

INTRODUCTION

The exposed linear chilled beam offers flexible one-way or two-way air distribution patterns and uses an optimized nozzle design that delivers high capacity with low noise levels, complemented by a sleek linear form that aligns with contemporary commercial architectural styling. Its integral coanda plates enable ceiling-independent operation, while the optimized diffuser geometry ensures effective air distribution to maximize occupant comfort.

MODEL

BEL-12 - Linear Active Chilled Beam

FEATURES

- 1-way or 2-way air distribution patterns
- 12" width
- 2' to 10' lengths, 1' increments
- Perforated induced air grille
- Left hand or Right hand coil connections
- Side, top, or multi air inlet locations
- 2-pipe and 4-pipe coil configurations
- Field-reversible coils
- Configured nozzle geometry for capacity optimization
- Hinged induced air grille for roomside coil access
- Commissioning port with roomside access for balancing
- Mounting brackets with adjustments in two directions
- Durable powder coat finish
- 1/2" Sweat water coil connections
- Coil air vent
- Coil drain valve

OPTIONS

- Internal closed cell foam insulation
- 1/2" or 3/4" MPT water coil connections
- 12", 18" or 24" stainless steel braided hoses
- Coil lint screen
- Constant volume regulator

FINISHES

- Standard Finish - #WHT British White
- Optional Finish - #BLK Black



APPLICATION

Krueger active chilled beams features the aerodynamic properties of Krueger ceiling diffusers and benefit from the use of using hydronic coils and induced air to reduce energy consumption associated with removal of sensible thermal loads. The primary air is supplied to the chilled beam subsequent to it being discharged through a series of nozzles located along the length of the beam. The nozzles inject the primary air into the mixing chamber at velocities capable of inducing room air through its water coil where it mixes with the primary supply air. This mixture of air is then discharged into the space through the ceiling slot diffusers. This provides high cooling outputs with low amounts of primary air. The reduced volume of air results in the reduction of the air handler capacity and size, smaller duct sizes, and the overall energy consumption.

The supplied air from the air handling unit is tempered and dehumidified to handle the latent load. The remaining loads in the space are addressed with the heat exchanger which is incorporated into the chilled beam. Applications with low latent cooling loads could use 100% outdoor air allowing for use of a dedicated outdoor air system with energy recovery further reducing total system energy consumption.

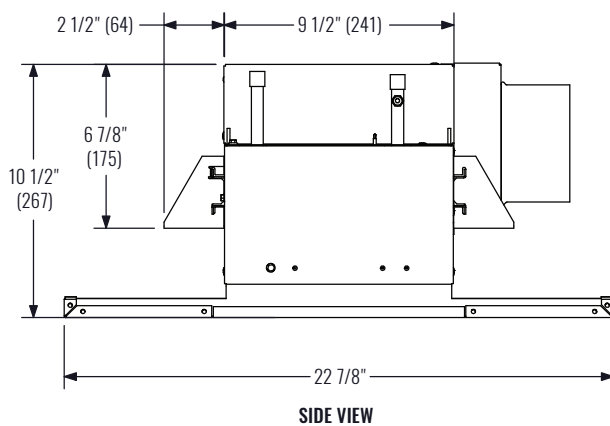
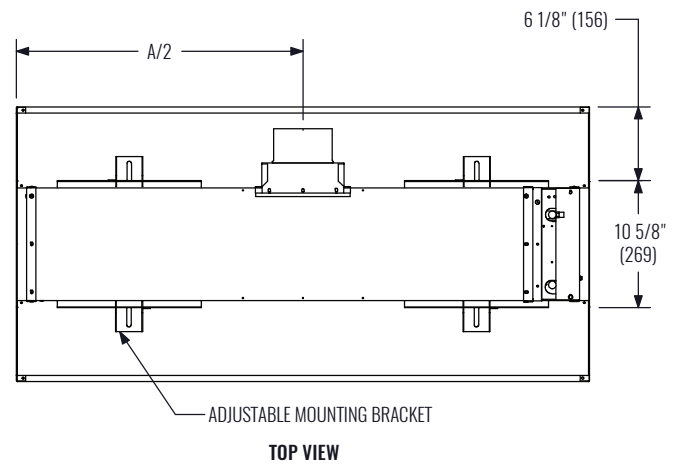
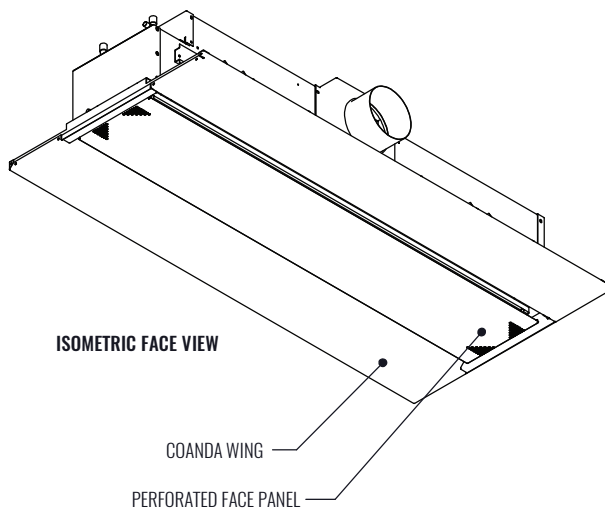
The BELs are offered for both cooling and heating and lengths from 2' to 10'. The low overall height of the BEL is ideal for open ceiling or retrofit applications with limited floor height.

