

CBAC / 4-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw ft.		
		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	B2	4	8	0.21	15	560	0.70		2.90	6.60	1.50	8	0.21	15	560	6.0	1 - 2 - 8
			11	0.39	15	733						609	837	621	627		2 - 4 - 12
			14	0.63	20	889						1023	1057	1073	1073		3 - 6 - 16
			17	0.93	26	1090						1244	1293	1317	1317		4 - 9 - 18
	B3	4	15	0.20	15	965						1102	1131	1146	1146		2 - 4 - 13
			20	0.36	15	1217						1403	1452	1475	1475		4 - 8 - 17
			25	0.56	19	1584						1792	1868	1906	1906		6 - 11 - 19
			30	0.81	25	1860						2131	2237	2292	2292		8 - 13 - 21
	B4	4	30	0.23	15	1324						1522	1571	1594	1594		4 - 8 - 17
			40	0.40	17	1791						2033	2117	2159	2159		6 - 12 - 20
			50	0.63	24	2207						2529	2655	2720	2720		10 - 15 - 22
			60	0.91	29	2492						2916	3085	3173	3173		12 - 17 - 24
4	B2	4	11	0.20	15	741	1.00		3.80	8.60	1.90	11	0.20	15	741	6.0	1 - 2 - 10
			15	0.38	15	954						819	1113	840	851		2 - 5 - 15
			19	0.61	21	1176						1349	1405	1434	1434		3 - 7 - 19
			23	0.89	27	1403						1611	1691	1732	1732		5 - 11 - 21
	B3	4	21	0.21	15	1287						1500	1552	1579	1579		2 - 6 - 16
			28	0.37	15	1665						1894	1981	2024	2024		4 - 10 - 20
			35	0.58	21	2060						2401	2535	2604	2604		7 - 13 - 23
			42	0.84	27	2379						2838	3024	3121	3121		10 - 16 - 25
	B4	4	35	0.18	15	1528						1780	1842	1873	1873		3 - 7 - 18
			50	0.36	15	2109						2414	2532	2592	2592		6 - 13 - 22
			65	0.59	18	2671						3156	3350	3450	3450		11 - 17 - 25
			80	0.90	25	3070						3730	4004	4147	4147		14 - 20 - 28
5	B2	4	15	0.23	15	960	1.20		4.70	1.30	2.40	15	0.23	15	960	6.0	1 - 3 - 13
			20	0.41	16	1205						1093	1440	1131	1150		3 - 6 - 17
			25	0.65	23	1455						1713	1805	1852	1852		4 - 9 - 22
			30	0.93	28	1709						2029	2157	2223	2223		6 - 13 - 24
	B3	4	25	0.18	15	1252						1487	1548	1579	1579		2 - 6 - 17
			35	0.36	15	1661						1950	2059	2115	2115		5 - 11 - 23
			45	0.59	23	2082						2512	2686	2777	2777		8 - 15 - 26
			55	0.87	24	2349						2996	3243	3374	3374		12 - 19 - 28
	B4	6" oval	40	0.14	15	1413						1666	1732	1766	1766		3 - 6 - 18
			60	0.32	15	1984						2325	2457	2525	2525		6 - 14 - 24
			80	0.57	15	2549						3115	3343	3462	3462		11 - 18 - 28
			100	0.89	21	2850						3700	4027	4226	4226		15 - 22 - 31
6	B2	4	20	0.28	15	1204	1.40		5.50	1.60	2.80	20	0.28	15	1204	6.0	2 - 4 - 16
			25	0.44	18	1429						1423	1744	1486	1518		3 - 7 - 20
			30	0.63	23	1654						2001	2127	2193	2193		4 - 10 - 24
			35	0.86	28	1879						2281	2446	2531	2531		6 - 13 - 26
	B3	4	35	0.25	15	1921						2338	2469	2536	2536		4 - 8 - 22
			45	0.41	17	2356						2843	3040	3143	3143		6 - 14 - 26
			55	0.61	23	2797						3485	3774	3926	3926		9 - 17 - 28
			65	0.83	23	3071						4019	4402	4607	4607		13 - 20 - 31
	B4	6" oval	60	0.22	15	2331						2834	2997	3080	3080		5 - 11 - 24
			80	0.40	15	2953						3602	3869	4008	4008		9 - 17 - 28
			100	0.62	15	3511						4471	4870	5081	5081		13 - 21 - 31
			120	0.90	21	3814						5132	5664	5971	5971		17 - 24 - 34

