

Project Information

For: Searle Residence
 Idaho Falls, ID

Design Information

	Htg	Clg		Infiltration	
Outside db (°F)	-6	89	Method		Simplified
Inside db (°F)	70	75	Construction quality		Semi-tight
Design TD (°F)	76	14	Fireplaces		0
Daily range	-	H			
Inside humidity (%)	50	50			
Moisture difference (gr/lb)	62	-31			

HEATING EQUIPMENT

Make	Lennox
Trade	LENNOX
Model	SLP98UH090XV48C-*
AHRI ref	4792117
Efficiency	98.2 AFUE
Heating input	88000 Btuh
Heating output	77400 Btuh
Temperature rise	58 °F
Actual air flow	1434 cfm
Air flow factor	0.026 cfm/Btuh
Static pressure	0.70 in H2O
Space thermostat	

COOLING EQUIPMENT

Make	Lennox
Trade	LENNOX
Cond	14ACX-048-230-14
Coil	CX35-48C+SLP98UH090XV48C*+TDR
AHRI ref	8267607
Efficiency	12.0 EER, 14 SEER
Sensible cooling	48000 Btuh
Latent cooling	0 Btuh
Total cooling	48000 Btuh
Actual air flow	1580 cfm
Air flow factor	0.063 cfm/Btuh
Static pressure	0.80 in H2O
Load sensible heat ratio	1.00

ROOM NAME	Area (ft²)	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Basement Zone	2511	24096	7437	615	471
Main Zone	1849	23682	14743	604	934
Master Zone	674	8445	4119	215	261
Entire House	5034	56222	24635	1434	1580
Other equip loads		13696	2523		
Equip. @ 0.94 RSM			25529		
Latent cooling			0		
TOTALS	5034	69918	25529	1434	1580

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.

Project Information

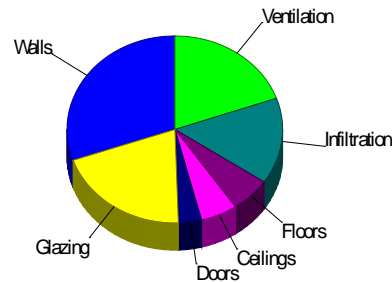
For: Searle Residence
Idaho Falls, ID

Design Conditions

Location: Idaho Falls, ID, US Elevation: 4741 ft Latitude: 44°N			Indoor: Indoor temperature (°F) Design TD (°F) Relative humidity (%) Moisture difference (gr/lb)	Heating 70 76 50 61.5	Cooling 75 14 50 -31.5
Outdoor: Dry bulb (°F) Daily range (°F) Wet bulb (°F) Wind speed (mph)	Heating -6 - - 15.0	Cooling 89 34 (H) 60 7.5	Infiltration: Method Construction quality Fireplaces		Simplified Semi-tight 0

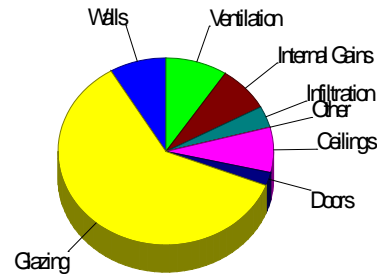
Heating

Component	Btuh/ft²	Btuh	% of load
Walls	4.5	21208	30.3
Glazing	21.7	14118	20.2
Doors	26.7	2427	3.5
Ceilings	1.5	3835	5.5
Floors	1.7	4226	6.0
Infiltration	2.8	10409	14.9
Ducts		0	0
Piping		0	0
Humidification		0	0
Ventilation		13696	19.6
Adjustments		0	0
Total		69918	100.0



Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	0.5	2311	8.5
Glazing	25.2	16451	60.6
Doors	6.9	624	2.3
Ceilings	0.8	2119	7.8
Floors	0.0	1	0.0
Infiltration	0.3	1009	3.7
Ducts		0	0
Ventilation		2523	9.3
Internal gains		2120	7.8
Blower		0	0
Adjustments		0	0
Total		27158	100.0



Latent Cooling Load = 0 Btuh
Overall U-value = 0.064 Btuh/ft²-°F

Data entries checked.