BEL-12

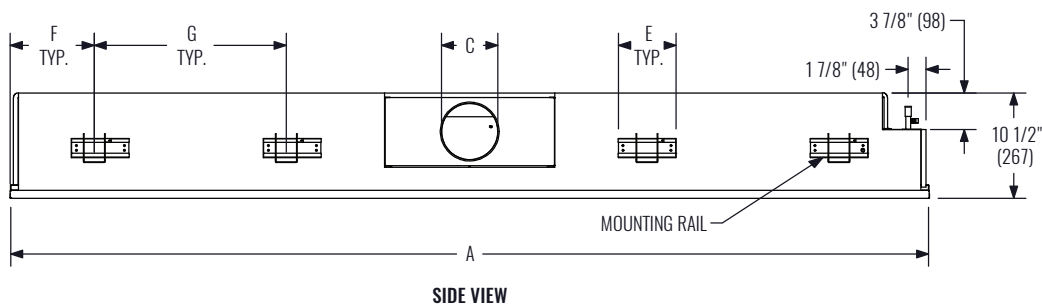
Linear Active Chilled Beam



DIMENSIONAL DATA



NOMINAL LENGTH	A	E	F	G	BRACKET QUANTITY
2 ft	23 3/4" (582)	4" (102)	2" (51)	---	4
3 ft	35 3/4" (909)		4" (109)		
4 ft	47 3/4" (1213)	12" (305)	3" (76)		
5 ft	59 3/4" (1518)		6" (152)		
6 ft	71 3/4" (1822)		8" (203)		
7 ft	83 3/4" (2127)		10" (254)		8
8 ft	95 3/4" (2432)			12" (305)	
9 ft	107 3/4" (2737)	6" (152)	6" (152)	17" (432)	
10 ft	119 3/4" (3042)			22" (559)	



