

CBAS / 4-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio			
		Inlet Dia. Inches	Flow Rate CFM	Inlet ΔPS (in. H2O)		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM					
						qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL				
3	B1	6" oval	6	0.42	15	527	0.60	2.20	5.00	8.80	587	604	609	7.2			
			8	0.74	15	669					757	784	792				
			10	1.16	15	800					917	954	967				
	B2	6" oval	10	0.42	15	712					805	833	842		5.7		
			13	0.72	15	877					1007	1048	1063				
			17	1.23	15	1065					1251	1312	1336				
	B3	6" oval	17	0.34	15	956					1107	1155	1174			4.2	
			23	0.62	15	1184					1408	1484	1514				
			30	1.06	16	1398					1706	1816	1864				
	B4	6" oval	30	0.28	15	1150					1356	1425	1453				3.4
			40	0.50	15	1384					1678	1782	1827				
			55	0.94	24	1667					2098	2261	2335				
4	B1	6" oval	8	0.35	15	683	0.70	2.90	6.40	1.50	772	798	807	7.2			
			10	0.54	15	824					943	979	992				
			14	1.06	15	1060					1244	1305	1329				
	B2	6" oval	12	0.29	15	846					965	1001	1014		5.7		
			16	0.52	15	1053					1228	1284	1305				
			22	0.99	15	1318					1584	1675	1713				
	B3	6" oval	22	0.27	15	1193					1408	1479	1508			4.8	
			30	0.51	15	1466					1789	1902	1950				
			42	1.00	20	1792					2275	2459	2543				
	B4	6" oval	42	0.29	15	1494					1822	1937	1986				3.4
			55	0.50	19	1763					2216	2386	2462				
			75	0.93	28	2072					2721	2981	3104				
5	B1	6" oval	10	0.31	15	718	0.90	3.50	7.90	1.80	819	842	853	7.2			
			13	0.53	15	890					1031	1067	1085				
			18	1.02	15	1118					1340	1402	1434				
	B2	6" oval	16	0.31	15	935					1081	1118	1136		5.7		
			20	0.48	15	1093					1294	1348	1376				
			28	0.94	15	1471					1735	1834	1885				
	B3	6" oval	28	0.26	15	1260					1509	1582	1619			4.8	
			40	0.53	15	1753					2096	2236	2309				
			58	1.12	26	2168					2740	2987	3119				
	B4	6" oval	58	0.34	16	1836					2203	2354	2432				3.4
			70	0.50	22	2055					2534	2736	2842				
			97	0.96	31	2392					3107	3427	3601				
6	B1	6" oval	13	0.35	15	893	1.00	4.10	9.30	2.10	1040	1077	1096	7.2			
			16	0.52	15	1054					1247	1299	1325				
			23	1.08	15	1351					1655	1751	1801				
	B2	6" oval	18	0.25	15	1031					1209	1255	1278		5.7		
			25	0.49	15	1297					1573	1654	1695				
			34	0.91	18	1679					2035	2171	2242				
	B3	6" oval	30	0.20	15	1328					1613	1696	1739			4.8	
			45	0.44	15	1875					2281	2448	2535				
			66	0.96	26	2354					3049	3356	3522				
	B4	6" oval	66	0.30	17	1979					2422	2606	2702				3.4
			85	0.50	24	2316					2952	3228	3376				
			120	1.00	34	2670					3620	4064	4310				