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Design Conditions

Location: Idaho Falls, ID, US Elevation: 4741 ft Latitude: 44°N	Indoor: Indoor temperature (°F) 70 Design TD (°F) 76 Relative humidity (%) 50 Moisture difference (gr/lb) 61.5	Heating 70	Cooling 75 14 50 -31.5
Outdoor: Dry bulb (°F) -6 Daily range (°F) - Wet bulb (°F) - Wind speed (mph) 15.0	Heating -6 - - 15.0	Cooling 89 34 (H) 60 7.5	Infiltration: Method Simplified Construction quality Semi-tight Fireplaces 0

Construction descriptions

Construction descriptions	Or	Area ft ²	U-value Btuh/ft ² -°F	Insul R ft ² -°F/Btuh	Htg HTM Btuh/ft ²	Loss Btuh	Clg HTM Btuh/ft ²	Gain Btuh
Walls								
15B19-0wc-6: Bg wall, light dry soil, 2"x4" wood int frm, concrete wall, r-19 cav ins, 8" thk, 1/2" gypsum board int fnsh	n	203	0.043	19.0	3.92	795	0.06	12
	n	198	0.040	19.0	3.28	648	0.02	4
	s	90	0.043	19.0	3.96	356	0.06	6
	s	90	0.040	19.0	3.48	313	0.04	3
	w	609	0.040	19.0	3.42	2083	0.03	19
	all	1190	0.040	19.0	3.53	4195	0.04	44
R-24: Frm wall, vnl ext, 3/8" wood shth, r-24 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud	n	720	0.054	24.0	4.10	2956	0.73	525
	e	1041	0.054	24.0	4.10	4273	0.73	759
	s	454	0.054	24.0	4.10	1864	0.73	331
	w	579	0.054	24.0	4.10	2374	0.73	422
	all	2794	0.054	24.0	4.10	11468	0.73	2037
Partitions								
Blk wall, 2"x4" wood int frm, 8" thk, r-19 cav ins, 1/2" gypsum board int fnsh		339	0.341	19.0	13.6	4624	0.34	116
R-24: Frm wall, vnl ext, 3/8" wood shth, r-24 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud		427	0.054	24.0	2.16	922	0.27	115
Windows								
U-28 Glazing: 2 glazing, clr low-e outr, argon gas, vnl frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.31); 6.67 ft head ht	n	7	0.280	0	21.3	149	9.81	69
	n	23	0.280	0	21.3	479	9.81	221
	n	30	0.280	0	21.3	638	9.81	294
	e	83	0.280	0	21.3	1756	32.9	2717
	all	142	0.280	0	21.3	3022	23.2	3300
Glass Door U 30: 2 glazing, clr low-e outr, argon gas, vnl frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.32); 6.67 ft head ht	n	24	0.300	0	22.8	547	7.19	173
	e	136	0.300	0	22.8	3101	23.9	3251
	all	160	0.300	0	22.8	3648	21.4	3423
U-28 Glazing: 2 glazing, clr outr, air gas, mtl no brk frm mat, clr innr, 1/4" gap, 1/8" thk; NFRC rated (SHGC=0.28); 6.67 ft head ht	n	39	0.280	0	21.3	830	9.24	360
	e	149	0.280	0	21.3	3176	30.1	4496
	w	162	0.280	0	21.3	3442	30.1	4872
	all	350	0.280	0	21.3	7448	27.8	9728

Doors

11D0: Door, wd sc type	w	21	0.390	0	29.6	622	7.22	152
	n	21	0.390	0	15.6	328	7.22	152
	n	21	0.390	0	15.6	328	1.95	41
	all	63	0.390	0	20.3	1278	5.46	344
11G0: Door, wd pnl type	w	28	0.540	0	41.0	1149	9.99	280

Ceilings

16B-50ad: Attic ceiling, asphalt shingles roof mat, r-50 ceil ins, 5/8" gypsum board int fnsh		2523	0.020	50.0	1.52	3835	0.84	2119
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Floors

20P-38t: Flr floor, frm flr, 12" thkns, tile flr fnsh, r-38 cav ins, amb ovr		12	0.030	38.0	2.28	27	0.06	1
21A-28t: Bg floor, light dry soil, 6.5' depth		2511	0.022	0	1.67	4198	0	0



Project Information

For: Searle Residence
 Idaho Falls, ID

Notes:

Design Information

Weather: Idaho Falls, ID, US

Winter Design Conditions

Outside db	-6 °F
Inside db	70 °F
Design TD	76 °F

Summer Design Conditions

Outside db	89 °F
Inside db	75 °F
Design TD	14 °F
Daily range	H
Relative humidity	50 %
Moisture difference	-31 gr/lb

Heating Summary

Structure	56222 Btuh
Ducts	0 Btuh
Central vent (195 cfm)	13696 Btuh
Outside air	
Humidification	0 Btuh
Piping	0 Btuh
Equipment load	69918 Btuh

