COOL CAT'S HVAC DESIGN

Cert.#: 13345(RHLG, RASD)
PO Box 215, Ayton, Ont N0G 1C0 Phone: 289-260-3490 Email: catlin@coolcatshvacdesign.com Web: www.coolcatshvacdesign.com License: BCIN 46979

Building Analysis
Entire House
Cool Cat's HVAC Design

Job:
Date: Oct 10/2024
By: Catlin Homer

Project Information

For: Re:

Design Conditions

Location:
Orangeville, ON, CA
Elevation: 1329 ft
Latitude: 44 °N

Outdoor:	**Heating**	**Cooling**
Dry bulb (°F)	-6	84
Daily range (°F)	-	22 (M)
Wet bulb (°F)	-	73
Wind speed (mph)	8.7	6.2

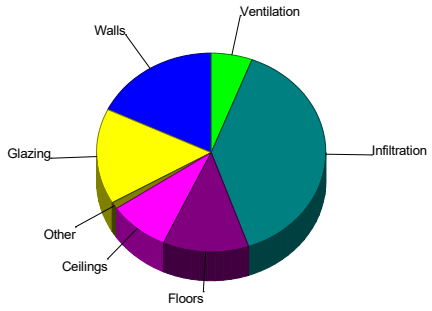
Indoor:	**Heating**	**Cooling**
Indoor temperature (°F)	72	74
Design TD (°F)	78	10
Relative humidity (%)	50	50
Moisture difference (gr/lb)	55.3	41.9

Infiltration:

Method	F280-12
Expos. categ	Light local shielding
Const. categ	Present (1961-) (ACH=3.57)
Number of stories	1.0

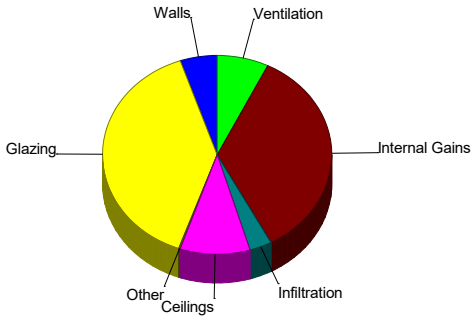
Heating

Component	Btuh/ft²	Btuh	% of load
Walls	0.4	10995	17.9
Glazing	21.8	9567	15.5
Doors	16.1	677	1.1
Ceilings	1.7	5315	8.6
Floors	2.4	7464	12.1
Infiltration	49.8	23939	38.9
Ducts		0	0
Hydronic		0	0
Humidification		0	0
Ventilation		3571	5.8
Adjustments		0	
Total		**61527**	**100.0**



Cooling

Component	Btuh/ft²	Btuh	% of load
Walls	0.1	1347	5.2
Glazing	23.0	10118	39.3
Doors	1.3	54	0.2
Ceilings	0.8	2541	9.9
Floors	0	0	0
Infiltration	1.7	810	3.1
Ducts		0	0
Ventilation		1873	7.3
Internal gains		8991	34.9
Blower		0	0
Adjustments		0	
Total		**25734**	**100.0**



Latent Cooling Load = 7720 Btuh
Overall U-value = 0.011 Btuh/ft²-°F, Window / Floor Area = 7.1 %

Data entries checked.

Project Summary
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Project Information

For: Re:

Notes: An analysis of the building envelope including insulation,windows,doors,etc. as per the prints submitted to us. Cool Cat's HVAC Design is not responsible for changes by the builder/contractor/owner during construction, or on site inspections. Losses are based on worst case scenarios. THIS DESIGN ONLY VALID FOR ADDRESS STATED ABOVE.

Design Information

Weather: Orangeville, ON, CA

Winter Design Conditions

Outside db	-6	°F
Inside db	72	°F
Design TD	78	°F
Ventilation Method	F280-12	

Summer Design Conditions

Outside db	84	°F
Inside db	74	°F
Design TD	10	°F
Daily range	M	
Relative humidity	50	%
Moisture difference	42	gr/lb

Heating Summary

Structure	57956	Btuh
Ducts	0	Btuh
Central vent (SER=75% 170 cfm)	3571	Btuh
Heat recovery, Fantech HERO 200H or equivalent		
Humidification	0	Btuh
Piping	0	Btuh
Equipment load	61527	Btuh

Sensible Cooling Equipment Load Sizing

Structure	23861	Btuh
Ducts	0	Btuh
Central vent (SER=0% 170 cfm)	1873	Btuh
Heat recovery, Fantech HERO 200H or equivalent		
Blower	0	Btuh
Use manufacturer's data	y	
Rate/swing multiplier	1.00	
Equipment sensible load	25734	Btuh