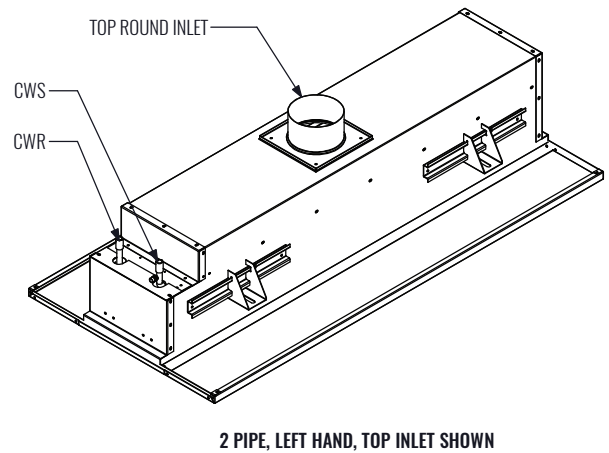
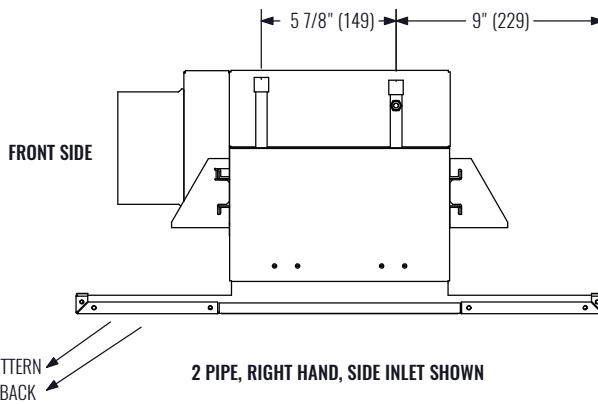
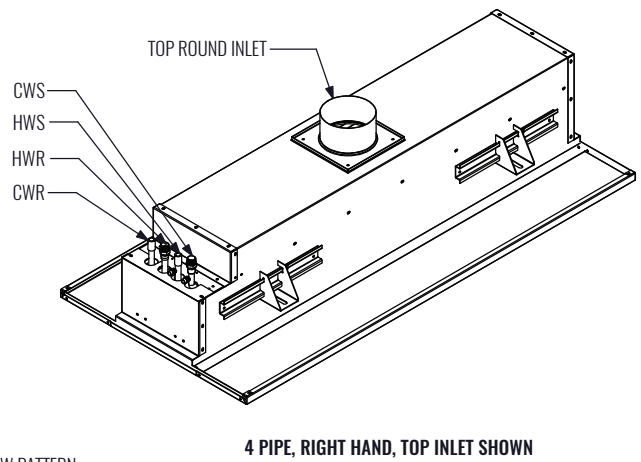
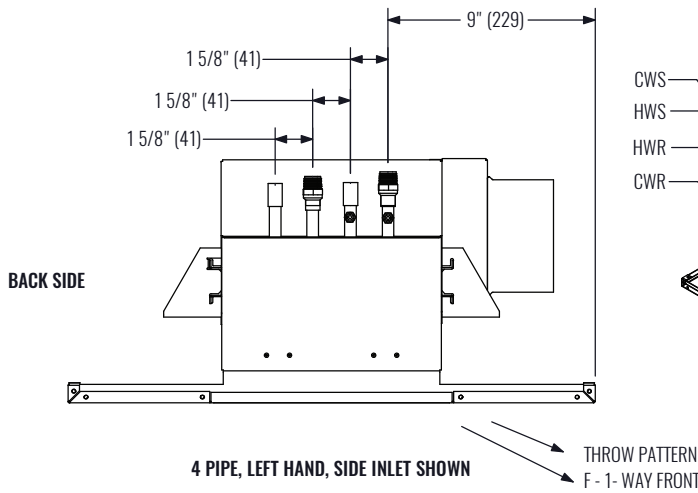
NOMINAL INLET	C
4" ROUND	3 7/8" (98)
5" ROUND	4 7/8" (124)
6" ROUND	5 7/8" (149)
8" OVAL	5 1/4" x 9 3/8" (133 x 238)
10" OVAL	5 1/4" x 12 1/2" (133 x 318)

NOTE: Dimensions in parentheses are in millimeters.