Note: Reference page U84 for operational conditions used for performance notes

CBAC / 4-PIPE HEATING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Heating (Btu/h)								Induction ratio	Throw ft.
		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	B2	4	8	0.21	15	1245	0.12	1354	0.49	1381	1.10	1394	1.95	6.0	1 - 2 - 8
			11	0.39	15	1629		1860		1908		1932			2 - 4 - 12
			14	0.63	20	1975		2273		2348		2384			3 - 6 - 16
			17	0.93	26	2423		2764		2873		2926			4 - 9 - 18
	B3	4	15	0.20	15	2144		2450		2514		2547		2577	2 - 4 - 13
			20	0.36	15	2704		3117		3226		3278		4 - 8 - 17	
			25	0.56	19	3519		3981		4151		4236		6 - 11 - 19	
			30	0.81	25	4133		4737		4972		5093		8 - 13 - 21	
	B4	4	30	0.23	15	2943		3383		3490		3543		3543	4 - 8 - 17
			40	0.40	17	3980		4517		4704		4797		6 - 12 - 20	
			50	0.63	24	4904		5621		5900		6044		10 - 15 - 22	
			60	0.91	29	5538		6479		6856		7052		12 - 17 - 24	
4	B2	4	11	0.20	15	1648	0.16	1820	0.63	1868	1.41	1891	2.51	6.0	1 - 2 - 10
			15	0.38	15	2121		2474		2556		2597			2 - 5 - 15
			19	0.61	21	2614		2997		3123		3187			3 - 7 - 19
			23	0.89	27	3119		3580		3759		3850			5 - 11 - 21
	B3	4	21	0.21	15	2861		3333		3449		3508		3508	2 - 6 - 16
			28	0.37	15	3700		4210		4401		4498		4 - 10 - 20	
			35	0.58	21	4577		5335		5634		5787		7 - 13 - 23	
			42	0.84	27	5286		6307		6720		6935		10 - 16 - 25	
	B4	4	35	0.18	15	3395		3955		4093		4163		4163	3 - 7 - 18
			50	0.36	15	4686		5365		5627		5760		6 - 13 - 22	
			65	0.59	18	5936		7014		7445		7668		11 - 17 - 25	
			80	0.90	25	6822		8290		8897		9216		14 - 20 - 28	
5	B2	4	15	0.23	15	2134	0.19	2430	0.78	2514	1.75	2556	3.11	6.0	1 - 3 - 13
			20	0.41	16	2679		3199		3337		3407			3 - 6 - 17
			25	0.65	23	3234		3807		4011		4115			4 - 9 - 22
			30	0.93	28	3797		4509		4793		4940			6 - 13 - 24
	B3	4	25	0.18	15	2783		3306		3440		3509		3509	2 - 6 - 17
			35	0.36	15	3692		4334		4575		4699		5 - 11 - 23	
			45	0.59	23	4626		5581		5969		6171		8 - 15 - 26	
			55	0.87	24	5220		6659		7208		7497		12 - 19 - 28	
	B4	4	40	0.14	15	3139		3702		3849		3924		3924	3 - 6 - 18
			60	0.32	15	4409		5167		5461		5612		6 - 14 - 24	
			80	0.57	15	5664		6922		7428		7693		11 - 18 - 28	
			100	0.89	21	6334		8222		8949		9391		15 - 22 - 31	
6	B2	4	20	0.28	15	2676	0.23	3162	0.92	3303	2.06	3374	3.67	6.0	2 - 4 - 16
			25	0.44	18	3176		3875		4081		4186			3 - 7 - 20
			30	0.63	23	3675		4447		4727		4872			4 - 10 - 24
			35	0.86	28	4175		5070		5435		5625			6 - 13 - 26
	B3	4	35	0.25	15	4268		5196		5486		5635		5635	4 - 8 - 22
			45	0.41	17	5236		6318		6756		6984		6 - 14 - 26	
			55	0.61	23	6215		7745		8388		8725		9 - 17 - 28	
			65	0.83	23	6825		8930		9783		10238		13 - 20 - 31	
	B4	4	60	0.22	15	5180		6297		6659		6845		6845	5 - 11 - 24
			80	0.40	15	6562		8005		8598		8907		9 - 17 - 28	
			100	0.62	15	7802		9937		10823		11291		13 - 21 - 31	
			120	0.90	21	8476		11405		12586		13269		17 - 24 - 34	