Infiltration

Method	F280-12
Expos. categ	Light local shielding
Const. categ	Present (1961-) (ACH=3.57)
Number of stories	1.0

	Heating	Cooling
Area (ft²)	6144	6144
Volume (ft³)	59200	59200
Air changes/hour	0.29	0.07
Equiv. AVF (cfm)	285	74

Latent Cooling Equipment Load Sizing

Structure	3097	Btuh
Ducts	0	Btuh
Central vent (170 cfm)	4623	Btuh
Heat recovery, Fantech HERO 200H or equivalent		
Equipment latent load	7720	Btuh
Equipment Total Load (Sen+Lat)	33454	Btuh
Req. total capacity at 0.77 SHR	2.8	ton

Heating Equipment Summary

Make	Keeprite or equivalent
Trade	KEEPRITE
Model	G96VTN0802120B
AHRI ref	212595187

Efficiency	96.7	AFUE
Heating input	80000	Btuh
Heating output	78000	Btuh
Temperature rise	50	°F
Actual air flow	1444	cfm
Air flow factor	0.025	cfm/Btuh
Static pressure	0.70	in H2O
Space thermostat		

Cooling Equipment Summary

Make	Keeprite or equivalent
Trade	15 SEER HORIZONTAL R410AAC
Cond	S4A5S36*K*WAA*
Coil	EA*4X42L24A*+*96VTN0802120B*
AHRI ref	212901268

Efficiency	12.5 EER2,15.2 SEER2	
Sensible cooling	26334	Btuh
Latent cooling	7866	Btuh
Total cooling	34200	Btuh
Actual air flow	1140	cfm
Air flow factor	0.048	cfm/Btuh
Static pressure	0.70	in H2O
Load sensible heat ratio	0.77	

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Right-F280™ Worksheet
Entire House
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		Entire House	Bed2	Bsmnt
1	Room name			
2	Exposed wall	502.0 ft	42.5 ft	251.0 ft
3	Room dimensions		18.5 x 12.0 ft	1.0 x 3072.0 ft
4	Room height	9.6 ft d	10.1 ft heat/cool	8.6 ft heat/cool

	Ty	CST	R-value	Or	TD/R (Btuh/ft²)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)	
					Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
5	W	R22Sidi	17.03	ne	4.6	0.5	515	406	1856	218	187	149	682	80	76	76	347	41
	├─G	W28	3.57	ne	21.8	20.1	51	0	1104	1017	0	0	0	0	0	0	0	0
	├─G	W28	3.57	ne	21.8	13.2	38	0	817	495	38	0	817	495	0	0	0	0
	└─D	23G0	4.83	ne	16.1	1.9	21	21	339	40	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	se	4.6	0.7	600	549	2508	364	121	121	554	80	50	28	129	19
	├─G	W28	3.57	se	21.8	28.5	41	0	900	1178	0	0	0	0	21	0	465	608
	└─G	W28	3.57	se	21.8	18.2	10	0	218	182	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	sw	4.6	0.7	844	600	2741	397	0	0	0	0	76	55	250	36
	├─G	W28	3.57	sw	21.8	28.5	106	0	2319	3035	0	0	0	0	21	0	465	608
	├─G	W28	3.57	sw	21.8	18.2	57	0	1247	1044	0	0	0	0	0	0	0	0
	└─G	W28	3.57	sw	21.8	28.5	80	0	1743	2281	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	nw	4.6	0.5	600	544	2487	291	121	121	554	65	50	28	129	15
	├─G	W28	3.57	nw	21.8	20.1	21	0	465	428	0	0	0	0	21	0	465	428
	└─G	W28	3.57	nw	21.8	13.2	35	0	755	457	0	0	0	0	0	0	0	0
	R	R22P	17.02	-	4.6	0.3	328	307	1404	77	0	0	0	0	0	0	0	0
	└─D	23G0	4.83	n	16.1	0.7	21	21	339	15	0	0	0	0	0	0	0	0
	C	R31 CCa	27.65	-	2.8	1.3	782	782	2200	1052	0	0	0	0	0	0	0	0
	C	R60-A	59.21	-	1.3	0.6	2371	2371	3115	1489	222	222	292	139	0	0	0	0
	F	BCIN 1	n/a	-	n/a	0.0	3072	3072	7464	0	0	0	0	0	3072	3072	7464	0
6	Total conductive loss/gain								34017	14061			2898	859			9712	1755
7	a) Infiltration								23939	810			1142	49			14363	101
	b) Ventilation								0	0			0	0			0	0
8	Internal gains: People@ 240							5		1200		1		240		0		0
	Electric/Appliances									7791				599				0
	Subtotal (lines 6 to 8)								57956	23861			4040	1748			24075	1857
9	Less external load								0	0			0	0			0	0
10	Less transfer								0	0			0	0			0	0
11	Subtotal								57956	23861			4040	1748			24075	1857
12	Distribution losses			Ducts			0%	0%	0	0	0%	0%	0	0	0%	0%	0	0
				Hydronic			0%		0		0%		0		0%		0	
	Redistribution								0	0			0	0			0	0
13	Total room load								57956	23861			4040	1748			24075	1857
14	**Air required (cfm)**								1444	1140			101	84			600	89