Note: Reference page U68 for operational conditions used for performance notes

CBAS / 4-PIPE HEATING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Heating (Btu/h)								Induction ratio
		Inlet Dia. Inches	Flow Rate CFM	Inlet ΔPS (in. H2O)		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM		
						qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	
3	B1	6" oval	6	0.42	15	1170	0.12	0.49	1.10	1.95	1256	7.2		
			8	0.74	15	1487					1305		1741	1631
			10	1.16	15	1778					2038		2119	1986
	B2	6" oval	10	0.42	15	1583					1789	1851	1709	5.7
			13	0.72	15	1949					2239	2330	2152	
			17	1.23	15	2368					2779	2916	2693	
	B3	6" oval	17	0.34	15	2125					2460	2567	2331	4.8
			23	0.62	15	2632					3128	3297	2991	
			30	1.06	16	3106					3792	4037	3654	
	B4	6" oval	30	0.28	15	2555					3014	3168	2741	3.4
			40	0.50	15	3076					3730	3960	3408	
			55	0.94	24	3704					4662	5025	4295	
4	B1	6" oval	8	0.35	15	1518	0.16	0.63	1.41	2.51	1663	7.2		
			10	0.54	15	1832					1715		1773	2041
			14	1.06	15	2354					2095		2175	2725
	B2	6" oval	12	0.29	15	1881					2145	2225	2059	5.7
			16	0.52	15	2340					2728	2852	2641	
			22	0.99	15	2929					3520	3723	3448	
	B3	6" oval	22	0.27	15	2652					3130	3287	2992	4.8
			30	0.51	15	3257					3975	4227	3846	
			42	1.00	20	3982					5056	5465	4967	
	B4	6" oval	42	0.29	15	3321					4049	4304	3729	3.4
			55	0.50	19	3918					4925	5302	4576	
			75	0.93	28	4605					6047	6624	5677	
5	B1	6" oval	10	0.31	15	1597	0.19	0.78	1.75	3.11	1733	7.2		
			13	0.53	15	1979					1819		1870	2198
			18	1.02	15	2483					2292		2371	2894
	B2	6" oval	16	0.31	15	2077					2402	2484	2264	5.7
			20	0.48	15	2430					2875	2997	2732	
			28	0.94	15	3269					3856	4076	3733	
	B3	6" oval	28	0.26	15	2800					3353	3516	3142	4.8
			40	0.53	15	3895					4658	4970	4480	
			58	1.12	26	4818					6089	6638	5988	
	B4	6" oval	58	0.34	16	4080					4896	5231	4460	3.4
			70	0.50	22	4567					5632	6080	5177	
			97	0.96	31	5315					6905	7615	6423	
6	B1	6" oval	13	0.35	15	1985	0.23	0.92	2.06	3.67	2223	7.2		
			16	0.52	15	2341					2312		2393	2683
			23	1.08	15	3002					2771		2886	3627
	B2	6" oval	18	0.25	15	2290					2686	2788	2547	5.7
			25	0.49	15	2882					3496	3675	3359	
			34	0.91	18	3732					4523	4824	4428	
	B3	6" oval	30	0.20	15	2952					3585	3770	3376	4.8
			45	0.44	15	4168					5070	5440	4902	
			66	0.96	26	5232					6776	7458	6753	
	B4	6" oval	66	0.30	17	4398					5383	5791	4930	3.4
			85	0.50	24	5146					6560	7174	6118	
			120	1.00	34	5934					8045	9032	7624	

