PERFORMANCE DATA | 4-PIPE COOLING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE COOLING (Btu/h)								INDUCTION RATIO	PRI + IND.
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		1.5 GPM		2.0 GPM		2.5 GPM			TOTAL FLOW RATE
		in	CFM	(in H_2O)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		CFM
2	M13	4	3	0.17	15	339	1.60	346	3.50	348	6.20	349	9.80		21
			5	0.48	15	536		551		555		559		6.1	36
			6	0.69	17	631		651		656		662			43
	M17	4	5	0.2	15	435		446		448		450			30
			8	0.51	16	660		681		688		693		4.9	47
			10	0.79	18	794		823		833		840			59
	M23	4	10	0.2	15	705		729		736		742			45
			15	0.45	15	985		1027		1043		1054		3.5	68
			20	0.81	19	1225		1289		1316		1334			90
	M31	4	16	0.19	15	827		857		867		874			61
			25	0.46	19	1180		1236		1259		1275		2.8	95
			32	0.75	22	1416		1495		1529		1552			122
3	M13	4	5	0.19	15	558	2.20	573	5.00	577	8.80	580	1.80		36
			8	0.47	17	848		877		887		894		6.1	57
			10	0.74	20	1027		1068		1083		1093			71
	M17	4	8	0.2	15	690		711		717		722			47
			12	0.44	16	982		1020		1034		1043		4.9	71
			16	0.79	20	1244		1303		1326		1342			94
	M23	4	15	0.17	15	1053		1095		1110		1120			68
			25	0.48	17	1575		1665		1702		1728		3.5	113
			32	0.79	20	1882		2009		2065		2105			144
	M31	4	25	0.18	15	1272		1329		1351		1367			95
			40	0.45	21	1821		1933		1982		2016		2.8	152
			50	0.71	24	2134		2289		2358		2407			190
4	M13	4	8	0.25	15	864	2.90	893	6.40	903	1.50	910	2.30		57
			12	0.56	19	1225		1279		1300		1314		6.1	85
			14	0.76	21	1393		1461		1488		1507			99
	M17	4	12	0.23	15	1008		1045		1059		1068			71
			18	0.52	18	1414		1483		1511		1531		4.9	106
			22	0.78	21	1653		1749		1788		1815			130
	M23	4	22	0.2	15	1482		1556		1586		1607			99
			34	0.48	18	2066		2209		2271		2316		3.5	153
			42	0.74	21	2393		2587		2675		2737			189
	M31	6 *	35	0.18	16	1718		1814		1852		1880			133
			55	0.45	22	2404		2588		2671		2729		2.8	209
			70	0.73	25	2824		3081		3202		3287			266
6	M13	4	10	0.18	15	932	4.10	957	9.30	969	2.10	978	3.30		71
			16	0.45	20	1396		1454		1483		1504		6.1	114
			20	0.71	23	1656		1741		1785		1815			142
	M17	4	16	0.19	15	1139		1178		1198		1212			94
			25	0.46	20	1642		1726		1769		1799		4.9	148
			32	0.76	24	2015		2143		2209		2255			189
	M23	6 *	35	0.23	16	1923		2037		2095		2136			158
			50	0.47	20	2646		2858		2970		3048		3.5	225
			62	0.72	23	3091		3386		3545		3657			279
	M31	6 *	55	0.21	20	2231		2375		2450		2503			209
			80	0.44	25	3076		3349		3495		3598		2.8	304
			105	0.75	28	3641		4044		4265		4424			399