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							WIC1 21.0 ft 7.0 x 14.0 ft 10.1 ft heat/cool				Ens1b 3.5 ft 7.0 x 3.5 ft 10.1 ft heat/cool				Ens1a 10.5 ft 11.5 x 10.5 ft 10.1 ft heat/cool			
	Ty	CST	R-value	Or	TD/R (Btuh/ft²)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)	
					Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
5	W	R22Sidi	17.03	ne	4.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	D	23G0	4.83	ne	16.1	1.9	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	se	4.6	0.7	141	141	646	94	35	35	161	23	106	96	439	64
	G	W28	3.57	se	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	se	21.8	18.2	0	0	0	0	0	0	0	0	10	0	218	182
	W	R22Sidi	17.03	sw	4.6	0.7	71	64	291	42	0	0	0	0	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	7	0	152	200	0	0	0	0	0	0	0	0
	G	W28	3.57	sw	21.8	18.2	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	nw	4.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	nw	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	nw	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	R	R22P	17.02	-	4.6	0.3	0	0	0	0	0	0	0	0	0	0	0	0
	D	23G0	4.83	n	16.1	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	C	R31 CCa	27.65	-	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0
	C	R60-A	59.21	-	1.3	0.6	98	98	129	62	25	25	32	15	121	121	159	76
	F	BCIN 1	n/a	-	n/a	0.0	0	0	0	0	0	0	0	0	0	0	0	0
6	Total conductive loss/gain								1218	397			194	39			815	322
7	a) Infiltration								480	23			76	2			321	19
	b) Ventilation								0	0			0	0			0	0
8	Internal gains: People@ 240							0		0		0		0		0		0
	Electric/Appliances									599				599				599
	Subtotal (lines 6 to 8)								1698	1019			270	640			1137	940
9	Less external load								0	0			0	0			0	0
10	Less transfer								0	0			0	0			0	0
11	Subtotal								1698	1019			270	640			1137	940
12	Distribution losses			Ducts			0%	0%	0	0	0%	0%	0	0	0%	0%	0	0
				Hydronic			0%		0		0%		0		0%		0	
	Redistribution								0	0			0	0			0	0
13	Total room load								1698	1019			270	640			1137	940
14	**Air required (cfm)**								42	49			7	31			28	45

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							Lndry 36.0 ft 1.0 x 271.8 ft 10.1 ft heat/cool				Mstr 17.5 ft 17.5 x 17.5 ft 10.1 ft heat/cool				Pwd 0 ft 4.5 x 7.5 ft 10.1 ft heat/cool			
	Ty	CST	R-value	Or	TD/R (Btuh/ft²)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)	
					Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
5	W	R22Sidi	17.03	ne	4.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	D	23G0	4.83	ne	16.1	1.9	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	se	4.6	0.7	96	76	347	50	0	0	0	0	0	0	0	0
	G	W28	3.57	se	21.8	28.5	20	0	436	570	0	0	0	0	0	0	0	0
	G	W28	3.57	se	21.8	18.2	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	sw	4.6	0.7	0	0	0	0	177	141	644	93	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	sw	21.8	18.2	0	0	0	0	36	0	782	655	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	nw	4.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	nw	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	nw	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	R	R22P	17.02	-	4.6	0.3	268	247	1127	62	0	0	0	0	0	0	0	0
	D	23G0	4.83	n	16.1	0.7	21	21	339	15	0	0	0	0	0	0	0	0
	C	R31 CCa	27.65	-	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0
	C	R60-A	59.21	-	1.3	0.6	272	272	357	171	306	306	402	192	34	34	44	21
	F	BCIN 1	n/a	-	n/a	0.0	0	0	0	0	0	0	0	0	0	0	0	0
6	Total conductive loss/gain								2605	868			1828	941			44	21
7	a) Infiltration								1026	50			720	54			17	1
	b) Ventilation								0	0			0	0			0	0
8	Internal gains: People@ 240							0		0		2		480		0		0
	Electric/Appliances									599				599				599
	Subtotal (lines 6 to 8)								3632	1517			2548	2074			62	622
9	Less external load								0	0			0	0			0	0
10	Less transfer								0	0			0	0			0	0
11	Subtotal								3632	1517			2548	2074			62	622
12	Distribution losses			Ducts			0%	0%	0	0	0%	0%	0	0	0%	0%	0	0
				Hydronic			0%		0		0%		0		0%		0	
	Redistribution								0	0			0	0			0	0
13	Total room load								3632	1517			2548	2074			62	622
14	**Air required (cfm)**								90	72			63	99			2	30