Sensible Cooling Equipment Load Sizing

Structure	24635 Btuh
Ducts	0 Btuh
Central vent (195 cfm)	2523 Btuh
Outside air	
Blower	0 Btuh
Use manufacturer's data	n
Rate/swing multiplier	0.94
Equipment sensible load	25529 Btuh

Infiltration

Method	Simplified
Construction quality	Semi-tight
Fireplaces	0

Latent Cooling Equipment Load Sizing

Structure	-603 Btuh
Ducts	0 Btuh
Central vent (195 cfm)	-3507 Btuh
Outside air	
Equipment latent load	0 Btuh

	Heating	Cooling
Area (ft ²)	5034	5034
Volume (ft ³)	46799	46799
Air changes/hour	0.19	0.10
Equip. AVF (cfm)	148	78

Equipment Total Load (Sen+Lat)	25529 Btuh
Req. total capacity at 1.00 SHR	2.1 ton

Heating Equipment Summary

Make	Lennox
Trade	LENNOX
Model	SLP98UH090XV48C-*
AHRI ref	4792117
Efficiency	98.2 AFUE
Heating input	88000 Btuh
Heating output	77400 Btuh
Temperature rise	58 °F
Actual air flow	1434 cfm
Air flow factor	0.026 cfm/Btuh
Static pressure	0.70 in H2O
Space thermostat	

Cooling Equipment Summary

Make	Lennox
Trade	LENNOX
Cond	14ACX-048-230-14
Coil	CX35-48C+SLP98UH090XV48C*+TDR
AHRI ref	8267607
Efficiency	12.0 EER, 14 SEER
Sensible cooling	48000 Btuh
Latent cooling	0 Btuh
Total cooling	48000 Btuh
Actual air flow	1580 cfm
Air flow factor	0.063 cfm/Btuh
Static pressure	0.80 in H2O
Load sensible heat ratio	1.00

Calculations approved by ACCA to meet all requirements of Manual J 8th Ed.



Duct System Summary

Entire House

Palmer Heating & Cooling, LLC

Job: Searle
Date: Jan 18, 2019
By: John A Christensen, Pa...

4107 S 45th W, Idaho Falls, ID 83402 Phone: 208 604-0831 Email: chrjohn.phc@gmail.com

Project Information

For: Searle Residence
Idaho Falls, ID

	Heating	Cooling
External static pressure	0.70 in H2O	0.80 in H2O
Pressure losses	0.39 in H2O	0.46 in H2O
Available static pressure	0.31 in H2O	0.34 in H2O
Supply / return available pressure	0.269 / 0.041 in H2O	0.295 / 0.045 in H2O
Lowest friction rate	0.071 in/100ft	0.077 in/100ft
Actual air flow	1434 cfm	1580 cfm
Total effective length (TEL)	439 ft	

Supply Branch Detail Table

Name	Design (Btuh)	Htg (cfm)	Clg (cfm)	Design FR	Diam (in)	H x W (in)	Duct Matl	Actual Ln (ft)	Ftg.Eqv Ln (ft)	Trunk
B Bath	h 616	16	7	0.119	6.0	0x0	ShMt	62.0	165.0	st8A
B Bedroom 1	h 2926	75	36	0.117	6.0	0x0	ShMt	79.0	150.0	st5
B Bedroom 2	c 1418	78	90	0.144	6.0	0x0	ShMt	50.5	155.0	st8
B Rec Room	h 4370	111	85	0.149	6.0	0x0	ShMt	30.5	150.0	st8
B Rec Room-A	h 4370	111	85	0.123	6.0	0x0	ShMt	58.0	160.0	st9
B Rec Room-B	h 4370	111	85	0.133	6.0	0x0	ShMt	57.5	145.0	st9A
B Rec Room-C	h 4370	111	85	0.143	6.0	0x0	ShMt	38.0	150.0	st9
Bath	c 629	31	40	0.083	6.0	0x0	ShMt	54.0	300.0	st17A
Dining	c 1236	60	78	0.081	6.0	0x0	ShMt	74.0	290.0	st16
Dining-A	c 1236	60	78	0.079	6.0	0x0	ShMt	69.0	305.0	st16
Entry/Hall	c 1542	75	98	0.206	6.0	0x0	ShMt	13.5	130.0	st12
Entry/Hall-A	c 1542	75	98	0.108	6.0	0x0	ShMt	53.0	220.0	st17
Great Room	c 2014	66	128	0.077	7.0	0x0	ShMt	81.0	300.0	st16A
Great Room-A	c 2014	66	128	0.078	7.0	0x0	ShMt	70.0	310.0	st16A
Kitchen	c 1760	55	112	0.085	7.0	0x0	ShMt	47.0	300.0	st16
Laundry	c 51	3	3	0.178	6.0	0x0	ShMt	21.0	145.0	st23
M Bath	c 1687	82	107	0.184	6.0	0x0	ShMt	30.5	130.0	st24
M Toilet	h 798	20	11	0.152	6.0	0x0	ShMt	31.5	145.0	st22
M WIC	h 2108	54	27	0.140	6.0	0x0	ShMt	42.0	150.0	st22
Master Suite	c 887	28	56	0.151	6.0	0x0	ShMt	40.0	155.0	st22
Master Suite-A	c 887	28	56	0.138	6.0	0x0	ShMt	49.0	165.0	st22A
Music Room	c 934	42	59	0.191	6.0	0x0	ShMt	24.5	130.0	st12
Music Room-A	c 934	42	59	0.201	6.0	0x0	ShMt	17.0	130.0	st12
Office	c 899	33	57	0.106	6.0	0x0	ShMt	49.5	230.0	st17A