NOTES: Reference page C3-60 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	PRI + IND.
		INLET DIA.	FLOW RATE	INLET ΔPs		0.5 GPM		1.0 GPM		1.5 GPM		2.0 GPM			TOTAL FLOW RATE
		in	CFM	(in H_2O)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		CFM
2	M13	4	3	0.17	15	674	0.10	733	0.30	749	0.80	753	1.40	6.1	21
			5	0.48	15	1050		1161		1193		1202			36
			6	0.69	17	1231		1366		1409		1421			43
	M17	4	5	0.2	15	858		942		965		970		4.9	30
			8	0.51	16	1282		1429		1475		1489			47
			10	0.79	18	1515		1719		1782		1804			59
	M23	4	10	0.2	15	1364		1527		1578		1594		3.5	45
			15	0.45	15	1849		2132		2223		2258			68
			20	0.81	19	2249		2653		2792		2848			90
	M31	4	16	0.19	15	1584		1791		1854		1877		2.8	61
			25	0.46	19	2187		2554		2676		2726			95
			32	0.75	22	2568		3065		3238		3310			122
3	M13	4	5	0.19	15	1095	0.10	1209	0.50	1240	1.10	1249	2.00	6.1	36
			8	0.47	17	1623		1836		1899		1921			57
			10	0.74	20	1940		2223		2312		2344			71
	M17	4	8	0.2	15	1338		1495		1539		1553		4.9	47
			12	0.44	16	1860		2127		2209		2238			71
			16	0.79	20	2307		2694		2821		2870			94
	M23	4	15	0.17	15	1988		2279		2370		2403		3.5	68
			25	0.48	17	2846		3410		3605		3685			113
			32	0.79	20	3312		4075		4350		4471			144
	M31	4	25	0.18	15	2372		2755		2878		2926		2.8	95
			40	0.45	21	3251		3942		4186		4290			152
			50	0.71	24	3712		4620		4955		5105			190
4	M13	4	8	0.25	15	1656	0.20	1870	0.60	1934	1.40	1956	2.50	6.1	57
			12	0.56	19	2286		2653		2769		2814			85
			14	0.76	21	2568		3017		3163		3222			99
	M17	4	12	0.23	15	1913		2181		2263		2292		4.9	71
			18	0.52	18	2603		3061		3212		3272			106
			22	0.78	21	2979		3580		3786		3870			130
	M23	4	22	0.2	15	2718		3208		3369		3434		3.5	99
			34	0.48	18	3613		4472		4782		4917			153
			42	0.74	21	4082		5182		5601		5792			189
	M31	6 *	35	0.18	16	3113		3720		3927		4011		2.8	133
			55	0.45	22	4141		5205		5603		5782			209
			70	0.73	25	4704		6115		6672		6932			266
6	M13	4	10	0.18	15	1774	0.20	2018	0.90	2071	2.10	2098	3.70	6.1	71
			16	0.45	20	2554		3023		3148		3211			114
			20	0.71	23	2952		3585		3770		3864			142
	M17	4	16	0.19	15	2122		2466		2551		2594		4.9	94
			25	0.46	20	2931		3555		3737		3830			148
			32	0.76	24	3585		4362		4639		4783			189
	M23	6 *	35	0.23	16	3402		4164		4409		4535		3.5	158
			50	0.47	20	4633		5729		6188		6429			225
			62	0.72	23	5223		6692		7332		7675			279
	M31	6 *	55	0.21	20	3975		4830		5142		5305		2.8	209
			80	0.44	25	5277		6659		7252		7566			304
			105	0.75	28	5961		7884		8755		9233			399

NOTES: Reference page C3-60 for operational conditions used for performance notes.

PERFORMANCE DATA | 2-PIPE COOLING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE COOLING (Btu/h)								INDUCTION RATIO	PRI + IND.
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		1.5 GPM		2.0 GPM		2.5 GPM			TOTAL FLOW RATE
		in	CFM	(in H_2O)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		CFM
2	M13	4	3	0.17	15	352	2.10	360	4.70	361	8.40	363	1.70	6.1	21
			5	0.48	15	557		573		577		580			36
			6	0.69	17	656		676		682		688			43
	M17	4	5	0.2	15	452		463		466		468		4.9	30
			8	0.51	16	686		708		715		720			47
			10	0.79	18	825		855		866		873			59
	M23	4	10	0.2	15	733		757		765		771		3.5	45
			15	0.45	15	1023		1067		1084		1096			68
			20	0.81	19	1274		1340		1367		1386			90
	M31	4	16	0.19	15	860		890		901		908		2.8	61
			25	0.46	19	1226		1285		1308		1325			95
			32	0.75	22	1471		1554		1589		1613			122
3	M13	4	5	0.19	15	580	2.90	595	6.60	599	1.50	603	2.30	6.1	36
			8	0.47	17	881		912		922		929			57
			10	0.74	20	1067		1110		1125		1135			71
	M17	4	8	0.2	15	717		739		746		751		4.9	47
			12	0.44	16	1021		1060		1074		1084			71
			16	0.79	20	1293		1354		1378		1394			94
	M23	4	15	0.17	15	1094		1138		1153		1164		3.5	68
			25	0.48	17	1637		1730		1769		1796			113
			32	0.79	20	1956		2088		2146		2187			144
	M31	4	25	0.18	15	1322		1382		1404		1420		2.8	95
			40	0.45	21	1892		2009		2059		2095			152
			50	0.71	24	2217		2379		2451		2502			190
4	M13	4	8	0.25	15	898	3.80	928	8.60	939	1.90	946	3.00	6.1	57
			12	0.56	19	1273		1329		1351		1366			85
			14	0.76	21	1448		1518		1546		1566			99
	M17	4	12	0.23	15	1047		1086		1100		1110		4.9	71
			18	0.52	18	1469		1542		1570		1591			106
			22	0.78	21	1718		1817		1858		1887			130
	M23	4	22	0 20	15	1540		1617		1648		1670		3.5	99
			34	0.48	18	2147		2295		2360		2406			153
			42	0.74	21	2487		2689		2780		2845			189
	M31	6 *	35	0.18	16	1786		1885		1925		1954		2.8	133
			55	0.45	22	2498		2690		2776		2836			209
			70	0.73	25	2935		3202		3327		3416			266
6	M13	4	10	0.18	15	969	5.50	994	1.60	1007	2.80	1016	4.40	6.1	71
			16	0.45	20	1451		1511		1541		1563			114
			20	0.71	23	1721		1809		1855		1887			142
	M17	4	16	0.19	15	1184		1224		1245		1260		4.9	94
			25	0.46	20	1707		1794		1838		1870			148
			32	0.76	24	2094		2227		2296		2344			189
	M23	6 *	35	0.23	16	1999		2117		2177		2219		3.5	158
			50	0.47	20	2750		2970		3086		3168			225
			62	0.72	23	3212		3519		3684		3801			279
	M31	6 *	55	0.21	20	2318		2468		2546		2601		2.8	209
			80	0.44	25	3196		3481		3632		3739			304
			105	0.75	28	3784		4202		4432		4597			399

