57.9, Sum.: 29.9	1,200		2.937	3,524	0.433	827	520
People: 200 lat/per, 230 sen/per:	3					600	690
Equipment:						0	1,200
Room Totals:				14,512		1,427	11,671

Detailed Room Loads - Room 3 - Second Floor (Average Load Procedure)

General

Calculation Mode:	Htg. & clg.		Occurrences:	1	
Room Length:	43.0	ft.	System Number:	2	
Room Width:	35.0	ft.	Zone Number:	1	
Area:	1,505.0	sq.ft.	Supply Air:	865	CFM
Ceiling Height:	8.0	ft.	Supply Air Changes:	4.3	AC/hr
Volume:	12,040	cu.ft.	Req. Vent. Clg:	0	CFM
Number of Registers:	8		Actual Winter Vent.:	0	CFM
Runout Air:	108	CFM	Percent of Supply.:	0	%
Runout Duct Size:	7	in.	Actual Summer Vent.:	0	CFM
Runout Air Velocity:	405	ft./min.	Percent of Supply:	0	%
Runout Air Velocity:	405	ft./min.	Actual Winter Infil.:	62	CFM
Actual Loss:	0.085	in.wg./100 ft.	Actual Summer Infil.:	32	CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-12C-0sw 43 X 8	283	0.091	5.1	1,442	2.0	0	579
N -Wall-12C-0sw 35 X 8	280	0.091	5.1	1,427	2.0	0	573
W -Wall-12C-0sw 43 X 8	283	0.091	5.1	1,442	2.0	0	579
S -Wall-12C-0sw 35 X 8	280	0.091	5.1	1,427	2.0	0	573
E -Gls-1D-cw-o shgc-0.56 0%S	61	0.570	31.9	1,947	62.1	0	3,787
W -Gls-1D-cw-o shgc-0.56 0%S	61	0.570	31.9	1,947	62.1	0	3,787
UP-Ceil-16A-30 43 X 35	1505	0.032	1.8	2,697	2.3	0	3,419
Floor-19A-19p 35 X 2.6	91	0.049	2.2	196	0.6	0	56
Subtotals for Structure:				12,525		0	13,353
Infil.: Win.: 62.2, Sum.: 32.1	1,248		3.036	3,789	0.448	889	559
Ductwork:				8,999			4,914
Room Totals:				25,313		889	18,826

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	Basement	1,400	9,511	125	1-5	341	1,010	214	46	46
	Zone 1 subtotal	1,400	9,511	125			1,010	214	46	46
---Zone 2---										
2	First Floor	1,400	14,512	191	5-7	402	11,671	1,427	537	537
	Zone 2 subtotal	1,400	14,512	191			11,671	1,427	537	537
	System 1 total	2,800	24,023	316			11,871	1,641	546	546

System 1 Main Trunk Size: 9x13 in.
Velocity: 672 ft./min
Loss per 100 ft.: 0.093 in.wg

Note: Since the system is multizone, the Peak Fenestration Gain Procedure was used to determine glass sensible gains at the room and zone levels, so the sums of the zone sensible gains and airflows for cooling shown above are not intended to equal the totals at the system level. Room and zone sensible gains and cooling CFM values are for the hour in which the glass sensible gain for the zone is at its peak. Sensible gains at the system level are based on the "Average Load Procedure + Excursion" method.

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	1.13	88% / 12%	11,871	1,641	13,512

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		
Indoor Model:		
Brand:		
Efficiency:	0 AFUE	0 SEER
Sound:	0	0
Capacity:	0 Btuh	0 Btuh
Sensible Capacity:	n/a	0 Btuh
Latent Capacity:	n/a	0 Btuh

System 2 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---										
3	Second Floor	1,505	25,313	332	8-7	405	18,826	889	865	865
	Duct Latent							351		
	Return Duct		3,014				3,641	799		
	System 2 total	1,505	28,327	332			22,467	2,039	865	865

System 2 Main Trunk Size: 10x16 in.
Velocity: 779 ft./min
Loss per 100 ft.: 0.103 in.wg

Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	2.04	92% / 8%	22,467	2,039	24,506

Equipment Data

	Heating System	Cooling System
Type:	Natural Gas Furnace	Standard Air Conditioner
Model:		
Indoor Model:		
Brand:		
Efficiency:	0 AFUE	0 SEER
Sound:	0	0
Capacity:	0 Btuh	0 Btuh
Sensible Capacity:	n/a	0 Btuh
Latent Capacity:	n/a	0 Btuh