

CBAV / 4-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw ft
		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		
2	B1	4	3	0.36	15	278	0.40	1.60	3.50	6.20	303	309	311	7.2	0-0-1
			4	0.64	15	357					392	402	404		0-0-1
			5	1.00	15	433					479	492	496		0-0-2
	B2	4	4	0.22	15	312					341	348	350	5.7	0-0-1
			6	0.49	15	445					491	504	508		0-1-2
			8	0.87	15	567					632	653	659		0-1-4
	B3	4	9	0.30	15	554					615	634	639	4.8	0-1-3
			12	0.54	15	687					780	809	819		1-1-5
			15	0.84	15	812					936	976	991		1-2-7
	B4	4	15	0.18	15	642					723	747	756	3.4	0-1-4
			21	0.35	15	827					953	994	1010		1-2-7
			27	0.58	21	983					1155	1214	1237		2-4-9
3	B1	4	5	0.29	15	452	0.60	2.20	5.00	8.80	499	512	515	7.2	0-0-1
			7	0.57	15	602					675	697	704		0-0-2
			9	0.94	15	735					837	869	880		0-1-3
	B2	4	7	0.21	15	528					586	603	607	5.7	0-0-2
			10	0.42	15	712					805	833	842		0-1-3
			13	0.72	15	877					1007	1048	1063		1-1-5
	B3	4	13	0.20	15	778					884	917	928	4.8	0-1-3
			19	0.43	15	1038					1212	1269	1292		1-2-7
			25	0.74	21	1250					1497	1583	1618		1-3-9
	B4	4	25	0.20	15	1010					1173	1226	1246	3.4	1-2-7
			35	0.39	21	1274					1526	1612	1648		1-3-10
			45	0.64	28	1487					1828	1952	2006		2-5-13
4	B1	4	6	0.20	15	542	0.70	2.90	6.40	1.50	601	617	622	7.2	0-0-1
			9	0.44	15	754					857	888	899		0-0-2
			12	0.78	15	943					1094	1142	1161		0-1-3
	B2	4	10	0.20	15	726					820	848	857	5.7	0-1-2
			14	0.40	15	954					1100	1146	1163		0-1-4
			18	0.66	16	1152					1355	1421	1448		1-2-7
	B3	4	18	0.19	15	1028					1194	1246	1266	4.8	0-1-4
			27	0.42	18	1372					1654	1751	1791		1-2-9
			36	0.74	26	1640					2044	2191	2257		2-4-12
	B4	6	30	0.15	15	1196					1406	1474	1502	3.4	1-2-6
			50	0.41	16	1665					2071	2219	2284		2-4-12
			70	0.81	26	2003					2604	2841	2951		4-9-16
6	B1	4	10	0.20	15	732	1.00	4.10	9.30	2.10	832	854	865	7.2	0-0-1
			14	0.40	15	947					1110	1151	1172		0-1-3
			18	0.66	16	1136					1363	1427	1459		0-1-4
	B2	4	16	0.20	15	939					1091	1129	1148	5.7	0-1-3
			22	0.38	15	1193					1426	1490	1523		1-1-5
			28	0.62	22	1401					1721	1817	1866		1-2-9
	B3	6	30	0.20	15	1328					1613	1696	1739	4.8	1-2-6
			45	0.44	15	1875					2281	2448	2535		2-3-12
			60	0.79	24	2255					2873	3141	3285		3-6-16
	B4	6	55	0.21	15	1693					2056	2189	2259	3.4	1-3-11
			80	0.45	22	2247					2835	3088	3221		3-6-16
			105	0.77	30	2538					3357	3728	3931		5-10-20