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		Kit/Liv/Din				Bed4				WIC4			
1	Room name												
2	Exposed wall	65.5 ft				29.5 ft				0 ft			
3	Room dimensions	1.0 x 1402.5 ft				17.0 x 12.5 ft				8.0 x 7.0 ft			
4	Room height	11.4 ft heat/cool				10.1 ft heat/cool				10.1 ft heat/cool			

	Ty	CST	R-value	Or	TD/R (Btuh/ft²)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)	
					Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
5	W	R22Sidi	17.03	ne	4.6	0.5	253	181	826	97	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	20.1	51	0	1104	1017	0	0	0	0	0	0	0	0
	G	W28	3.57	ne	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	D	23G0	4.83	ne	16.1	1.9	21	21	339	40	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	se	4.6	0.7	51	51	232	34	0	0	0	0	0	0	0	0
	G	W28	3.57	se	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	se	21.8	18.2	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	sw	4.6	0.7	348	190	870	126	172	150	687	100	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	78	0	1702	2227	0	0	0	0	0	0	0	0
	G	W28	3.57	sw	21.8	18.2	0	0	0	0	21	0	465	389	0	0	0	0
	G	W28	3.57	sw	21.8	28.5	80	0	1743	2281	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	nw	4.6	0.5	51	51	232	27	126	126	577	68	0	0	0	0
	G	W28	3.57	nw	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	G	W28	3.57	nw	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	R	R22P	17.02	-	4.6	0.3	61	61	277	15	0	0	0	0	0	0	0	0
	D	23G0	4.83	n	16.1	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	C	R31 CCa	27.65	-	2.8	1.3	782	782	2200	1052	0	0	0	0	0	0	0	0
	C	R60-A	59.21	-	1.3	0.6	701	701	921	440	213	213	279	134	56	56	74	35
	F	BCIN 1	n/a	-	n/a	0.0	0	0	0	0	0	0	0	0	0	0	0	0
6	Total conductive loss/gain								10445	7356			2008	690			74	35
7	a) Infiltration								4115	424			791	40			29	2
	b) Ventilation								0	0			0	0			0	0
8	Internal gains: People@ 240							0		0		1		240		0		0
	Electric/Appliances									599				599				599
	Subtotal (lines 6 to 8)								14559	8379			2799	1569			103	636
9	Less external load								0	0			0	0			0	0
10	Less transfer								0	0			0	0			0	0
11	Subtotal								14559	8379			2799	1569			103	636
12	Distribution losses			Ducts			0%	0%	0	0	0%	0%	0	0	0%	0%	0	0
				Hydronic			0%		0		0%		0		0%		0	
	Redistribution								0	0			0	0			0	0
13	Total room load								14559	8379			2799	1569			103	636
14	**Air required (cfm)**								363	400			70	75			3	30

This software has been verified by HVAC Designers of Canada in accordance with section 8 of CSA F280-12 revised Mar 2023.

Right-F280™ Worksheet
Entire House
Cool Cat's HVAC Design

Job:
Date: Oct 10/2024
By: Catlin Homer

Cert.#: 13345(RHLG, RASD)
PO Box 215, Ayton, Ont N0G 1C0 Phone: 289-260-3490 Email: catlin@coolcatshvacdesign.com Web: www.coolcatshvacdesign.com License: BCIN 46979

		Bed3	Ens2	Ens4
1	Room name			
2	Exposed wall	12.0 ft	6.0 ft	7.0 ft
3	Room dimensions	1.0 x 192.0 ft	11.5 x 6.0 ft	9.0 x 7.0 ft
4	Room height	10.1 ft heat/cool	10.1 ft heat/cool	10.1 ft heat/cool

