

The undersigned has reviewed and takes responsibility for this design, and has the qualifications and meets the requirements set out in the Ontario Building Code to be a designer.

QUALIFICATION INFORMATION

Required unless design is exempt under 2.17.5.1 of the building code

S Clarke-Johnson *S Clarke-Johnson* 24790
 NAME SIGNATURE BCIN

REGISTRATION INFORMATION

Required unless design is exempt under 2.17.4.1 of the building code

S Clarke-Johnson *S Clarke-Johnson* 24790
 NAME SIGNATURE BCIN



Plan No: BU1 8802009

Authority:

Date: 20 11 09

Signed: *S Clarke-Johnson* #0095
 S E CLARKE-JOHNSON

Reviewed for Ontario Building Code Compliance.
 Subject to Corrections Noted on Plans and Field Inspections.

HRAI Residential Heating and Cooling Duct Design Program

Permit: 21 104272 000 00 R9

For: Name
 Address 688 CROOKS HOLLOW RD
 Town, Prov DUNDAS ON

Phone (res):
 (bus):
 (fax):
 Date: 05/19/21
 Name: Laurie Smith

By: Name WELMERS & SONS HEATING & A/C
 Address 59 KIRBY AVE UNIT 2
 Town, Prov DUNDAS ON L9H 6P3

Approved by: *L Smith*
 (905) 628-3809
 (905) 627-5949

Bldg address

PART A: HEATING EQUIPMENT SUMMARY

Fuel type: gas
 Unit make: LENNOX
 Unit model: EL296UH045SV36B
AFUE: 96%
 1 Rated output: 28000 Btu/h
 2 Approved max temp rise: 50 F
 Approved min temp rise: 20 F
 Fan dr: Direct Speed: MED-LOW
 3 Unit external st pr: 0.500 "wc

PART B: COOLING EQUIPMENT SUMMARY

Type: central air conditioner
 Unit make: LUXAIRE
 Unit model:
 Outdoor make: LUXAIRE
 Outdr unit model: TDJD18541S3A
 1 Rated output 18000 Btu/h
 2 Airflow rate/ton 400 cfm/ton
 3 Coil pressure drop 0.250 "wc

PART C: PRELIMINARY DESIGN CALCULATION


1 Volume of house 13012 cu ft
 2 Heat gain of condtn sp 9428 Btu/h
 3 Heat loss of condtn sp 17395 Btu/h
 4 Cooling airfl rt reqt 600 cfm
 5 Temp rise airfl rt reqt 519 cfm
 6 Crclt reqt for 1.50 ac/h 325 cfm
 7 System dsgn airfl rate 660 cfm

8 Calc system temp rise 39.3 F
 9 Available sys st pr 0.250 "wc
 10 Cooling airfl propn fac 0.0700
 11 Heating airfl propn fac 0.0379
 12 Total eff length of sys 241 ft
 [longest rtn tot eff lg]
 13 Supply plenum propn fac 0.500
 14 Supply plenum pressure 0.130 "wc
 15 Return plenum pressure 0.120 "wc

Direct input of total effective lengths

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PART D: ROOM AND FLOOR SUPPLY AND RETURN DESIGN AIR FLOW R



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Draft A Nov 30 2017 8pts

1	FLOOR		BASEMENT	1st-FLOOR	1st-FLOOR	1st-FLOOR	1st-FLOOR
2	ROOM		BASEMENT	ENSUITE	GARAGE ENTRY	HALL	LAUNDRY RM
3	Cooling load	Btu/h	511	1252	649	225	2409
4	Cooling flow rate	cfm	34	87	65	14	87
5	Heating load	Btu/h	8264	1916	1578	1041	1475
6	Heating flow rate	cfm	314	73	87	37	49
	Design flow rate	cfm	314	87	87	87	87
7a	Total floor htg supply	cfm	314				
7b	Total floor return	cfm	0				
	Addnl vent flow	cfm	0	0	0	0	0

1	FLOOR		1st-FLOOR				
2	ROOM		MASTER BDRM				
3	Cooling load	Btu/h	4233	0	0	0	0
4	Cooling flow rate	cfm	350	0	0	0	0
5	Heating load	Btu/h	2614	0	0	0	0
6	Heating flow rate	cfm	118	0	0	0	0
	Design flow rate	cfm	350	0	0	0	0
7a	Total floor htg supply	cfm	346				
7b	Total floor return	cfm	660				
	Addnl vent flow	cfm	0	0	0	0	0



