

BEL-12

Linear Active Chilled Beam



PERFORMANCE DATA | 4-PIPE COOLING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE COOLING (Btu/h)								INDUCTION RATIO	THROW
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		1.5 GPM		2.0 GPM		2.5 GPM			
						in	CFM	(in H ₂ O)	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
4	M13	5	15	0.24	15	842	0.70	853	1.60	864	2.90	870	4.50	3.4	2-3-5
			20	0.42	18	1048		1070		1087		1096			2-3-5
			25	0.65	21	1238		1271		1296		1309			3-4-6
	M17	5	25	0.27	15	1143		1171		1191		1203		2.3	3-3-6
			35	0.53	20	1450		1499		1534		1553			3-4-7
			40	0.7	21	1582		1644		1686		1709			4-6-8
	M23	5	40	0.21	16	1195		1226		1248		1260		1.9	4-5-7
			60	0.47	22	1583		1643		1685		1708			5-7-9
			75	0.73	25	1830		1916		1974		2006			6-7-10
	M31	6	75	0.24	20	1394		1428		1454		1469		1.3	5-6-8
			100	0.42	23	1708		1765		1805		1827			6-8-11
			130	0.71	28	2034		2121		2181		2213			7-8-11
6	M13	5	20	0.19	16	1156	1.00	1174	2.30	1191	4.20	1199	6.50	3.4	2-3-5
			30	0.42	21	1546		1591		1623		1641			3-5-8
			40	0.75	25	1906		1979		2029		2057			4-5-7
	M17	5	40	0.31	19	1766		1826		1868		1892		2.3	3-5-8
			50	0.49	22	2050		2139		2199		2232			4-6-9
			60	0.71	25	2312		2431		2510		2552			5-7-10
	M23	6	60	0.21	20	1766		1825		1866		1890		1.9	4-6-10
			85	0.42	24	2235		2342		2413		2452			6-8-11
			110	0.7	27	2628		2785		2890		2946			7-10-12
	M31	8 *	110	0.22	22	2020		2085		2132		2158		1.3	6-8-12
			150	0.42	26	2498		2610		2685		2726			7-10-13
			190	0.67	29	2910		3070		3178		3235			9-11-14
8	M13	5	30	0.24	19	1800	1.40	1848	3.00	1883	5.40	1901	8.50	3.4	3-4-8
			40	0.43	23	2204		2288		2343		2374			3-5-9
			50	0.67	26	2599		2718		2795		2838			4-6-9
	M17	6	50	0.28	21	2419		2521		2588		2625		2.3	4-6-8
			65	0.48	24	2886		3041		3141		3196			5-7-10
			80	0.72	27	3301		3511		3647		3722			6-8-11
	M23	8	80	0.22	22	2507		2617		2689		2728		1.9	5-7-10
			110	0.42	26	3093		3273		3390		3454			7-9-13
			140	0.67	30	3584		3839		4003		4094			8-10-14
	M31	10 *	140	0.22	25	2533		2637		2705		2743		1.3	7-9-13
			195	0.42	29	3174		3349		3463		3525			8-10-15
			250	0.69	34	3710		3962		4125		4214			10-12-17
10	M13	5	35	0.22	21	2815	1.70	2941	3.80	3022	6.70	3067	10.50	3.4	4-5-9
			50	0.45	25	3603		3821		3960		4037			4-6-10
			60	0.64	27	4045		4329		4512		4612			5-7-11
	M17	6	60	0.27	22	3804		4052		4211		4298		2.3	4-6-9
			80	0.49	26	4528		4899		5137		5270			5-8-11
			95	0.69	28	4986		5452		5751		5919			6-9-12
	M23	8 *	95	0.22	25	3970		4243		4418		4514		1.9	5-8-11
			135	0.44	29	4880		5322		5605		5764			7-9-12
			170	0.69	32	5500		6091		6473		6687			8-10-15
	M31	10 *	170	0.23	28	3784		4029		4186		4272		1.3	7-9-13
			230	0.41	32	4544		4919		5159		5292			8-11-16
			290	0.66	40	5162		5670		5997		6180			11-13-18

NOTES: Reference page C3-40 for operational conditions used for performance notes.