Note: Reference page U84 for operational conditions used for performance notes

CBAC / 2-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw ft.	
		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	B2	4	8	0.21	15	598	0.90		3.70	8.30	1.90	650	663	669	6.0	1 - 2 - 8
			11	0.39	15	782						893	916	927		2 - 4 - 12
			14	0.63	20	948						1091	1127	1144		3 - 6 - 16
			17	0.93	26	1163						1327	1379	1405		4 - 9 - 18
	B3	4	15	0.20	15	1029						1176	1207	1222		2 - 4 - 13
			20	0.36	15	1298						1496	1548	1574		4 - 8 - 17
			25	0.56	19	1689						1911	1992	2033		6 - 11 - 19
			30	0.81	25	1984						2274	2386	2445		8 - 13 - 21
	B4	4	30	0.23	15	1413						1624	1675	1701		4 - 8 - 17
			40	0.40	17	1910						2168	2258	2303		6 - 12 - 20
			50	0.63	24	2354						2698	2832	2901		10 - 15 - 22
			60	0.91	29	2658						3110	3291	3385		12 - 17 - 24
4	B2	4	11	0.20	15	791	1.20		4.80	1.40	2.40	874	896	907	6.0	1 - 2 - 10
			15	0.38	15	1018						1187	1227	1247		2 - 5 - 15
			19	0.61	21	1255						1439	1499	1530		3 - 7 - 19
			23	0.89	27	1497						1718	1804	1848		5 - 11 - 21
	B3	4	21	0.21	15	1373						1600	1656	1684		2 - 6 - 16
			28	0.37	15	1776						2021	2113	2159		4 - 10 - 20
			35	0.58	21	2197						2561	2704	2778		7 - 13 - 23
			42	0.84	27	2538						3027	3226	3329		10 - 16 - 25
	B4	4	35	0.18	15	1629						1899	1965	1998		3 - 7 - 18
			50	0.36	15	2249						2575	2701	2765		6 - 13 - 22
			65	0.59	18	2849						3367	3573	3680		11 - 17 - 25
			80	0.90	25	3275						3979	4270	4424		14 - 20 - 28
5	B2	4	15	0.23	15	1025	1.50		5.80	1.70	3.00	1166	1206	1227	6.0	1 - 3 - 13
			20	0.41	16	1286						1536	1602	1635		3 - 6 - 17
			25	0.65	23	1552						1827	1925	1975		4 - 9 - 22
			30	0.93	28	1823						2164	2301	2371		6 - 13 - 24
	B3	4	25	0.18	15	1336						1587	1651	1684		2 - 6 - 17
			35	0.36	15	1772						2080	2196	2256		5 - 11 - 23
			45	0.59	23	2220						2679	2865	2962		8 - 15 - 26
			55	0.87	24	2506						3196	3460	3599		12 - 19 - 28
	B4	6" oval	40	0.14	15	1507						1777	1847	1883		3 - 6 - 18
			60	0.32	15	2116						2480	2621	2694		6 - 14 - 24
			80	0.57	15	2719						3322	3566	3693		11 - 18 - 28
			100	0.89	21	3040						3946	4296	4508		15 - 22 - 31
6	B2	4	20	0.28	15	1285	1.70		6.90	2.00	3.50	1518	1585	1620	6.0	2 - 4 - 16
			25	0.44	18	1525						1860	1959	2009		3 - 7 - 20
			30	0.63	23	1764						2134	2269	2339		4 - 10 - 24
			35	0.86	28	2004						2433	2609	2700		6 - 13 - 26
	B3	4	35	0.25	15	2049						2494	2633	2705		4 - 8 - 22
			45	0.41	17	2513						3033	3243	3352		6 - 14 - 26
			55	0.61	23	2983						3718	4026	4188		9 - 17 - 28
			65	0.83	23	3276						4286	4696	4914		13 - 20 - 31
	B4	6" oval	60	0.22	15	2486						3023	3196	3285		5 - 11 - 24
			80	0.40	15	3150						3842	4127	4275		9 - 17 - 28
			100	0.62	15	3745						4770	5195	5420		13 - 21 - 31
			120	0.90	21	4069						5475	6041	6369		17 - 24 - 34

