CBAM / 4-PIPE COOLING

Nominal Size, L x W (ft)	Nozzle Size	Primary Air			Sound	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		Inches	CFM	(in. H2O)	NC	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL		
2 x 2	B1	4	11	0.21	15	545	0.50	617	2.00	634	4.40	648	5.70	5.9	0 - 0 - 2
			16	0.45	16	718		822		846		854			0 - 1 - 3
			21	0.77	25	910		1091		1122		1154			1 - 1 - 6
	B2	4	18	0.22	15	710		806		829		837		3.5	0 - 1 - 3
			24	0.39	22	899		1059		1090		1113			1 - 1 - 5
			30	0.61	28	1061		1242		1290		1315			1 - 2 - 8
	B3	5	30	0.17	15	828		957		986		999		2.2	1 - 1 - 5
			45	0.39	24	1126		1296		1353		1372			1 - 3 - 9
			60	0.69	32	1338		1532		1617		1610			2 - 5 - 12
	B4	6	55	0.18	15	1065		1261		1304		1335		1.5	1 - 3 - 9
			85	0.44	28	1383		1583		1670		1667			3 - 6 - 13
			115	0.78	24	1538		1720		1820		1824			5 - 9 - 16
4 x 2	B1	4	18	0.19	15	825	1.00	966	3.90	995	8.70	1001	11.20	6.9	0 - 1 - 3
			27	0.44	23	1190		1432		1514		1556			1 - 2 - 6
			36	0.78	32	1451		1788		1889		1930			1 - 3 - 11
	B2	5	25	0.15	15	962		1132		1170		1177		3.9	0 - 1 - 4
			40	0.38	23	1434		1749		1851		1899			1 - 2 - 10
			55	0.71	32	1727		2162		2305		2336			2 - 5 - 14
	B3	6	50	0.17	15	1357		1638		1737		1788		2.6	1 - 2 - 9
			75	0.37	26	1731		2162		2303		2336			2 - 5 - 15
			100	0.66	34	2108		2805		3012		3112			4 - 9 - 19
	B4	8	90	0.18	15	1642		2027		2143		2188		1.8	2 - 5 - 14
			135	0.39	20	2119		2799		3003		3096			5 - 11 - 20
			180	0.70	28	2462		3224		3545		3627			9 - 14 - 23

CBAM / 4-PIPE HEATING

Nominal Size, L x W (ft)	Nozzle Size	Primary Air			Sound	Coil Heating (Btu/h)								Induction ratio	Throw
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		Inches	CFM	(in. H2O)	NC	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL		
2 x 2	B1	4	11	0.21	15	1050	0.08	1189	0.33	1222	0.74	1247	0.96	5.9	0 - 0 - 2
			16	0.45	16	1384		1583		1630		1644			0 - 1 - 3
			21	0.77	25	1753		2100		2162		2222			1 - 1 - 6
	B2	4	18	0.22	15	1367		1553		1597		1612		3.3	0 - 1 - 3
			24	0.39	22	1731		2040		2100		2144			1 - 1 - 5
			30	0.61	28	2044		2393		2485		2533			1 - 2 - 8
	B3	5	30	0.17	15	1595		1844		1899		1923		2.2	1 - 1 - 5
			45	0.39	24	2169		2496		2607		2642			1 - 3 - 9
			60	0.69	32	2577		2951		3114		3102			2 - 5 - 12
	B4	6	55	0.18	15	2051		2429		2512		2572		1.5	1 - 3 - 9
			85	0.44	28	2664		3049		3215		3211			3 - 6 - 13
			115	0.78	24	2963		3313		3505		3512			5 - 9 - 16
4 x 2	B1	4	18	0.19	15	1589	0.17	1860	0.68	1917	1.52	1928	1.96	6.9	0 - 1 - 3
			27	0.44	23	2292		2758		2916		2998			1 - 2 - 6
			36	0.78	32	2794		3444		3638		3718			1 - 3 - 11
	B2	5	25	0.15	15	1852		2181		2253		2267		3.9	0 - 1 - 4
			40	0.38	23	2761		3368		3564		3657			1 - 2 - 10
			55	0.71	32	3326		4164		4440		4499			2 - 5 - 14
	B3	6	50	0.17	15	2613		3155		3344		3444		2.6	1 - 2 - 9
			75	0.37	26	3334		4165		4435		4499			2 - 5 - 15
			100	0.66	34	4060		5402		5800		5994			4 - 9 - 19
	B4	8	90	0.18	15	3162		3904		4128		4215		1.8	2 - 5 - 14
			135	0.39	20	4080		5391		5784		5963			5 - 11 - 20
			180	0.70	28	4741		6209		6827		6986			9 - 14 - 23