	Ty	CST	R-value	Or	TD/R (Btuh/ft²)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)		Area (ft²) or perim (ft)		Load (Btuh)	
					Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool	Gross	N/P/S	Heat	Cool
5	W	R22Sidi	17.03	ne	4.6	0.5	0	0	0	0	0	0	0	0	0	0	0	0
	├─G	W28	3.57	ne	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	├─G	W28	3.57	ne	21.8	13.2	0	0	0	0	0	0	0	0	0	0	0	0
	└─D	23G0	4.83	ne	16.1	1.9	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	se	4.6	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	├─G	W28	3.57	se	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	└─G	W28	3.57	se	21.8	18.2	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	sw	4.6	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	├─G	W28	3.57	sw	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	├─G	W28	3.57	sw	21.8	18.2	0	0	0	0	0	0	0	0	0	0	0	0
	└─G	W28	3.57	sw	21.8	28.5	0	0	0	0	0	0	0	0	0	0	0	0
	W	R22Sidi	17.03	nw	4.6	0.5	121	95	432	51	61	61	277	32	71	63	286	34
	├─G	W28	3.57	nw	21.8	20.1	0	0	0	0	0	0	0	0	0	0	0	0
	└─G	W28	3.57	nw	21.8	13.2	27	0	581	352	0	0	0	0	8	0	174	106
	R	R22P	17.02	-	4.6	0.3	0	0	0	0	0	0	0	0	0	0	0	0
	└─D	23G0	4.83	n	16.1	0.7	0	0	0	0	0	0	0	0	0	0	0	0
	C	R31 CCa	27.65	-	2.8	1.3	0	0	0	0	0	0	0	0	0	0	0	0
	C	R60-A	59.21	-	1.3	0.6	192	192	252	121	69	69	91	43	63	63	83	40
	F	BCIN 1	n/a	-	n/a	0.0	0	0	0	0	0	0	0	0	0	0	0	0
6	Total conductive loss/gain								1265	523			368	76			543	179
7	a) Infiltration								498	30			145	4			214	10
	b) Ventilation								0	0			0	0			0	0
8	Internal gains: People@ 240							1		240		0		0		0		0
	Electric/Appliances									599				599				599
	Subtotal (lines 6 to 8)								1763	1392			512	679			758	788
9	Less external load								0	0			0	0			0	0
10	Less transfer								0	0			0	0			0	0
11	Subtotal								1763	1392			512	679			758	788
12	Distribution losses			Ducts			0%	0%	0	0	0%	0%	0	0	0%	0%	0	0
				Hydronic			0%		0		0%		0		0%		0	
	Redistribution								0	0			0	0			0	0
13	Total room load								1763	1392			512	679			758	788
14	**Air required (cfm)**								44	67			13	32			19	38

This software has been verified by HVAC Designers of Canada in accordance with section 8 of CSA F280-12 revised Mar 2023.

COOL CAT'S HVAC DESIGN
Cert.#: 13345(RHLG, RASD)
PO Box 215, Ayton, Ont N0G 1C0 Phone: 289-260-3490 Email: catlin@coolcatshvacdesign.com Web: www.coolcatshvacdesign.com License: BCIN 46979

F280 Infiltration Report

Entire House

Cool Cat's HVAC Design

Job: [illegible]
Date: Oct 10/2024
By: Catlin Homer

Project Information

For: Re:
9 Maple Grove Rd, Caledon, Ont

Design Conditions

House type	Detached
Site	Suburban, forest
Wall shielding	Light local shielding
Storeys	1.0 (w/o basement)
Highest ceiling height (ft)	17.0
Foundation	Full

Air Leakage

Air tightness	Present (1961-) (ACH=3.57)

Flues

Shielding	No local shielding			
	#1	#2	#3	#4
Diameter (in)	0	0	0	0

Summary

Heating

Infiltation area	6144	ft²
Infiltration volume	59200	ft³
Unadjusted air change rate	0.289	ach
Unadjusted AVF	285	cfm
Vent adjustment	0	cfm
Net AVF	285	cfm
Net air change rate	0.289	ach

Cooling

Infiltration area	6144	ft²
Infiltration volume	59200	ft³
Unadjusted air change rate	0.075	ach
Unadjusted AVF	74	cfm
Vent adjustment	0	cfm
Net AVF	74	cfm
Net air change rate	0.075	ach

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F280-12 Room Infiltration

Entire House

Cool Cat's HVAC Design

Job: [illegible]
Date: Oct 10/2024
By: Catlin Homer

Room Name	Level Factor	Htg load (Btuh)	Clg load (Btuh)	Htg AVF (cfm)	Clg AVF (cfm)
Bed2	0.40	1142	49	14	4
Bsmnt	0.60	14363	101	171	9
WIC1	0.40	480	23	6	2
Ens1b	0.40	76	2	1	0
Ens1a	0.40	321	19	4	2
Lndry	0.40	1026	50	12	5
Mstr	0.40	720	54	9	5
Pwd	0.40	17	1	0	0
Kit/Liv/Din	0.40	4115	424	49	38
Bed4	0.40	791	40	9	4
WIC4	0.40	29	2	0	0
Bed3	0.40	498	30	6	3
Ens2	0.40	145	4	2	0
Ens4	0.40	214	10	3	1
Entire House	0	23939	810	285	74

This software has been verified by HVAC Designers of Canada in accordance with section 8 of CSA F280-12 revised Mar 2023.