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PART E: SIZING OF RETURN AIR DUCTS

1 TRUNK No		R	R	R		
2 ROOM		BASEMENT	MASTER BDRM	LAUNDRY RM		
-----B-R-A-N-C-H---R-U-N-S-----						
3 Inlet No		3	2	1		
4 Inlet flow rate	cfm	157	253	250		
Grille pressure loss	"wc	0.010	0.010	0.010		
7 Grille size	in	6x14	8x14	8x14		
Location		Ceill	Flr	Flr		
8 Duct design pressure	"wc	0.110	0.110	0.110		
9 Measured length	ft	23.0	24.0	31.0		
10 Equivalent length	ft	165.0	205.0	210.0		
11 Total eff length	ft	188.0	229.0	241.0		
12 Friction loss	"wc/hft	0.059	0.048	0.046		
14 Branch pipe diameter	in	8	10	10		
15 Branch rect equivalent	in	8x7	8x10	8x10		
Number of above		1	1	1		
Branch air velocity	ft/min	403.71	455.40	450.00	0.00	0.00
Grille velocity	ft/min	347.82	433.71	428.57	0.00	0.00
-----D-O-W-N-S-T-R-E-A-M---T-R-U-N-K---S-E-C-T-I-O-N-S-----						
5 Trunk flow rate	cfm	660	503	250	0	0
13 Friction loss	"wc/hft	0.046	0.046	0.046	0.000	0.000
16 Trunk pipe diameter	in	14	13	10	0	0
17 Trunk rect equivalent	in	8x22	8x18	8x10		
18 Installed size	in	8x22	8x18	8x10		
Number of above		1	1	1	0	0
Trunk air velocity	ft/min	540.00	503.00	450.00	0.00	0.00

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Date: 05/19/21

Name: Laurie Smith

Approved by: *Smith*

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 Name: Laurie Smith
 Approved by: *[Signature]*

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PART F: SIZING OF SUPPLY DUCTS

1 TRUNK No		S1	S1	S1	S1	S1
2 ROOM		ENSUITE	MASTER BDRM	MASTER BDRM	BASEMENT	BASEMENT
-----B-R-A-N-C-H---R-U-N-S-----						
3 Outlet No		1	2	3	4	5
4 Dsgn outlet flow rate cfm		43	95	89	78	77
6 Register size	in	4x10	4x10	4x10	4x10	4x10
Location		Flr	Flr	Flr	Flr	Flr
7 Outlet pressure loss "wc		0.010	0.010	0.010	0.010	0.010
8 Duct design pressure "wc		0.120	0.120	0.120	0.120	0.120
9 Measured length	ft	12.0	29.0	33.0	33.0	33.0
10 Equivalent length	ft	100.0	150.0	180.0	170.0	120.0
11 Total eff length	ft	112.0	179.0	213.0	203.0	125.0
12 Friction loss "wc/hft		0.107	0.067	0.056	0.059	0.096
14 Branch pipe diameter	in	4	6	6	6	6
15 Branch rect equivalent in		0x0	0x0	0x0	0x0	0x0
Branch air velocity	ft/min	492.75	483.83	453.27	397.25	402.34
Register velocity	ft/min	387.00	456.00	427.20	374.40	379.20

-----U-P-S-T-R-E-A-M---T-R-U-N-K---S-E-C-T-I-O-N-S-----						
5 Trunk flow rate	cfm	43	138	227	235	255
13 Friction loss "wc/hft		0.107	0.067	0.056	0.056	0.056
16 Trunk pipe diameter	in	4	7	9	9	9
17 Trunk rect equivalent in		8x6	8x6	8x9	8x9	8x9
18 Installed size	in	8x6	8x6	8x10	8x10	8x10
Trunk air velocity	ft/min	129.00	414.00	408.60	423.00	459.00

1 TRUNK No		S1	S1	S1	S1	S2
2 ROOM		HALL	MASTER BDRM	MASTER BDRM	ENSUITE	GARAGE ENTRY
-----B-R-A-N-C-H---R-U-N-S-----						
3 Outlet No		6	7	8	9	10
4 Dsgn outlet flow rate cfm		20	83	83	44	35
6 Register size	in	4x10	4x10	4x10	4x10	4x10
Location		Flr	Flr	Flr	Flr	Flr
7 Outlet pressure loss "wc		0.010	0.010	0.010	0.010	0.010
8 Duct design pressure "wc		0.120	0.120	0.120	0.120	0.120
9 Measured length	ft	33.0	42.0	36.0	4.0	14.0
10 Equivalent length	ft	130.0	200.0	200.0	160.0	100.0
11 Total eff length	ft	163.0	242.0	236.0	164.0	114.0
12 Friction loss "wc/hft		0.074	0.050	0.051	0.073	0.105
14 Branch pipe diameter	in	4	6	6	5	4
15 Branch rect equivalent in		0x0	0x0	0x0	0x0	0x0
Branch air velocity	ft/min	229.18	422.72	422.72	322.69	401.07
Register velocity	ft/min	96.00	398.40	398.40	211.20	168.00