Note: Reference page U53 for operational conditions used for performance notes

CBAM / 2-PIPE COOLING

Nominal Size, L x W (ft)	Nozzle Size	Primary Air			Sound	Coil Sensible Cooling (Btu/h)								Induction ratio	Throw
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		Inches	CFM	(in. H20)	NC	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL		
2 x 2	B1	4	11	0.21	15	582	0.60	658	2.40	677	5.40	691	6.90	5.9	0 - 0 - 2
			16	0.45	16	766		877		903		910			0 - 1 - 3
			21	0.77	25	971		1163		1197		1231			1 - 1 - 6
	B2	4	18	0.22	15	757		860		884		893		3.3	0 - 1 - 3
			24	0.39	22	959		1130		1163		1187			1 - 1 - 5
			30	0.61	28	1132		1325		1376		1403			1 - 2 - 8
	B3	5	30	0.17	15	883		1021		1052		1065		2.2	1 - 1 - 5
			45	0.39	24	1201		1382		1444		1463			1 - 3 - 9
			60	0.69	32	1427		1635		1725		1718			2 - 5 - 12
	B4	6	55	0.18	15	1136		1345		1391		1424		1.5	1 - 3 - 9
			85	0.44	28	1475		1688		1781		1779			3 - 6 - 13
			115	0.78	24	1641		1835		1941		1945			5 - 9 - 16
4 x 2	B1	4	18	0.19	15	880	1.20	1030	4.80	1062	10.70	1068	13.70	6.9	0 - 1 - 3
			27	0.44	23	1269		1527		1615		1660			1 - 2 - 6
			36	0.78	32	1547		1907		2015		2059			1 - 3 - 11
	B2	5	25	0.15	15	1026		1208		1248		1255		3.9	0 - 1 - 4
			40	0.38	23	1529		1865		1974		2025			1 - 2 - 10
			55	0.71	32	1842		2306		2459		2492			2 - 5 - 14
	B3	6	50	0.17	15	1447		1747		1852		1907		2.6	1 - 2 - 9
			75	0.37	26	1846		2306		2456		2492			2 - 5 - 15
			100	0.66	34	2249		2992		3212		3320			4 - 9 - 19
	B4	8	90	0.18	15	1751		2162		2286		2334		1.8	2 - 5 - 14
			135	0.39	20	2260		2986		3203		3303			5 - 11 - 20
			180	0.70	28	2626		3439		3781		3869			9 - 14 - 23

CBAM / 2-PIPE HEATING

Nominal Size, L x W (ft)	Nozzle Size	Primary Air			Sound	Coil Heating (Btu/h)								Induction ratio	Throw
		Inlet Dia.	Flow Rate	Inlet ΔPS		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		Inches	CFM	(in. H20)	NC	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL	qTOTAL	ΔCOIL		
2 x 2	B1	4	11	0.21	15	1616	0.60	1829	2.40	1880	5.40	1919	6.94	5.9	0 - 0 - 2
			16	0.45	16	2129		2435		2508		2529			0 - 1 - 3
			21	0.77	25	2696		3231		3326		3419			1 - 1 - 6
	B2	4	18	0.22	15	2103		2389		2456		2481		3.3	0 - 1 - 3
			24	0.39	22	2664		3138		3231		3298			1 - 1 - 5
			30	0.61	28	3144		3681		3823		3898			1 - 2 - 8
	B3	5	30	0.17	15	2454		2836		2921		2959		2.2	1 - 1 - 5
			45	0.39	24	3336		3840		4010		4065			1 - 3 - 9
			60	0.69	32	3965		4540		4791		4772			2 - 5 - 12
	B4	6	55	0.18	15	3155		3737		3864		3957		1.5	1 - 3 - 9
			85	0.44	28	4098		4690		4947		4941			3 - 6 - 13
			115	0.78	24	4558		5097		5393		5403			5 - 9 - 16
4 x 2	B1	4	18	0.19	15	2445	1.19	2862	4.75	2950	10.69	2967	13.73	6.9	0 - 1 - 3
			27	0.44	23	3526		4243		4487		4612			1 - 2 - 6
			36	0.78	32	4298		5298		5597		5719			1 - 3 - 11
	B2	5	25	0.15	15	2849		3355		3465		3487		3.9	0 - 1 - 4
			40	0.38	23	4248		5182		5484		5626			1 - 2 - 10
			55	0.71	32	5117		6406		6830		6922			2 - 5 - 14
	B3	6	50	0.17	15	4019		4854		5145		5298		2.6	1 - 2 - 9
			75	0.37	26	5129		6407		6823		6922			2 - 5 - 15
			100	0.66	34	6246		8311		8924		9221			4 - 9 - 19
	B4	8	90	0.18	15	4864		6006		6351		6484		1.8	2 - 5 - 14
			135	0.39	20	6277		8294		8899		9174			5 - 11 - 20
			180	0.70	28	7294		9552		10502		10748			9 - 14 - 23

Note: Reference page U53 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]

qCoil = Sensible Capacity, Coil [Btu/h]

ΔCoil = Water coil pressure drop [ft wg]

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

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

T_{PA} = Temperature Primary Air [°F]

T_{ROOM} = Temperature Room Air [°F]

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