Heat loss and gain calculation summary sheet

CSA-F280-M12
Standard Form No. 1

These documents issued for the use of **Cool Cat's HVAC Design** | Project no.
and may not be used by any other persons without authorization. Documents for permit and/or construction are signed in red.

Building location

Model:		Site:	
Address:		Lot:	
City and Province:	Caledon Ont	Postal code:	

Calculations based on

Dimensional information based on:	Supplied Drawings				
Attachment:	Detached	Front facing:	Northeast	Assumed?	No
Number of storeys:	1 + basement	Air tightness:	Present (1961-) (ACH=3.57)	Assumed?	Yes
Weather location:	Orangeville, ON, CA Ventilated: Included	Wind exposure:	Light local shielding		
HRV?	Fantech HERO 200H or equivalent	Internal shading:	Drapes	Occupants:	5
Recovery %:	75 %	Units:	Imperial (I-P)		

Heating design conditions

Outdoor temp: -6 °F Indoor temp: 72 °F Mean soil temp: 46 °F

Cooling design conditions

Outdoor temp: 84 °F Indoor temp: 74 °F Latitude: 44 °N STrange: 22 °F

Above grade walls

Style A:	ne,se,sw,nw - R22Siding (Frm wall, vnl ext, 1/2" wood shth, r-22 cav ins, 1/2" gypsum board int fnsh, 2"x6" wood frm, 16" o.c. stud)
Style B:	
Style C:	
Style D:	

Below grade walls

Style A:	BCIN_1: Bsmnt, 7.6 ft BG, conc fndatn, wall R-21.12, flr unins
Style B:	
Style C:	
Style D:	

Floors on soil

Style A:	BCIN_1: Bsmnt, 7.6 ft BG, conc fndatn, wall R-21.12, flr unins HLR=7464 Btuh
Style B:	

Ceilings

Style A:	R31 CCat (Rf/clg ceiling, asphalt shingles roof mat, frm cons, 1/2" gypsum board int fnsh, 8" thkns, r-31 ceil ins)
Style B:	R60-A (Attic ceiling, asphalt shingles roof mat, r-60 ceil ins, 1/2" gypsum board int fnsh)
Style C:	

Exposed floors

Style A:	
Style B:	

Doors

Style A:	ne,n - 23G0 (Door, mtl fbrgl type)
Style B:	
Style C:	

Windows

Style A:	ne,se,sw,nw - W28 (R 3.57; 6.67 ft head ht)
Style B:	ne,se,sw,nw - W28 (R 3.57; 100% drapes; 6.67 ft head ht)
Style C:	
Style D:	

Skylights

Style A:	
Style B:	

Attached documents:

Notes: An analysis of the building envelope including insulation,windows,doors,etc. as per the prints submitted to us. Cool Cat's HVAC Design is not responsible for changes by the builder/contractor/owner during construction, or on site inspections. Losses are based on worst case scenarios. THIS DESIGN ONLY VALID FOR ADDRESS STATED ABOVE.

Calculations performed by

Name:	Catlin Homer
Company:	Cool Cat's HVAC Design
Address:	PO Box 215
City and Province:	Ayton Ont
Postal code:	N0G 1C0
Telephone:	289-260-3490
Fax:	
E-mail:	catlin@coolcatshvacdesign.com

COOL CAT'S HVAC DESIGN

Certificate #: 13345 (Loads,Ducts)

This software has been verified by HVAC Designers of Canada in accordance with section 8 of CSA F280-12 revised Mar 2023.