-----U-P-S-T-R-E-A-M---T-R-U-N-K---S-E-C-T-I-O-N-S-----						
5 Trunk flow rate	cfm	275	334	417	461	35
13 Friction loss "wc/hft		0.056	0.050	0.050	0.050	0.105
16 Trunk pipe diameter	in	10	11	12	12	4
17 Trunk rect equivalent in		8x10	8x12	8x14	8x16	8x6
18 Installed size	in	8x10	8x12	8x14	8x16	8x6
Trunk air velocity	ft/min	495.00	501.00	536.14	518.63	105.00



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PART F: SIZING OF SUPPLY DUCTS

1 TRUNK No	S2	S2	S2	S2	S2
2 ROOM	BARAGE ENTRY	BASEMENT	HALL	BASEMENT	LAUNDRY RM
-----B-R-A-N-C-H---R-U-N-S-----					
3 Outlet No	11	12	13	14	15
4 Dsgn outlet flow rate cfm	52	78	19	74	117
6 Register size	in 4x10	4x10	4x10	4x10	4x10
Location	Flr	Ceil	Flr	Flr	Flr
7 Outlet pressure loss "wc	0.010	0.010	0.010	0.010	0.010
8 Duct design pressure "wc	0.120	0.120	0.120	0.120	0.120
9 Measured length ft	21.0	34.0	41.0	120.0	180.0
10 Equivalent length ft	140.0	160.0	110.0	130.0	219.0
11 Total eff length ft	161.0	194.0	151.0	130.0	219.0
12 Friction loss "wc/hft	0.075	0.062	0.079	0.075	0.055
14 Branch pipe diameter in	5	6	4	6	6
15 Branch rect equivalent in	0x0	0x0	0x0	0x0	0x0
Branch air velocity ft/min	381.36	397.25	217.72	402.34	443.89
Register velocity ft/min	249.60	374.40	91.20	379.20	417.60
-----U-P-S-T-R-E-A-M---T-R-U-N-K---S-E-C-T-I-O-N-S-----					
5 Trunk flow rate cfm	87	165	184	263	292
13 Friction loss "wc/hft	0.075	0.062	0.062	0.062	0.055
16 Trunk pipe diameter in	6	8	8	9	10
17 Trunk rect equivalent in	8x6	8x7	8x7	8x9	8x11
18 Installed size in	8x6	8x8	8x8	8x10	8x12
Trunk air velocity ft/min	261.00	371.25	414.00	473.40	438.00
-----B-R-A-N-C-H---R-U-N-S-----					
3 Outlet No					
4 Dsgn outlet flow rate cfm	0	0	0	0	0
6 Register size	in				
Location					
7 Outlet pressure loss "wc	0.000	0.000	0.000	0.000	0.000
8 Duct design pressure "wc	0.000	0.000	0.000	0.000	0.000
9 Measured length ft	0.0	0.0	0.0	0.0	0.0
10 Equivalent length ft	0.0	0.0	0.0	0.0	0.0
11 Total eff length ft	0.0	0.0	0.0	0.0	0.0
12 Friction loss "wc/hft	0.000	0.000	0.000	0.000	0.000
14 Branch pipe diameter in	0	0	0	0	0
15 Branch rect equivalent in					
Branch air velocity ft/min	0.00	0.00	0.00	0.00	0.00
Register velocity ft/min	0.00	0.00	0.00	0.00	0.00
-----U-P-S-T-R-E-A-M---T-R-U-N-K---S-E-C-T-I-O-N-S-----					
5 Trunk flow rate cfm	660	0	0	0	0
13 Friction loss "wc/hft	0.050	0.000	0.000	0.000	0.000
16 Trunk pipe diameter in	14	0	0	0	0
17 Trunk rect equivalent in	8x22				
18 Installed size in	8x22				
Trunk air velocity ft/min	540.00	0.00	0.00	0.00	0.00

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