Note: Reference page U60 for operational conditions used for performance notes

CBAV / 4-PIPE HEATING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Heating (Btu/h)								Induction ratio	Throw ft
		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		
2	B1	4	3	0.36	15	618	0.08	672	0.34	687	0.76	690	1.36	7.2	0-0-1
			4	0.64	15	794		872		893		898			0-0-1
			5	1.00	15	963		1064		1094		1102			0-0-2
	B2	4	4	0.22	15	694		757		773		778		5.7	0-0-1
			6	0.49	15	988		1091		1120		1128			0-1-2
			8	0.87	15	1261		1405		1450		1464			0-1-4
	B3	4	9	0.30	15	1231		1366		1409		1421		4.8	0-1-3
			12	0.54	15	1527		1734		1797		1820			1-1-5
			15	0.84	15	1803		2080		2169		2203			1-2-7
	B4	4	15	0.18	15	1427		1606		1661		1679		3.4	0-1-4
			21	0.35	15	1838		2119		2209		2244			1-2-7
			27	0.58	21	2184		2567		2697		2750			2-4-9
3	B1	4	5	0.29	15	1003	0.12	1108	0.49	1137	1.10	1145	1.95	7.2	0-0-1
			7	0.57	15	1337		1501		1548		1563			0-0-2
			9	0.94	15	1633		1861		1930		1955			0-1-3
	B2	4	7	0.21	15	1174		1303		1339		1350		5.7	0-0-2
			10	0.42	15	1583		1789		1851		1872			0-1-3
			13	0.72	15	1949		2239		2330		2363			1-1-5
	B3	4	13	0.20	15	1728		1965		2037		2062		4.8	0-1-3
			19	0.43	15	2307		2694		2821		2870			1-2-7
			25	0.74	21	2777		3327		3517		3595			1-3-9
	B4	4	25	0.20	15	2244		2606		2723		2768		3.4	1-2-7
			35	0.39	21	2832		3390		3582		3662			1-3-10
			45	0.64	28	3304		4063		4337		4457			2-5-13
4	B1	4	6	0.20	15	1203	0.16	1335	0.63	1371	1.41	1382	2.51	7.2	0-0-1
			9	0.44	15	1675		1905		1974		1998			0-0-2
			12	0.78	15	2095		2432		2539		2580			0-1-3
	B2	4	10	0.20	15	1614		1822		1883		1905		5.7	0-1-2
			14	0.40	15	2120		2444		2546		2584			0-1-4
			18	0.66	16	2559		3010		3158		3217			1-2-7
	B3	4	18	0.19	15	2286		2653		2769		2814		4.8	0-1-4
			27	0.42	18	3049		3675		3891		3980			1-2-9
			36	0.74	26	3645		4541		4870		5015			2-4-12
	B4	6	30	0.15	15	2657		3123		3276		3337		3.4	1-2-6
			50	0.41	16	3700		4602		4930		5075			2-4-12
			70	0.81	26	4451		5786		6312		6558			4-9-16
6	B1	4	10	0.20	15	1626	0.23	1850	0.92	1899	2.06	1923	3.67	7.2	0-0-1
			14	0.40	15	2105		2466		2558		2605			0-1-3
			18	0.66	16	2524		3029		3171		3243			0-1-4
	B2	4	16	0.20	15	2087		2425		2508		2551		5.7	0-1-3
			22	0.38	15	2650		3168		3312		3385			1-1-5
			28	0.62	22	3114		3824		4038		4147			1-2-9
	B3	6	30	0.20	15	2952		3585		3770		3864		4.8	1-2-6
			45	0.44	15	4168		5070		5440		5634			2-3-12
			60	0.79	24	5011		6385		6981		7299			3-6-16
	B4	6	55	0.21	15	3761		4569		4866		5019		3.4	1-3-11
			80	0.45	22	4993		6300		6861		7159			3-6-16
			105	0.77	30	5640		7459		8284		8736			5-10-20

Note: Reference page U60 for operational conditions used for performance notes



CBAV / 2-PIPE COOLING

Nominal Length ft	Nozzle Size	Primary Air			Sound NC	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw ft	
		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			
2	B1	4	3	0.36	15	297	0.50	2.10	4.70	8.40	323	330	331	7.2	0-0-1	
			4	0.64	15	381					418	429	431		0-0-1	
			5	1.00	15	462					511	525	529		0-0-2	
	B2	4	4	0.22	15	333					363	371	373		5.7	0-0-1
			6	0.49	15	474					524	538	541			0-1-2
			8	0.87	15	605					675	696	703			0-1-4
	B3	4	9	0.30	15	591					656	676	682		4.8	0-1-3
			12	0.54	15	733					832	863	874			1-1-5
			15	0.84	15	866					998	1041	1058			1-2-7
	B4	4	15	0.18	15	685					771	797	806		3.4	0-1-4
			21	0.35	15	882					1017	1060	1077			1-2-7
			27	0.58	21	1048					1232	1294	1320			2-4-9
3	B1	4	5	0.29	15	482	0.70	2.90	6.60	1.50	532	546	550	7.2	0-0-1	
			7	0.57	15	642					721	743	750		0-0-2	
			9	0.94	15	784					893	927	938		0-1-3	
	B2	4	7	0.21	15	563					625	643	648	5.7	0-0-2	
			10	0.42	15	760					859	888	898		0-1-3	
			13	0.72	15	935					1075	1118	1134		1-1-5	
	B3	4	13	0.20	15	830					943	978	990	4.8	0-1-3	
			19	0.43	15	1108					1293	1354	1378		1-2-7	
			25	0.74	21	1333					1597	1688	1726		1-3-9	
	B4	4	25	0.20	15	1077					1251	1307	1329	3.4	1-2-7	
			35	0.39	21	1359					1627	1720	1758		1-3-10	
			45	0.64	28	1586					1950	2082	2139		2-5-13	
4	B1	4	6	0.20	15	578	1.00	3.80	8.60	1.90	641	658	663	7.2	0-0-1	
			9	0.44	15	804					914	947	959		0-0-2	
			12	0.78	15	1006					1167	1218	1238		0-1-3	
	B2	4	10	0.20	15	775					875	904	914	5.7	0-1-2	
			14	0.40	15	1018					1173	1222	1240		0-1-4	
			18	0.66	16	1228					1445	1516	1544		1-2-7	
	B3	4	18	0.19	15	1097					1273	1329	1351	4.8	0-1-4	
			27	0.42	18	1463					1764	1868	1911		1-2-9	
			36	0.74	26	1749					2180	2337	2407		2-4-12	
	B4	6	30	0.15	15	1275					1499	1573	1602	3.4	1-2-6	
			50	0.41	16	1776					2209	2367	2436		2-4-12	
			70	0.81	26	2136					2777	3030	3148		4-9-16	
6	B1	4	10	0.20	15	781	1.40	5.50	1.60	2.80	888	911	923	7.2	0-0-1	
			14	0.40	15	1010					1184	1228	1250		0-1-3	
			18	0.66	16	1211					1454	1522	1557		0-1-4	
	B2	4	16	0.20	15	1002					1164	1204	1224	5.7	0-1-3	
			22	0.38	15	1272					1521	1590	1625		1-1-5	
			28	0.62	22	1495					1835	1938	1991		1-2-9	
	B3	6	30	0.20	15	1417					1721	1809	1855	4.8	1-2-6	
			45	0.44	15	2000					2433	2611	2705		2-3-12	
			60	0.79	24	2405					3065	3351	3504		3-6-16	
	B4	6	55	0.21	15	1805					2193	2335	2409	3.4	1-3-11	
			80	0.45	22	2396					3024	3293	3436		3-6-16	
			105	0.77	30	2707					3581	3976	4193		5-10-20	