NOTES: Reference page C3-60 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	PRI + IND.
		INLET DIA.	FLOW RATE	INLET ΔPs		0.5 GPM		1.0 GPM		1.5 GPM		2.0 GPM			TOTAL FLOW RATE
		in	CFM	(in H_2O)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		CFM
2	M13	4	3	0.17	15	967	0.50	1052	2.10	1075	4.70	1080	8.40	6.1	21
			5	0.48	15	1507		1665		1712		1724			36
			6	0.69	17	1766		1960		2021		2039			43
	M17	4	5	0.2	15	1231		1351		1384		1392		4.9	30
			8	0.51	16	1840		2050		2116		2136			47
			10	0.79	18	2173		2466		2556		2589			59
	M23	4	10	0.2	15	1958		2192		2264		2287		3.5	45
			15	0.45	15	2652		3059		3190		3240			68
			20	0.81	19	3227		3807		4005		4087			90
	M31	4	16	0.19	15	2272		2569		2661		2693		2.8	61
			25	0.46	19	3138		3665		3840		3911			95
			32	0.75	22	3685		4398		4646		4750			122
3	M13	4	5	0.19	15	1571	0.70	1734	2.90	1779	6.60	1792	1.50	6.1	36
			8	0.47	17	2328		2634		2725		2756			57
			10	0.74	20	2783		3190		3317		3364			71
	M17	4	8	0.2	15	1919		2145		2209		2229		4.9	47
			12	0.44	16	2669		3051		3169		3212			71
			16	0.79	20	3311		3866		4047		4118			94
	M23	4	15	0.17	15	2853		3270		3400		3448		3.5	68
			25	0.48	17	4084		4893		5172		5287			113
			32	0.79	20	4753		5847		6242		6415			144
	M31	4	25	0.18	15	3403		3953		4130		4198		2.8	95
			40	0.45	21	4664		5656		6006		6156			152
			50	0.71	24	5326		6628		7110		7326			190
4	M13	4	8	0.25	15	2376	1.00	2684	3.80	2775	8.60	2806	1.90	6.1	57
			12	0.56	19	3279		3806		3974		4038			85
			14	0.76	21	3685		4329		4539		4623			99
	M17	4	12	0.23	15	2744		3130		3246		3289		4.9	71
			18	0.52	18	3734		4393		4608		4694			106
			22	0.78	21	4275		5137		5432		5553			130
	M23	4	22	0.2	15	3901		4603		4835		4928		3.5	99
			34	0.48	18	5183		6417		6861		7055			153
			42	0.74	21	5857		7435		8037		8311			189
	M31	6 *	35	0.18	16	4467		5338		5634		5755		2.8	133
			55	0.45	22	5942		7468		8040		8297			209
			70	0.73	25	6750		8774		9573		9946			266
6	M13	4	10	0.18	15	2546	1.40	2895	5.50	2972	1.60	3010	2.80	6.1	71
			16	0.45	20	3665		4338		4517		4608			114
			20	0.71	23	4235		5143		5409		5544			142
	M17	4	16	0.19	15	3045		3538		3660		3722		4.9	94
			25	0.46	20	4206		5102		5362		5496			148
			32	0.76	24	5144		6259		6656		6862			189
	M23	6 *	35	0.23	16	4881		5975		6327		6508		3.5	158
			50	0.47	20	6647		8220		8880		9225			225
			62	0.72	23	7494		9602		10520		11013			279
	M31	6 *	55	0.21	20	5704		6930		7379		7612		2.8	209
			80	0.44	25	7571		9554		10405		10856			304
			105	0.75	28	8553		11312		12562		13248			399

NOTES: Reference page C3-60 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. All performance data based on installation with matched Krueger 1700 diffusers - contact the Krueger Specialty Group for performance with other linear diffusers.
3. ΔP_s values are measured in inches of water.
4. NC values are based on room absorption of 10 dB. A dash (-) indicates an NC value less than 15.
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^{0}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^{0}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 HEATING 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]

W_{ROOM} = Humidity Ratio of the Room

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

T_{PA} = Temperature Primary Air [^{0}F]

T_{ROOM} = Temperature Room Air [^{0}F]

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

W_{PA} = Humidity Ratio of the Primary Air