PERFORMANCE DATA | 4-PIPE HEATING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE HEATING (Btu/h)								INDUCTION RATIO	THROW
		INLET DIA.	FLOW RATE	INLET ΔPs		0.5 GPM		1.0 GPM		1.5 GPM		2.0 GPM			
		in	CFM	(in H ₂ O)		TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		
4	M13	5	15	0.24	15	1500	0.10	1599	0.20	1620	0.50	1639	1.00	3.4	2-3-5
			20	0.42	18	1844		1997		2037		2068			2-3-5
			25	0.65	21	2158		2367		2427		2471			3-4-6
	M17	5	25	0.27	15	2018		2197		2246		2283		2.3	3-3-6
			35	0.53	20	2517		2804		2893		2955			3-4-7
			40	0.70	21	2727		3069		3180		3256			4-6-8
	M23	5	40	0.21	16	2178		2372		2426		2467		1.9	4-5-7
			60	0.47	22	2840		3178		3288		3363			5-7-9
			75	0.73	25	3259		3706		3860		3966			6-7-10
	M31	6	75	0.24	20	2695		2919		2982		3028		1.3	5-6-8
			100	0.42	23	3285		3621		3724		3796			6-8-11
			130	0.71	28	3902		4372		4529		4637			7-8-11
6	M13	5	20	0.19	16	2041	0.10	2192	0.30	2226	0.80	2255	1.40	3.4	2-3-5
			30	0.42	21	2666		2950		3030		3089			3-5-8
			40	0.75	25	3232		3652		3784		3874			4-5-7
	M17	5	40	0.31	19	3037		3401		3508		3585		2.3	3-5-8
			50	0.49	22	3477		3966		4127		4235			4-6-9
			60	0.71	25	3878		4494		4707		4849			5-7-10
	M23	6	60	0.21	20	3150		3509		3615		3690		1.9	4-6-10
			85	0.42	24	3924		4491		4684		4811			6-8-11
			110	0.70	27	4557		5335		5617		5806			7-10-12
	M31	8 *	110	0.22	22	3835		4239		4356		4441		1.3	6-8-12
			150	0.42	26	4709		5317		5519		5654			7-10-13
			190	0.67	29	5460		6276		6566		6759			9-11-14
8	M13	5	30	0.24	19	3093	0.10	3407	0.50	3494	1.00	3557	1.80	3.4	3-4-8
			40	0.43	23	3709		4190		4341		4441			3-5-9
			50	0.67	26	4308		4957		5171		5310			4-6-9
	M17	6	50	0.28	21	4062		4632		4816		4936		2.3	4-6-8
			65	0.48	24	4752		5556		5834		6016			5-7-10
			80	0.72	27	5348		6385		6764		7009			6-8-11
	M23	8	80	0.22	22	4348		4954		5152		5281		1.9	5-7-10
			110	0.42	26	5257		6172		6497		6709			7-9-13
			140	0.67	30	6005		7220		7681		7976			8-10-14
	M31	10 *	140	0.22	25	4741		5326		5513		5636		1.3	7-9-13
			195	0.42	29	5877		6780		7095		7300			8-10-15
			250	0.69	34	6829		8045		8499		8792			10-12-17
10	M13	5	35	0.22	21	4572	0.10	5265	0.60	5491	1.30	5638	2.30	3.4	4-5-9
			50	0.45	25	5662		6766		7159		7411			4-6-10
			60	0.64	27	6239		7618		8130		8459			5-7-11
	M17	6	60	0.27	22	5954		7183		7630		7917		2.3	4-6-9
			80	0.49	26	6883		8596		9266		9695			5-8-11
			95	0.69	28	7448		9503		10344		10884			6-9-12
	M23	8 *	95	0.22	25	6340		7672		8164		8479		1.9	5-8-11
			135	0.44	29	7559		9530		10326		10837			7-9-12
			170	0.69	32	8361		10837		11903		12591			8-10-15
	M31	10 *	170	0.23	28	6527		7743		8185		8468		1.3	7-9-13
			230	0.41	32	7715		9439		10114		10547			8-11-16
			290	0.66	40	8683		10879		11795		12384			11-13-18

NOTES: Reference page C3-40 for operational conditions used for performance notes.