Note: Reference page U84 for operational conditions used for performance notes



CBAC / 2-PIPE HEATING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Heating (Btu/h)								Induction ratio	Throw ft.	
		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	B2	4	8	0.21	15	1660	0.92		3.69	8.30	1.88	6.0	1 - 2 - 8			
			11	0.39	15	2172							2 - 4 - 12			
			14	0.63	20	2634							3 - 6 - 16			
			17	0.93	26	3230							4 - 9 - 18			
	B3	4	15	0.20	15	2859							3267	3352	3396	2 - 4 - 13
			20	0.36	15	3605							4157	4301	4371	4 - 8 - 17
			25	0.56	19	4692							5309	5534	5648	6 - 11 - 19
			30	0.81	25	5510							6315	6629	6791	8 - 13 - 21
	B4	4	30	0.23	15	3924							4510	4654	4724	4 - 8 - 17
			40	0.40	17	5306							6023	6272	6396	6 - 12 - 20
			50	0.63	24	6539							7494	7866	8059	10 - 15 - 22
			60	0.91	29	7384							8639	9142	9403	12 - 17 - 24
4	B2	4	11	0.20	15	2197	1.19		4.76	1.37	2.43	6.0	1 - 2 - 10			
			15	0.38	15	2827							3298	3408	3463	2 - 5 - 15
			19	0.61	21	3485							3996	4164	4249	3 - 7 - 19
			23	0.89	27	4158							4774	5012	5133	5 - 11 - 21
	B3	4	21	0.21	15	3814							4444	4599	4678	2 - 6 - 16
			28	0.37	15	4933							5613	5868	5998	4 - 10 - 20
			35	0.58	21	6103							7114	7512	7716	7 - 13 - 23
			42	0.84	27	7049							8409	8960	9247	10 - 16 - 25
	B4	4	35	0.18	15	4526							5274	5458	5551	3 - 7 - 18
			50	0.36	15	6248							7153	7502	7680	6 - 13 - 22
			65	0.59	18	7915							9352	9926	10224	11 - 17 - 25
			80	0.90	25	9096							11053	11862	12288	14 - 20 - 28
5	B2	4	15	0.23	15	2846	1.46		5.83	1.67	2.97	6.0	1 - 3 - 13			
			20	0.41	16	3572							4266	4449	4543	3 - 6 - 17
			25	0.65	23	4311							5076	5348	5487	4 - 9 - 22
			30	0.93	28	5063							6012	6390	6586	6 - 13 - 24
	B3	4	25	0.18	15	3710							4407	4587	4679	2 - 6 - 17
			35	0.36	15	4923							5779	6101	6266	5 - 11 - 23
			45	0.59	23	6168							7442	7959	8228	8 - 15 - 26
			55	0.87	24	6960							8878	9610	9996	12 - 19 - 28
	B4	4	40	0.14	15	4185							4936	5132	5232	3 - 6 - 18
			60	0.32	15	5878							6890	7281	7482	6 - 14 - 24
			80	0.57	15	7552							9229	9904	10257	11 - 18 - 28
			100	0.89	21	8446							10962	11932	12522	15 - 22 - 31
6	B2	4	20	0.28	15	3568	1.72		6.89	1.98	3.52	6.0	2 - 4 - 16			
			25	0.44	18	4235							5167	5442	5581	3 - 7 - 20
			30	0.63	23	4900							5929	6303	6496	4 - 10 - 24
			35	0.86	28	5567							6760	7247	7500	6 - 13 - 26
	B3	4	35	0.25	15	5691							6928	7315	7513	4 - 8 - 22
			45	0.41	17	6981							8424	9008	9312	6 - 14 - 26
			55	0.61	23	8286							10326	11184	11633	9 - 17 - 28
			65	0.83	23	9100							11907	13044	13650	13 - 20 - 31
	B4	4	60	0.22	15	6906							8396	8879	9126	5 - 11 - 24
			80	0.40	15	8749							10674	11464	11876	9 - 17 - 28
			100	0.62	15	10403							13249	14431	15055	13 - 21 - 31
			120	0.90	21	11302							15207	16781	17692	17 - 24 - 34

Note: Reference page U84 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]

$\Delta Coil$ = Water coil pressure drop [ft wg]

T_{PA} = Temperature Primary Air [°F]