Note: Reference page U68 for operational conditions used for performance notes



CBAS / 2-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio			
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM					
		Inches	CFM	(in. H2O)		qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL				
3	B1	6" oval	6	0.42	15	562	0.70	2.90	6.60	1.50	626	644	650	7.2			
			8	0.74	15	714					808	836	845				
			10	1.16	15	853					978	1017	1032				
	B2	6" oval	10	0.42	15	760					859	888	898		5.7		
			13	0.72	15	935					1075	1118	1134				
			17	1.23	15	1137					1334	1400	1425				
	B3	6" oval	17	0.34	15	1020					1181	1232	1252			4.8	
			23	0.62	15	1263					1502	1583	1615				
			30	1.06	16	1491					1820	1938	1989				
	B4	6" oval	30	0.28	15	1226					1447	1520	1550				3.4
			40	0.50	15	1476					1790	1901	1948				
			55	0.94	24	1778					2238	2412	2491				
4	B1	6" oval	8	0.35	15	728	1.00	3.80	8.60	1.90	823	851	861	7.2			
			10	0.54	15	879					1005	1044	1058				
			14	1.06	15	1130					1327	1392	1417				
	B2	6" oval	12	0.29	15	903					1030	1068	1082		5.7		
			16	0.52	15	1123					1309	1369	1392				
			22	0.99	15	1406					1690	1787	1827				
	B3	6" oval	22	0.27	15	1273					1502	1578	1608			4.8	
			30	0.51	15	1563					1908	2029	2080				
			42	1.00	20	1912					2427	2623	2712				
	B4	6" oval	42	0.29	15	1594					1943	2066	2118				3.4
			55	0.50	19	1881					2364	2545	2626				
			75	0.93	28	2210					2902	3180	3311				
5	B1	6" oval	10	0.31	15	766	1.20	4.70	1.30	2.40	873	898	910	7.2			
			13	0.53	15	950					1100	1138	1157				
			18	1.02	15	1192					1429	1496	1530				
	B2	6" oval	16	0.31	15	997					1153	1192	1212		5.7		
			20	0.48	15	1166					1380	1438	1468				
			28	0.94	15	1569					1851	1957	2011				
	B3	6" oval	28	0.26	15	1344					1609	1687	1727			4.8	
			40	0.53	15	1870					2236	2385	2463				
			58	1.12	26	2312					2923	3186	3327				
	B4	6" oval	58	0.34	16	1958					2350	2511	2594				3.4
			70	0.50	22	2192					2703	2918	3032				
			97	0.96	31	2551					3314	3655	3841				
6	B1	6" oval	13	0.35	15	953	1.40	5.50	1.60	2.80	1110	1149	1169	7.2			
			16	0.52	15	1124					1330	1385	1413				
			23	1.08	15	1441					1766	1868	1921				
	B2	6" oval	18	0.25	15	1099					1289	1338	1363		5.7		
			25	0.49	15	1383					1678	1764	1808				
			34	0.91	18	1791					2171	2316	2391				
	B3	6" oval	30	0.20	15	1417					1721	1809	1855			4.8	
			45	0.44	15	2000					2433	2611	2705				
			66	0.96	26	2511					3253	3580	3757				
	B4	6" oval	66	0.30	17	2111					2584	2780	2882				3.4
			85	0.50	24	2470					3149	3443	3601				
			120	1.00	34	2848					3862	4335	4597				

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CBAS / 2-PIPE HEATING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Heating (Btu/h)								Induction ratio			
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM					
		Inches	CFM	(in. H2O)		qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL				
3	B1	6" oval	6	0.42	15	1561	0.74	2.94	6.62	1.50	1739	1790	1805	7.2			
			8	0.74	15	1983					2244	2322	2348				
			10	1.16	15	2371					2718	2826	2865				
	B2	6" oval	10	0.42	15	2110					2386	2468	2495		5.7		
			13	0.72	15	2598					2985	3106	3151				
			17	1.23	15	3157					3706	3888	3960				
	B3	6" oval	17	0.34	15	2833					3280	3423	3477			4.8	
			23	0.62	15	3509					4171	4396	4487				
			30	1.06	16	4141					5056	5382	5524				
	B4	6" oval	30	0.28	15	3406					4019	4224	4305				3.4
			40	0.50	15	4101					4973	5280	5412				
			55	0.94	24	4939					6216	6700	6920				
4	B1	6" oval	8	0.35	15	2024	0.95	3.80	8.55	1.94	2286	2363	2390	7.2			
			10	0.54	15	2443					2793	2899	2939				
			14	1.06	15	3139					3687	3866	3937				
	B2	6" oval	12	0.29	15	2508					2860	2966	3005		5.7		
			16	0.52	15	3120					3637	3803	3868				
			22	0.99	15	3906					4694	4963	5074				
	B3	6" oval	22	0.27	15	3536					4173	4383	4467			4.8	
			30	0.51	15	4342					5300	5636	5779				
			42	1.00	20	5310					6741	7286	7534				
	B4	6" oval	42	0.29	15	4428					5398	5739	5884				3.4
			55	0.50	19	5225					6566	7069	7295				
			75	0.93	28	6139					8062	8833	9197				
5	B1	6" oval	10	0.31	15	2129	1.16	4.65	1.33	2.37	2425	2493	2528	7.2			
			13	0.53	15	2638					3056	3161	3213				
			18	1.02	15	3311					3969	4155	4249				
	B2	6" oval	16	0.31	15	2769					3203	3312	3365		5.7		
			20	0.48	15	3240					3834	3996	4077				
			28	0.94	15	4358					5142	5435	5585				
	B3	6" oval	28	0.26	15	3733					4470	4687	4798			4.8	
			40	0.53	15	5194					6211	6626	6841				
			58	1.12	26	6423					8118	8850	9242				
	B4	6" oval	58	0.34	16	5440					6529	6974	7205				3.4
			70	0.50	22	6090					7509	8106	8421				
			97	0.96	31	7087					9207	10154	10669				
6	B1	6" oval	13	0.35	15	2647	1.38	5.51	1.58	2.81	3082	3191	3246	7.2			
			16	0.52	15	3122					3695	3847	3925				
			23	1.08	15	4002					4904	5189	5335				
	B2	6" oval	18	0.25	15	3053					3582	3718	3787		5.7		
			25	0.49	15	3843					4662	4900	5022				
			34	0.91	18	4976					6031	6432	6642				
	B3	6" oval	30	0.20	15	3936					4780	5026	5152			4.8	
			45	0.44	15	5557					6760	7254	7513				
			66	0.96	26	6976					9035	9944	10437				
	B4	6" oval	66	0.30	17	5864					7177	7721	8006				3.4
			85	0.50	24	6861					8747	9565	10002				
			120	1.00	34	7912					10727	12042	12770				