BEL-12

Linear Active Chilled Beam



PERFORMANCE DATA | 2-PIPE COOLING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE COOLING (Btu/h)								INDUCTION RATIO	THROW
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		1.5 GPM		2.0 GPM		2.5 GPM			
		in	CFM	(in H ₂ O)		NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
4	M13	5	15	0.24	15	884	1.00	896	2.20	907	3.80	913	6.00	3.4	2-3-5
			20	0.42	18	1100		1123		1141		1151			2-3-5
			25	0.65	21	1300		1335		1360		1375			3-4-6
	M17	5	25	0.27	15	1200		1229		1251		1263		2.3	3-3-6
			35	0.53	20	1522		1574		1610		1631			3-4-7
			40	0.70	21	1661		1726		1770		1795			4-6-8
	M23	5	40	0.21	16	1255		1287		1310		1323		1.9	4-5-7
			60	0.47	22	1662		1725		1769		1793			5-7-9
			75	0.73	25	1922		2011		2073		2106			6-7-10
	M31	6	75	0.24	20	1463		1500		1527		1542		1.3	5-6-8
			100	0.42	23	1793		1853		1895		1919			6-8-11
			130	0.71	28	2135		2227		2290		2324			7-8-11
6	M13	5	20	0.19	16	1213	1.40	1233	3.10	1250	5.50	1258	8.70	3.4	2-3-5
			30	0.42	21	1623		1670		1704		1723			3-5-8
			40	0.75	25	2001		2077		2130		2159			4-5-7
	M17	5	40	0.31	19	1854		1917		1961		1986		2.3	3-5-8
			50	0.49	22	2152		2245		2308		2343			4-6-9
			60	0.71	25	2427		2562		2635		2680			5-7-10
	M23	6	60	0.21	20	1854		1916		1960		1984		1.9	4-6-10
			85	0.42	24	2347		2459		2534		2575			6-8-11
			110	0.70	27	2760		2924		3034		3093			7-10-12
	M31	8 *	110	0.22	22	2121		2190		2239		2266		1.3	6-8-12
			150	0.42	26	2623		2740		2819		2863			7-10-13
			190	0.67	29	3055		3223		3336		3397			9-11-14
8	M13	5	30	0.24	19	1889	1.80	1940	4.10	1977	7.30	1996	2.70	3.4	3-4-8
			40	0.43	23	2314		2402		2460		2492			3-5-9
			50	0.67	26	2729		2854		2935		2979			4-6-9
	M17	6	50	0.28	21	2540		2647		2717		2756		2.3	4-6-8
			65	0.48	24	3030		3193		3298		3356			5-7-10
			80	0.72	27	3466		3687		3829		3907			6-8-11
	M23	8 *	80	0.22	22	2633		2748		2823		2864		1.9	5-7-10
			110	0.42	26	3247		3436		3559		3626			7-9-13
			140	0.67	30	3762		4031		4203		4298			8-10-14
	M31	10 *	140	0.22	25	2659		2769		2840		2880		1.3	7-9-13
			195	0.42	29	3332		3516		3635		3700			8-10-15
			250	0.69	34	3896		4160		4330		4424			10-12-17
10	M13	5	35	0.22	21	2956	2.20	3088	5.00	3173	8.90	3220	3.70	3.4	4-5-9
			50	0.45	25	3782		4012		4158		4238			4-6-10
			60	0.64	27	4247		4545		4737		4842			5-7-11
	M17	6	60	0.27	22	3994		4254		4421		4513		2.3	4-6-9
			80	0.49	26	4754		5143		5394		5533			5-8-11
			95	0.69	28	5234		5724		6038		6215			6-9-12
	M23	8 *	95	0.22	25	4168		4454		4638		4739		1.9	5-8-11
			135	0.44	29	5124		5587		5885		6051			7-9-12
			170	0.69	32	5774		6395		6796		7021			8-10-15
	M31	10 *	170	0.23	28	3973		4230		4395		4485		1.3	7-9-13
			230	0.41	32	4771		5164		5416		5556			8-11-16
			290	0.66	40	5420		5953		6296		6488			11-13-18

NOTES: Reference page C3-40 for operational conditions used for performance notes.