Note: Reference page U60 for operational conditions used for performance notes

CBAV / 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				
2	B1	4	3	0.36	15	824	0.52	2.09	4.70	8.36	896	915	920	7.2	0-0-1		
			4	0.64	15	1058					1162	1191	1198		0-0-1		
			5	1.00	15	1283					1418	1458	1469		0-0-2		
	B2	4	4	0.22	15	926					1009	1031	1037		5.7	0-0-1	
			6	0.49	15	1318					1454	1494	1504			0-1-2	
			8	0.87	15	1681					1874	1934	1952			0-1-4	
	B3	4	9	0.30	15	1641					1822	1878	1894		4.8	0-1-3	
			12	0.54	15	2035					2311	2397	2427			1-1-5	
			15	0.84	15	2405					2773	2892	2938			1-2-7	
			15	0.18	15	1903					2141	2214	2239			0-1-4	
	B4	4	21	0.35	15	2451					2825	2946	2992		3.4	1-2-7	
			27	0.58	21	2912					3422	3596	3666			2-4-9	
			5	0.29	15	1338					1477	1516	1526			7.2	0-0-1
	B1	4	7	0.57	15	1783					2001	2064	2084		5.7		0-0-2
			9	0.94	15	2177					2481	2574	2607				0-1-3
			7	0.21	15	1565					1737	1785	1800			1.50	0-0-2
B2	4	10	0.42	15	2110	2386	2468	2495	5.7	0-1-3							
		13	0.72	15	2598	2985	3106	3151		1-1-5							
B3	4	13	0.20	15	2304	2620	2716	2749	4.8	0-1-3							
		19	0.43	15	3077	3592	3761	3827		1-2-7							
		25	0.74	21	3702	4436	4689	4794		1-3-9							
		25	0.20	15	2992	3475	3631	3691		1-2-7							
		35	0.39	21	3776	4520	4777	4882		3.4	1-3-10						
45	0.64	28	4406	5417	5782	5942	2-5-13										
4	B1	4	6	0.20	15	1604	0.95	3.80	8.55	1.94	1779	1827	1842	7.2	0-0-1		
			9	0.44	15	2233					2539	2631	2665		0-0-2		
			12	0.78	15	2793					3242	3385	3440		0-1-3		
	B2	4	10	0.20	15	2152					2430	2511	2540	5.7	0-1-2		
			14	0.40	15	2827					3259	3394	3445		0-1-4		
			18	0.66	16	3412					4014	4211	4290		1-2-7		
	B3	4	18	0.19	15	3047					3537	3692	3753	4.8	0-1-4		
			27	0.42	18	4065					4900	5189	5307		1-2-9		
			36	0.74	26	4860					6055	6493	6687		2-4-12		
	B4	6	30	0.15	15	3542					4165	4368	4449	3.4	1-2-6		
			50	0.41	16	4933					6136	6574	6767		2-4-12		
			70	0.81	26	5934					7714	8416	8745		4-9-16		
6	B1	4	10	0.20	15	2169	1.38	5.51	1.58	2.81	2466	2532	2564	7.2	0-0-1		
			14	0.40	15	2807					3288	3411	3473		0-1-3		
			18	0.66	16	3365					4038	4227	4324		0-1-4		
	B2	4	16	0.20	15	2783					3233	3344	3401	5.7	0-1-3		
			22	0.38	15	3533					4225	4416	4514		1-1-5		
			28	0.62	22	4152					5099	5384	5530		1-2-9		
	B3	6	30	0.20	15	3936					4780	5026	5152	4.8	1-2-6		
			45	0.44	15	5557					6760	7254	7513		2-3-12		
			60	0.79	24	6682					8514	9308	9732		3-6-16		
	B4	6	55	0.21	15	5015					6093	6487	6692	3.4	1-3-11		
			80	0.45	22	6657					8400	9149	9545		3-6-16		
			105	0.77	30	7520					9946	11045	11648		5-10-20		

Note: Reference page U60 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]