*Side Inlet Only

**Top Inlet Only

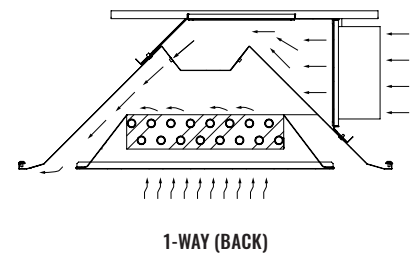
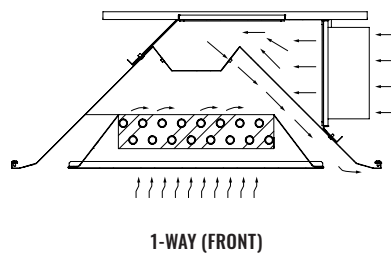
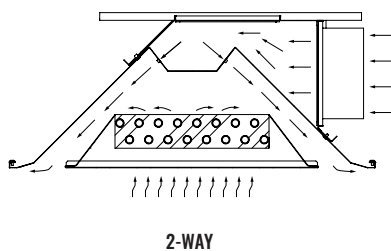
PIPING & HANDING



NOTE: Dimensions in parentheses are in millimeters.

CWS - Cold Water Supply
CWR - Cold Water Return
HWS - Hot Water Supply
HWR - Hot Water Return

THROW PATTERNS



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	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	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	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	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			ΔP COIL		
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	1263	1631	1795	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	1323	1793	2106	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	1542	1919	2324	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	1986	2343	2680	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	1984	2575	3093	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	2266	2863	3397	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	2756	3356	3907	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	2864	3626	4298	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	2880	3700	4424	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	4513	5533	6215	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	4739	6051	7021	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	4485	5556	6488	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

ENGINEERING SPECIFICATION & CONFIGURATION

Furnish and install active chilled beams in the sizes, configurations and capacities indicated on the project schedules and plans. Unit shall comprise a primary air connection, a pressurized inlet plenum feeding a series of room air induction nozzles and an associated heat transfer coil contained in a single unit housing. A hinged perforated room air induction grille shall be provided for easy access to the unit heat transfer coil.

UNIT CASING

The unit casing shall be constructed from a minimum 22-gauge galvanized sheet steel. Units shall have a maximum casing height of 9 7/8".

FACE

The face of the beam shall consist of a perforated room air induction section of 50% free area flanked by linear supply slots. Face and frame styles shall be designed for flush integration into a standard 12" wide module T-bar lay-in ceiling. The face section shall include hinged fastening that allows the face to be swung opened for coil cleaning.

FINISH

The entire visible face sections and all visible internal surfaces shall be finished in white powder coat paint or as specified by the architect (OPTIONAL). Concealed surfaces shall be G90 galvanized steel.

PRIMARY AIR INLETS

Manufacturer shall provide round or oval inlet collars of diameter(s) as indicated on the project plans and schedules and suitable for connection to common flexible or rigid ductwork sizes. The inlet collar shall be roll-formed to facilitate the connection of flexible or rigid ductwork. Inlet location may be side or top as indicated on the project plans and schedules. Nozzles shall be of a fixed size, selected with respect to cooling and heating requirements, and constructed of formed sheet metal.

PRIMARY AIR PLENUM PRESSURE TAP

A plenum air pressure tap shall be mounted within the pressurized plenum for measuring the pressure differential between the primary air plenum and the room. The pressure tap manometer connection port shall be fitted to the end of a plastic tube accessible from the diffuser face. Airflow calibration charts that relate the pressure differential reading with the primary airflow rates, shall be furnished with the IOM's.

MOUNTING RAILS

Factory installed mounting rails shall incorporate slotted holes for hanging using threaded rods.

HYDRONIC HEAT TRANSFER COIL

Integral heat transfer coils shall be provided with connections for either 2 or 4 pipe water connections as indicated on plans and schedules. Four pipe configurations shall require separate supply and return connections for chilled and hot

water. The coil shall be mounted horizontally and shall be manufactured with seamless copper tubing (1/2" or 3/4" outside diameter as indicated on the plans and schedules) with minimum .016" wall thickness mechanically fixed to aluminum fins. The aluminum fins shall be limited to no more than ten (10) fins per inch. The coil shall have a working pressure of at least 360 PSI, and be factory tested for leakage at a minimum pressure of 500 PSI.

Each chilled beam shall be provided with factory integrated manual air vents.