PERFORMANCE DATA | 2-PIPE HEATING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE HEATING (Btu/h)								INDUCTION RATIO	THROW
		INLET DIA.	FLOW RATE	INLET ΔPs		0.5 GPM		1.0 GPM		1.5 GPM		2.0 GPM			
		in	CFM	(in H ₂ O)		NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
4	M13	5	15	0.24	15	2417	0.20	2580	1.00	2613	2.20	2646	3.80	3.4	2-3-5
			20	0.42	18	2966		3218		3282		3334			2-3-5
			25	0.65	21	3465		3810		3908		3981			3-4-6
	M17	5	25	0.27	15	3234		3629		3609		3670		2.3	3-3-6
			35	0.53	20	4020		4493		4639		4741			3-4-7
			40	0.70	21	4349		4912		5096		5220			4-6-8
	M23	5	40	0.21	16	3445		3764		3854		3921		1.9	4-5-7
			60	0.47	22	4466		5022		5202		5325			5-7-9
			75	0.73	25	5101		5839		6092		6266			6-7-10
	M31	6	75	0.24	20	4174		4543		4646		4722		1.3	5-6-8
			100	0.42	23	5057		5610		5780		5898			6-8-11
			130	0.71	28	5968		6741		7001		7177			7-8-11
6	M13	5	20	0.19	16	3290	0.30	3638	1.40	3594	3.10	3642	5.50	3.4	2-3-5
			30	0.42	21	4284		4751		4883		4980			3-5-8
			40	0.75	25	5180		5872		6088		6238			4-5-7
	M17	5	40	0.31	19	4859		5458		5635		5761		2.3	3-5-8
			50	0.49	22	5549		6353		6618		6796			4-6-9
			60	0.71	25	6174		7187		7539		7773			5-7-10
	M23	6	60	0.21	20	4975		5567		5740		5864		1.9	4-6-10
			85	0.42	24	6161		7095		7412		7623			6-8-11
			110	0.70	27	7116		8397		8861		9172			7-10-12
	M31	8 *	110	0.22	22	5928		6592		6786		6924		1.3	6-8-12
			150	0.42	26	7227		8227		8560		8782			7-10-13
			190	0.57	29	8321		9665		10142		10461			9-11-14
8	M13	5	30	0.24	19	4986	0.50	5503	1.80	5647	4.10	5749	7.30	3.4	3-4-8
			40	0.43	23	5966		6758		7005		7171			3-5-9
			50	0.67	26	6916		7984		8337		8567			4-6-9
	M17	6	50	0.28	21	6512		7450		7753		7951		2.3	4-6-8
			65	0.48	24	7595		8918		9377		9675			5-7-10
			80	0.72	27	8523		10231		10854		11258			6-8-11
	M23	8 *	80	0.22	22	6877		7875		8201		8413		1.9	5-7-10
			110	0.42	26	8269		9775		10310		10658			7-9-13
			140	0.67	30	9395		11394		12153		12640			8-10-14
	M31	10 *	140	0.22	25	7315		8277		8585		8788		1.3	7-9-13
			196	0.42	29	8992		10477		10996		11334			8-10-15
			250	0.69	34	10365		12367		13115		13596			10-12-17
10	M13	5	35	0.22	21	7403	0.60	8545	2.20	8917	5.00	9159	8.90	3.4	4-5-9
			50	0.45	25	9146		10963		11610		12024			4-6-10
			60	0.64	27	10061		12331		13173		13714			5-7-11
	M17	6	60	0.27	22	9591		11614		12350		12822		2.3	4-6-9
			80	0.49	26	11051		13871		14972		15679			5-8-11
			95	0.69	28	11927		15310		16695		17583			6-9-12
	M23	8 *	95	0.22	25	10104		12297		13106		13625		1.9	5-8-11
			135	0.44	29	11970		15215		16526		17366			7-9-12
			170	0.69	32	13168		17243		18998		20130			8-10-15
	M31	10 *	170	0.23	28	10149		12151		12878		13344		1.3	7-9-13
			230	0.41	32	11894		14733		15844		16557			8-11-16
			290	0.66	40	13277		16893		18401		19369			11-13-18

NOTES: Reference page C3-40 for operational conditions used for performance notes.

PERFORMANCE DATA

NOTES:

1. All performance data based on test performed in accordance with ASHRAE Standard 200-2018.
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 inches 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.
7. * denotes oval inlet air connection.

COOLING PERFORMANCE:

- Cooling capacity listed (TOTAL) 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 (TOTAL) is the sensible heat added 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 heating 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_{Coil} = Sensible Capacity, Coil [Btu/h]

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

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

W_{ROOM} = Humidity Ratio of the Room

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

T_{PA} = Temperature Primary Air [°F]

T_{ROOM} = Temperature Room Air [°F]

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

W_{PA} = Humidity Ratio of the Primary Air