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
st16	Peak AVF	306	524	0.077	673	11.4	8 x 14	ShtMetl	st13
st9A	Peak AVF	111	85	0.133	568	6.0	0 x 0	ShtMetl	st9
st9	Peak AVF	334	254	0.123	602	8.8	8 x 10	ShtMetl	st4
st13	Peak AVF	445	718	0.077	718	12.8	12 x 12	ShtMetl	st2
st4	Peak AVF	615	471	0.117	790	11.1	8 x 14	ShtMetl	st1
st1	Peak AVF	615	471	0.117	738	11.1	12 x 10	ShtMetl	
st12	Peak AVF	159	216	0.191	649	6.8	8 x 6	ShtMetl	st2
st16A	Peak AVF	132	255	0.077	574	8.7	8 x 8	ShtMetl	st16
st17A	Peak AVF	64	97	0.083	291	6.0	8 x 6	ShtMetl	st17
st17	Peak AVF	139	195	0.083	438	7.7	8 x 8	ShtMetl	st13
st2	Peak AVF	604	934	0.077	701	14.1	12 x 16	ShtMetl	
st8	Peak AVF	280	217	0.117	630	8.3	8 x 8	ShtMetl	st4
st8A	Peak AVF	90	43	0.117	271	5.4	8 x 6	ShtMetl	st8
st5	Peak AVF	75	36	0.117	224	5.1	8 x 6	ShtMetl	st8A
st22A	Peak AVF	28	56	0.138	169	4.4	8 x 6	ShtMetl	st22
st22	Peak AVF	131	151	0.138	453	6.4	8 x 6	ShtMetl	st3
st23	Peak AVF	85	110	0.178	331	5.4	8 x 6	ShtMetl	st3
st24	Peak AVF	82	107	0.184	545	6.0	0 x 0	ShtMetl	st23
st3	Peak AVF	215	261	0.138	587	7.8	8 x 8	ShtMetl	

Return Branch Detail Table

Name	Grille Size (in)	Htg (cfm)	Clg (cfm)	TEL (ft)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Stud/Joist Opening (in)	Duct Matl	Trunk
rb1	24x 32	1434	1667	58.0	0.077	682	17.5	16x 22		ShMt	



Static Pressure and Friction Rate
Entire House
Palmer Heating & Cooling, LLC

Job: Searle
 Date: Jan 18, 2019
 By: John A Christensen, Pa...

4107 S 45th W, Idaho Falls, ID 83402 Phone: 208 604-0831 Email: chrjohn.phc@gmail.com

Project Information

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Available Static Pressure

	Heating (in H2O)	Cooling (in H2O)
External static pressure	0.70	0.80
Pressure losses		
Coil	0.14	0.19
Heat exchanger	0	0
Supply diffusers	0.03	0.03
Return grilles	0.03	0.03
Filter	0.16	0.18
Humidifier	0	0
Balancing damper	0.03	0.03
Other device	0	0
Available static pressure	0.31	0.34

Total Effective Length

	Supply (ft)	Return (ft)
Measured length of run-out	1	3
Measured length of trunk	80	0
Equivalent length of fittings	300	55
Total length	381	58
Total effective length		439

Friction Rate

	Heating (in/100ft)		Cooling (in/100ft)	
Supply Ducts	0.071	OK	0.077	OK
Return Ducts	0.071	OK	0.077	OK

Fitting Equivalent Length Details

Supply 4AD=60, 2B0=20, 12O1=10, 8CB=5, 9A1=80, 8CB=5, 8CB=5, 9A1=80, 1C=35: TotalEL=300
 Return 5O=35, 6M=20: TotalEL=55