F280-12 Basement/Slab Heat Loss
For BCIN_1
Cool Cat's HVAC Design

Job:
Date: Oct 10/2024
By: Catlin Homer

Cert.#: 13345(RHLG, RASD)
PO Box 215, Ayton, Ont N0G 1C0 Phone: 289-260-3490 Email: catlin@coolcatshvacdesign.com Web: www.coolcatshvacdesign.com License: BCIN 46979

Project Information

For: Re:

Weather Station

Province	ON
Region	Orangeville

Foundation Dimensions

Floor length (ft)	92.2
Floor width (ft)	33.3
Exposed perimeter (ft)	251.0
Wall height (ft)	8.6
Depth below grade (ft)	7.6
Window area (ft²)	64.0
Door area (ft²)	0

Radiant Slab

Heated fraction	0

Design Months

Heating month	1

Foundation Loads

Heating load (Btuh)	7464

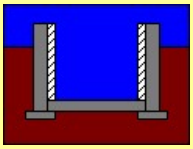
Site

Soil conductivity	Normal - dry sand, loam, clay
Water table	Normal (23-33 ft)

Insulation Configuration

Configuration	BCIN_1

Int wall insul (ft²-°F/Btuh) 21.12



- concrete walls and floor
- interior surface of wall insulated over full-height
- any first storey construction type

Load Allocation

Room	Exposed perimeter (ft)	Heating load (Btuh)
Bsmnt	251.0	7464

This software has been verified by HVAC Designers of Canada in accordance with section 8 of CSA F280-12 revised Mar 2023.

Duct System Summary
Entire House
Cool Cat's HVAC Design

Job:
Date: Oct 10/2024
By: Catlin Homer

Cert.#: 13345(RHLG, RASD)
PO Box 215, Ayton, Ont N0G 1C0 Phone: 289-260-3490 Email: catlin@coolcatshvacdesign.com Web: www.coolcatshvacdesign.com License: BCIN 46979

Project Information

For: Re:

	Heating		Cooling	
External static pressure	0.70	in H2O	0.70	in H2O
Pressure losses	0.32	in H2O	0.32	in H2O
Available static pressure	0.38	in H2O	0.38	in H2O
Supply / return available pressure	0.198 / 0.182	in H2O	0.198 / 0.182	in H2O
Lowest friction rate	0.070	in/100ft	0.070	in/100ft
Actual air flow	1444	cfm	1140	cfm
Total effective length (TEL)	543	ft		

ESP setting based on exact design and equip specs.
Therefore during commissioning, airflow measurements are required to assure a proper temp rise and drop during heating and cooling.

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
Bed2	h 2020	50	42	0.218	5.0	0x 0	ShMt	11.0	80.0	st2
Bed2-A	h 2020	50	42	0.143	5.0	0x 0	ShMt	18.4	120.0	st2
Bed3	c 1392	44	67	0.173	5.0	0x 0	ShMt	14.5	100.0	st1
Bed4	c 1569	70	75	0.126	5.0	0x 0	ShMt	42.5	115.0	st1A
Bsmnt	h 3009	75	11	0.170	5.0	0x 0	ShMt	6.5	110.0	st1
Bsmnt-A	h 3009	75	11	0.162	5.0	0x 0	ShMt	32.0	90.0	st1
Bsmnt-B	h 3009	75	11	0.135	5.0	0x 0	ShMt	42.0	105.0	st1A
Bsmnt-C	h 3009	75	11	0.100	5.0	0x 0	ShMt	89.0	110.0	st1D
Bsmnt-D	h 3009	75	11	0.071	5.0	0x 0	ShMt	114.5	165.0	st1E
Bsmnt-E	h 3009	75	11	0.077	5.0	0x 0	ShMt	112.0	145.0	st1E
Bsmnt-F	h 3009	75	11	0.157	5.0	0x 0	ShMt	16.0	110.0	st2
Bsmnt-G	h 3009	75	11	0.198	5.0	0x 0	ShMt	10.0	90.0	st2
Ens1a	c 940	28	45	0.077	4.0	0x 0	ShMt	112.5	145.0	st1E
Ens1b	c 640	7	31	0.070	4.0	0x 0	ShMt	128.0	155.0	st1E
Ens2	c 679	13	32	0.137	4.0	0x 0	ShMt	15.0	130.0	st2
Ens4	c 788	19	38	0.160	4.0	0x 0	ShMt	24.0	100.0	st1
Kit/Liv/Din	c 1397	60	67	0.105	5.0	0x 0	ShMt	74.0	115.0	st1C
Kit/Liv/Din-A	c 1397	60	67	0.125	5.0	0x 0	ShMt	59.0	100.0	st1B
Kit/Liv/Din-B	c 1397	60	67	0.092	5.0	0x 0	ShMt	74.5	140.0	st1D
Kit/Liv/Din-C	c 1397	60	67	0.120	5.0	0x 0	ShMt	55.0	110.0	st1B
Kit/Liv/Din-D	c 1397	60	67	0.110	5.0	0x 0	ShMt	66.0	115.0	st1C
Kit/Liv/Din-E	c 1397	60	67	0.107	5.0	0x 0	ShMt	60.5	125.0	st1C
Lndry	h 1816	45	36	0.090	4.0	0x 0	ShMt	89.5	130.0	st1D
Lndry-A	h 1816	45	36	0.073	4.0	0x 0	ShMt	107.5	165.0	st1E
Mstr	c 1037	32	50	0.095	4.0	0x 0	ShMt	88.5	120.0	st1D
Mstr-A	c 1037	32	50	0.078	4.0	0x 0	ShMt	100.5	155.0	st1E
Pwd	c 622	2	30	0.098	4.0	0x 0	ShMt	87.0	115.0	st1E
WIC1	c 1019	42	49	0.076	4.0	0x 0	ShMt	106.2	155.0	st1E
WIC4	c 636	3	30	0.158	4.0	0x 0	ShMt	30.5	95.0	st1A