COILS

- **(Optional)** Coil shall be provided with factory integrated drain fittings. Unless otherwise specified, coil connections shall be bare copper for field sweating to the water supply circuit(s).
- **(Optional)** The chilled water coil shall be provided with NPT male threaded fittings. These fittings must be suitable for field connection to a similar NPT female flexible hose spigot and shall be at least 1 1/2" long to facilitate field connection (by others).

Connections shall face upwards to avoid issues with coordination of ceiling installation. The coil shall be rated and certified in accordance with AHRI Standard 410.

PACKAGING

Beams shall be delivered to site clean with hydronic coils flushed and fitted with protective caps. Protective film shall be applied to the entire beam face to prevent ingress of dirt. Units shall be shipped to site in cartons and labeled with identification tagging.

THE MANUFACTURER SHALL PROVIDE THE FOLLOWING ACCESSORIES

- **(Optional) Lint Screens:** Manufacturer shall provide zinc plated steel mesh lint screens with galvanized frames fitted to the heat exchange coils.
- **(Optional) Water Connection Hoses:** Manufacturer shall provide 1/2" or 3/4" dia. x (12"), (18") or (24") long stainless-steel braided hoses with female swivel connections. Hoses shall be constructed with a KEVLAR® reinforced EPDM core with stainless steel ferrules. Hoses shall be tested for working pressures up to 400 PSIG (at max. operating temperature of 248°F) with a burst pressure of 1600 PSIG.
- **(Optional) Airflow Regulators:** Manufacturer shall supply UL94 V-0 rated ABS polymer and UL2043 listed constant volume regulators (BFR's). BFR's shall be designed to fit inside rigid round ductwork and located at a minimum distance of three duct diameters upstream of the active chilled beam primary air inlet.

ENGINEERING SPECIFICATION & CONFIGURATION

1. **SERIES: (XXX-XX)**
BEL-12 - Linear Active Chilled Beam
2. **MODULE SIZE: (XX)**
12 - 12" Width
3. **BEAM LENGTH: (XX)**
2 - 2 ft
3 - 3 ft
4 - 4 ft
5 - 5 ft
6 - 6 ft
7 - 7 ft
8 - 8 ft
9 - 9 ft
10 - 10 ft
4. **AIR PATTERN-NOZZLE TYPE: (XXX)**
M13 - M13
M17 - M17
M23 - M23
M31 - M31
5. **THROW PATTERN: (X)**
2 - 2-Way
F - 1-Way towards inlet
B - 1-Way away from inlet
6. **COIL TYPE: (XXXX)**
2P1C - 2 Pipe Coil - 1 Circuit
2P2C - 2 Pipe Coil - 2 Circuit
4P1C - 4 Pipe Coil - 1 Circuit
4P2C - 4 Pipe Coil - 2 Circuit
7. **COIL ACC1: (X)**
M - Manual Air Vent
8. **COIL ACC2: (X)**
0 - None
D - Drain Pan
9. **WATER CONNECTION: (X)**
L - Left Handing
R - Right Handing
10. **PIPING TYPE: (XXX)**
SWT - Sweat
MPT - 1/2" Male Pipe Thread
3PT - 3/4" Male Pipe Thread
11. **INLET CONFIGURATION: (XX)**
TM - Top Middle
SM - Side Middle
12. **INLET SIZE: (XX)**
4 - 4" Round
5 - 5" Round
6 - 6" Round
8 - 8" Oval
10 - 10" Oval
13. **FACE PATTERN: (XX)**
CP - Circular Perforation
14. **INSULATION: (X)**
0 - None
I - Internal Closed Foam Insulation
15. **FRAME STYLE: (XXX)**
LTF - Lay-In
NTG - Tegular 9/16" Frame
16. **FINISH: (XXX)**
WHT - British White
BLK - Black
17. **ACCESSORY 1: (XX)**
0 - None
LS - Lint Screen
XX - Special

SAMPLE CONFIGURATION: BEL-12 - 12 - 2 - M13 - 2 - 2P1C - M - 0 - L - SWT - TM - 4 - CP - 0 - LTF - WHT - 0