

INTRODUCTION

The active linear chilled beam features 1-way or 2-way air distribution patterns and incorporates an optimized nozzle design to deliver high capacity with low noise levels, all within a sleek linear form that complements modern commercial architectural styling. It is engineered to fit standard 12-inch ceiling systems and utilizes a vertical coil configuration, while its carefully optimized diffuser geometry enhances airflow performance and maximizes occupant comfort.

MODEL

BAL-12 - Active, Linear 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 or top air inlet locations
- 2-pipe and 4-pipe coil configurations
- 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
- Condensate tray with drain connection for field plumbing

OPTIONS

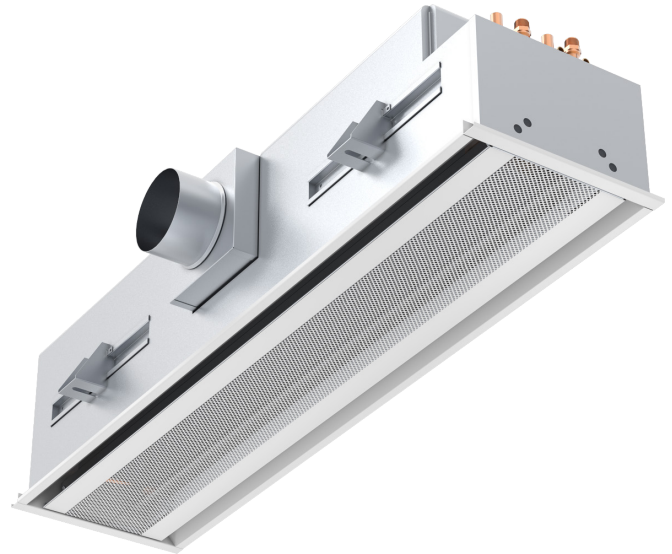
- Internal closed cell foam insulation
- 1/2" or 3/4" MPT water coil connections
- 12", 18" or 24" stainless steel braided hoses
- Lay-in and narrow tee frame styles
- Coil lint screen
- Constant volume regulator

FINISHES

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

ADVANTAGES

- Removal of high thermal loads is possible in this air/water system
- The size of the air duct system is reduced to a minimum, due to the low supply of primary air
- Substantial reduction in the operating costs, due to low primary air volume
- Improvement of the thermal comfort inside the room
- Suitable for several standard ceiling grids
- Contributing sound levels below NC-30



APPLICATION

Krueger active chilled beams features the aerodynamic properties of Krueger ceiling diffusers and benefit from the use of using hydronic coils and 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 two coils and 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.

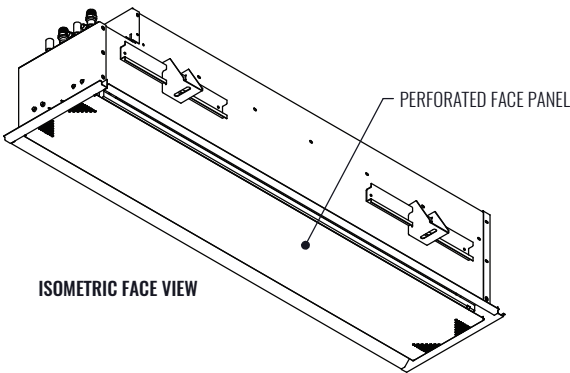
The BAL-12s are offered for both cooling and heating, and lengths from 2' to 10'. They can be easily integrated into different grids styles within a suspended ceiling or even in drywall ceilings.