Supply Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
st1E	Peak AVF	306	262	0.070	551	9.5	8 x 10	ShtMetl	st1D
st1A	Peak AVF	968	876	0.070	697	14.6	10 x 20	ShtMetl	st1
st2	Peak AVF	263	138	0.137	593	7.9	8 x 8	ShtMetl	
st1B	Peak AVF	821	759	0.070	739	13.7	10 x 16	ShtMetl	st1A
st1C	Peak AVF	700	626	0.070	720	12.9	10 x 14	ShtMetl	st1B
st1D	Peak AVF	518	425	0.070	622	11.6	10 x 12	ShtMetl	st1C
st1	Peak AVF	1181	1002	0.070	773	15.7	10 x 22	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
rb3	8x 14	141	175	172.5	0.105	277	7.1	2-3.25x14	2-10x18	SJSp	rt2A
rb5	8x 14	141	175	162.0	0.112	555	7.0	3.25x14	10x9	SJSp	rt2
rb4	8x 14	141	175	195.5	0.093	555	7.0	3.25x14	10x9	SJSp	rt2A
rb7	8x 14	141	175	232.0	0.078	555	7.0	3.25x14	10x9	SJSp	rt2A
rb2	14x 10	300	44	202.5	0.090	386	9.0	8.00x14	10x22	SJSp	rt2B
rb8	14x 10	300	44	207.5	0.088	386	9.0	8.00x14	10x22	SJSp	rt2B
rb6	8x 14	141	175	259.5	0.070	555	7.0	3.25x14	10x9	SJSp	rt2C
rb1	8x 14	141	175	243.5	0.075	555	7.0	3.25x14	10x9	SJSp	rt2C

Return Trunk Detail Table

Name	Trunk Type	Htg (cfm)	Clg (cfm)	Design FR	Veloc (fpm)	Diam (in)	H x W (in)	Duct Material	Trunk
rt2	Peak AVF	1444	1140	0.070	650	17.0	10 x 32	ShtMetl	rt1
rt2A	Peak AVF	1303	965	0.070	626	16.3	10 x 30	ShtMetl	rt2
rt2B	Peak AVF	881	439	0.070	634	14.1	10 x 20	ShtMetl	rt2A
rt2C	Peak AVF	281	350	0.070	526	10.0	8 x 12	ShtMetl	rt2B
rt1	Peak AVF	1444	1140	0.070	619	17.0	14 x 24	ShtMetl	

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Static Pressure and Friction Rate
Entire House
Cool Cat's HVAC Design

Job:
Date: Oct 10/2024
By: Catlin Homer

Project Information

For: Re:

Available Static Pressure

	Heating (in H2O)	Cooling (in H2O)
External static pressure	0.70	0.70
Pressure losses		
Coil	0.15	0.15
Heat exchanger	0	0
Supply diffusers	0.04	0.04
Return grilles	0.02	0.02
Filter	0.10	0.10
Humidifier	0	0
Balancing damper	0.01	0.01
Other device	0	0
Available static pressure	0.38	0.38

ESP setting based on exact design and equip specs.
Therefore during commissioning, airflow measurements are required to assure a proper temp rise and drop during heating and cooling.

Total Effective Length

	Supply (ft)	Return (ft)
Measured length of run-out	52	6
Measured length of trunk	77	64
Equivalent length of fittings	155	190
Total length	283	260
Total effective length		543

Friction Rate

	Heating (in/100ft)		Cooling (in/100ft)	
Supply Ducts	0.070	OK	0.070	OK
Return Ducts	0.070	OK	0.070	OK

Fitting Equivalent Length Details

Supply	8B=30, 8D=10, 8D=10, 7A=60, 6K=5, 6K=5, 6K=5, 6K=5, 6H=10, 6K=5, 5B=10: TotalEL=155
Return	4D=10, 4B=25, 3A2=60, 2K=15, 2K=15, 2K=15, 2B2=15, 3A1=25, 1C=10: TotalEL=190