Note: Reference page U68 for operational conditions used for performance notes



NOTES:

1. All performance data based on test performed in accordance with ASHRAE Standard 200-2015
2. ΔP_s values are measured in inches of water
3. NC values are based on room absorption of 10 dB. A dash (-) indicates an NC value less than 15.
4. Throw values are based on isothermal supply air and represent throw distances to terminal velocities of 150, 100 and 50 fpm respectively
5. ΔP_{Coil} values are measured in feet of water. ΔP_{Coil} values in shaded cells indicate use of a two circuit coil. All other values represent a single circuit coil.
6. Induction ratio is multiplied by the volume flow rate of primary air to estimate the volume flow rate of room air entrained through the coil

Cooling performance:

- Cooling capacity listed (qTOTAL) is the total sensible heat removal by the beam's integral coil. It does not include any contribution or offset by the primary air.
- Capacity is based on 18°F ΔT between the induced air and the chilled water supply. Table 1 provides correction factors for other temperature differentials.
- Primary air sensible cooling contribution can be calculated by the following equation:

$$q_{SENSPA} = 1.085 \times CFM_{PA} \times (T_{ROOM} - T_{PA})$$

- Primary air latent cooling can be calculated by the following equation:

$$q_{LATENT} = 0.69 \times CFM_{PA} \times (W_{ROOM} - W_{PA})$$

where W_{ROOM} and W_{PA} are the humidity ratio of the room and primary air respectively expressed in Grains of moisture per pound dry air

TABLE 4: CORRECTION FOR (ΔT) BETWEEN ENTERING AIR AND ENTERING CHILLED WATER

Actual ΔT	10	12	14	16	18	20	22	24
Multiply Table Value by:	0.56	0.67	0.78	0.89	1.00	1.11	1.22	1.33

Heating performance:

- Heating capacity listed (qTOTAL) is the sensible heat removal by the beam's integral coil. It does not include any contribution or offset by the primary air
- Capacity is based on 50°F ΔT between the induced air and the chilled water supply. Table 2 provides correction factors for other temperature differentials.
- Primary air sensible heating offset (or contribution) can be calculated by the following equation:

$$q_{SENSPA} = 1.085 \times CFM_{PA} \times (T_{PA} - T_{ROOM})$$

if the primary air temperature is lower than that of the room, it will offset the coil's heating

if the primary air temperature is higher than that of the room, it will contribute to the coil's heating

TABLE 2: CORRECTION FOR (ΔT) BETWEEN ENTERING AIR AND ENTERING CHILLED WATER

Actual ΔT	20	30	40	50	60	70	80	90	100	110	120
Multiply Table Value by:	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40

Legend:

ΔP_s = Unit Inlet Pressure [in wg]

q_{SENSPA} = Sensible Capacity, Primary Air [Btu/h]

T_{ROOM} = Temperature Room Air [°F]

qCoil = Sensible Capacity, Coil [Btu/h]

CFM_{PA} = Air Flowrate, Primary Air [CFM]

q_{SENSPA} = Latent Capacity, Primary Air [Btu/h]

ΔP_{Coil} = Water coil pressure drop [ft wg]

T_{PA} = Temperature Primary Air [°F]