BAL-12

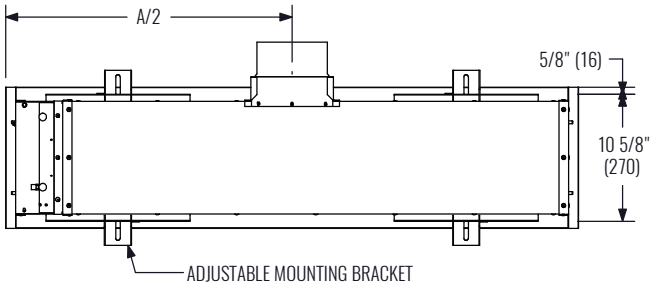
Linear Active Chilled Beam



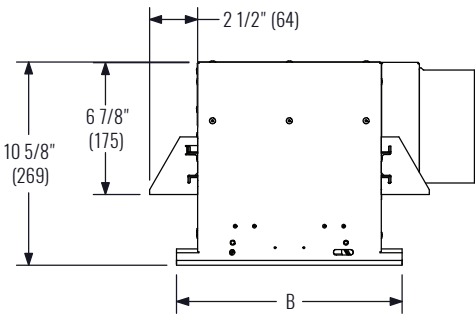
DIMENSIONAL DATA



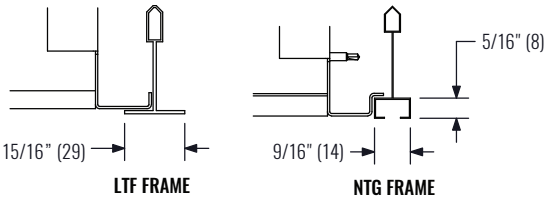
ISOMETRIC FACE VIEW



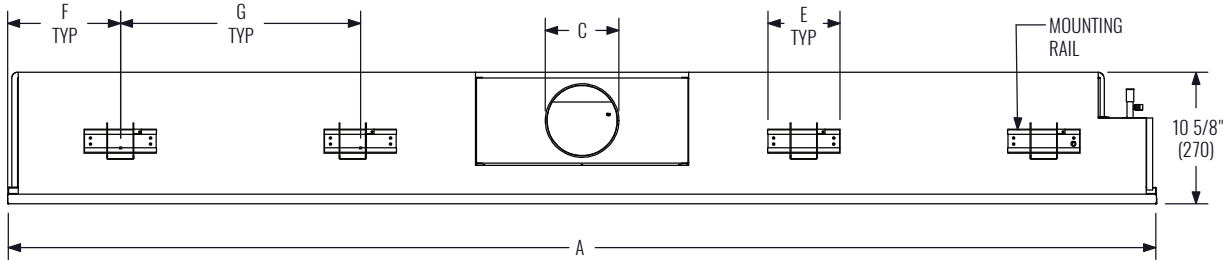
TOP VIEW



SIDE VIEW



FRAME STYLES



SIDE VIEW

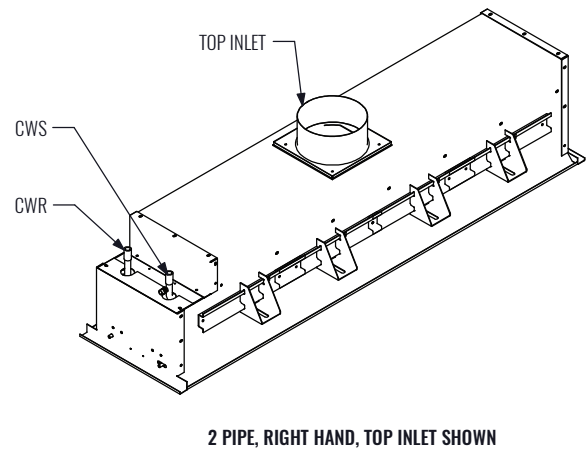
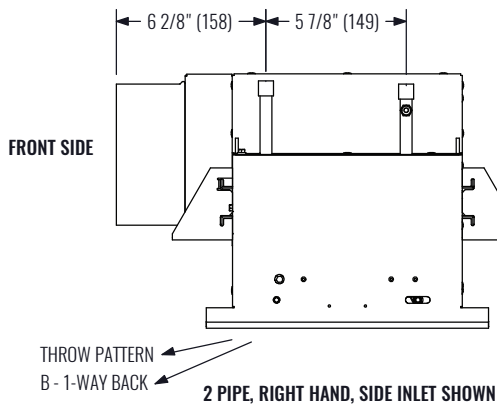
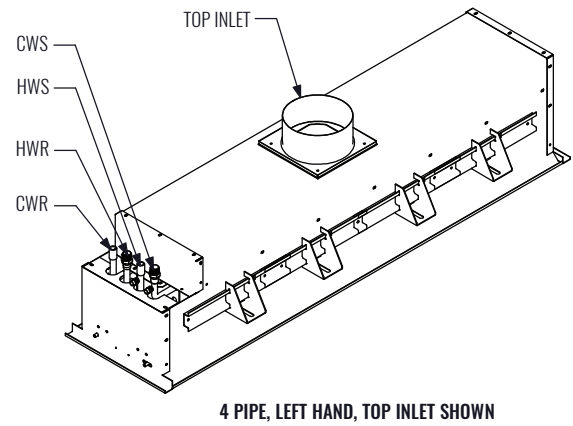
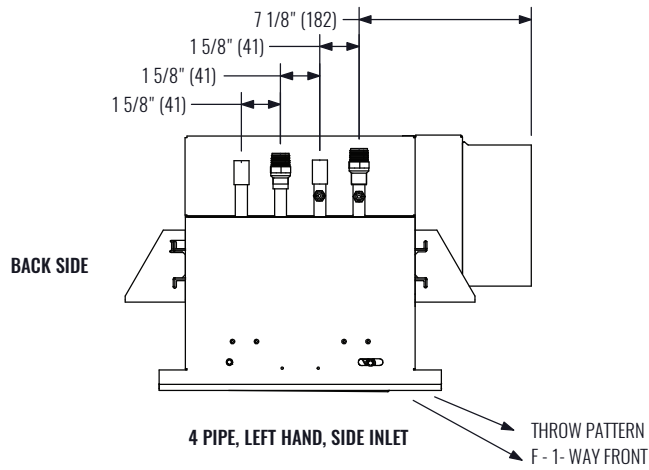
NOMINAL LENGTH	A	E	F	G	BRACKET QTY
2 ft	23 3/4" (582)	4" (25)	2" (51)	---	4
3 ft	35 3/4" (909)		4" (25)		
4 ft	47 3/4" (1213)		3" (25)		
5 ft	59 3/4" (1518)		6" (152)		
6 ft	71 3/4" (1822)	12" (305)	8" (203)	12" (305)	8
7 ft	83 3/4" (2127)		10" (254)		
8 ft	95 3/4" (2432)				
9 ft	107 3/4" (2737)	6" (152)	6" (152)	17" (432)	8
10 ft	119 3/4" (3042)			22" (559)	

NOTE: Dimensions in parentheses are in millimeters.

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)

NOMINAL WIDTH	B
LTF	11.75 (299)
NTG	11.72 (297)

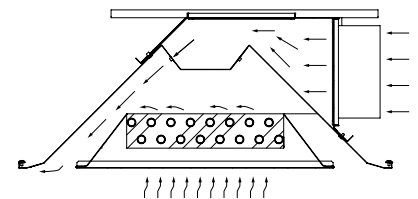
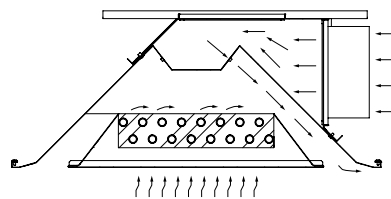
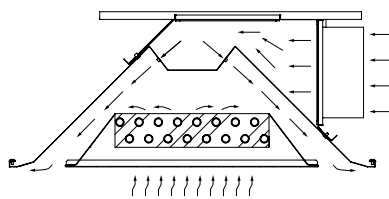
PIPING & HANDING



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



BAL-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)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL			TOTAL	ΔP COIL	TOTAL
4	M13	5	15	0.24	15	842	0.70		853		864		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	1.60	1248	2.90	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		1191		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	2.30	1868	4.20	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		1883		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	3.00	2588	5.40	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		3022		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	3.80	4211	6.70	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 C3-20 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 C3-20 for operational conditions used for performance notes.

BAL-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)		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	1263	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	1323	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	1542	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	1986	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	1984	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	2266	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	2756	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	2864	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	2880	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	4513	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	4739	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	4485	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 C3-20 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)		TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL				
4	M13	5	15	0.24	15	2417	0.20		2580		2613		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	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	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	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		3594		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	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	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	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		5647		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	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	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	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		8917		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	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	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	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 C3-20 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 10 5/8".

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)**
BAL-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
MI - Multi-Inlet
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: BAL-12 - 12 - 4 - M13 - 2 - 2P1C - M - 0 - L - SWT - SM - 5 - CP - 0 - NTG - WHT - 0