

PERFORMANCE DATA | 4-PIPE COOLING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL SENSIBLE COOLING (Btu/h)								INDUCTION RATIO	THROW ft
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		in	CFM	(in H ₂ O)		NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
3	M17	4	8	0.27	15	405	0.30	425	1.10	432	2.50	435	4.00	4.4	1 - 2 - 6
			10	0.42	19	484		513		524		528			1 - 2 - 8
			12	0.61	23	556		597		611		617			2 - 4 - 9
			14	0.83	27	623		675		694		702			2 - 5 - 11
	M23	4	14	0.23	16	579		619	633	639		2 - 5 - 11			
			18	0.38	22	696		757	779	788		4 - 7 - 12			
			22	0.57	27	800		882	914	927		5 - 8 - 13			
			26	0.80	31	892		997	1038	1056		7 - 10 - 15			
	M31	4	24	0.18	19	770		842	870	882		6 - 9 - 14			
			32	0.32	26	930		1043	1087	1105		8 - 12 - 16			
			40	0.51	31	1066		1219	1281	1307		10 - 13 - 18			
			48	0.71	25	1181		1375	1455	1490		12 - 14 - 20			
4	M17	4	10	0.20	15	502	0.40	531	1.40	541	3.20	545	5.10	4.4	1 - 2 - 6
			13	0.35	20	619		663		680		687			1 - 3 - 9
			16	0.52	24	723		786		810		820			2 - 4 - 11
			19	0.74	28	818		901		933		945			3 - 6 - 13
	M23	4	18	0.19	17	734		793	815	824		2 - 5 - 12			
			24	0.33	24	901		995	1031	1045		4 - 8 - 14			
			30	0.52	29	1046		1178	1229	1250		6 - 10 - 16			
			36	0.74	33	1171		1341	1410	1438		8 - 12 - 17			
	M31	4	35	0.21	23	1054		1184	1234	1255		8 - 12 - 17			
			45	0.35	29	1232		1417	1492	1523		10 - 14 - 19			
			55	0.52	34	1381		1623	1723	1766		12 - 15 - 21			
			65	0.69	27	1508		1806	1933	1987		13 - 16 - 23			
5	M17	4	12	0.17	15	596	0.40	634	1.70	648	3.90	654	6.30	4.4	1 - 2 - 7
			16	0.31	20	747		809		833		842			1 - 3 - 10
			20	0.48	26	880		970		1004		1018			2 - 5 - 12
			24	0.69	30	998		1118		1164		1183			3 - 7 - 14
	M23	4	24	0.20	20	936		1030	1066	1080		3 - 7 - 14			
			30	0.31	25	1091		1224	1276	1297		5 - 9 - 16			
			36	0.44	29	1226		1401	1471	1499		7 - 11 - 17			
			42	0.60	33	1346		1564	1652	1688		8 - 13 - 19			
	M31	6	40	0.16	15	1200		1360	1424	1449		8 - 12 - 18			
			55	0.31	19	1454		1706	1809	1852		11 - 15 - 21			
			70	0.50	25	1655		1999	2145	2207		14 - 17 - 24			
			85	0.74	30	1819		2253	2442	2525		15 - 19 - 27			
6	M17	4	15	0.18	16	726	0.50	783	2.00	804	4.60	812	7.40	4.4	1 - 2 - 8
			20	0.32	23	904		995		1029		1043			2 - 4 - 11
			25	0.50	28	1058		1188		1238		1258			2 - 5 - 14
			30	0.71	32	1193		1364		1431		1459			4 - 8 - 16
	M23	4	28	0.18	20	1074		1196	1242	1261		3 - 7 - 15			
			36	0.29	26	1270		1449	1520	1548		5 - 10 - 17			
			44	0.44	31	1436		1676	1772	1812		8 - 12 - 19			
			52	0.61	35	1580		1881	2005	2058		9 - 14 - 21			
	M31	6	50	0.17	15	1429		1657	1748	1785		9 - 14 - 20			
			70	0.34	22	1725		2085	2235	2299		13 - 17 - 24			
			90	0.56	28	1950		2439	2653	2745		16 - 19 - 27			
			110	0.84	32	2128		2739	3016	3138		17 - 21 - 30			

NOTES: Reference page C3-90 for operational conditions used for performance notes.

PERFORMANCE DATA | 4-PIPE HEATING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL HEATING (Btu/h)								INDUCTION RATIO	THROW ft
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		in	CFM	(in H ₂ O)		NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
3	M17	4	8	0.27	15	938	0.09	984	0.36	1001	0.82	1007	1.31	4.4	1 - 2 - 6
			10	0.42	19	1121		1189		1214		1223			1 - 2 - 8
			12	0.61	23	1288		1381		1416		1428			2 - 4 - 9
			14	0.83	27	1443		1563		1607		1625			2 - 5 - 11
	M23	4	14	0.23	16	1340		1432	1466	1479	3.6	2 - 5 - 11			
			18	0.38	22	1612		1751	1804	1825		4 - 7 - 12			
			22	0.57	27	1852		2042	2116	2146		5 - 8 - 13			
			26	0.80	31	2064		2308	2404	2444		7 - 10 - 15			
	M31	4	24	0.18	19	1782		1950	2015	2041	3.0	6 - 9 - 14			
			32	0.32	26	2154		2414	2516	2559		8 - 12 - 16			
			40	0.51	31	2468		2822	2965	3025		10 - 13 - 18			
			48	0.71	25	2734		3183	3369	3448		12 - 14 - 20			
4	M17	4	10	0.20	15	1163	0.12	1228	0.47	1252	1.06	1262	1.70	4.4	1 - 2 - 6
			13	0.35	20	1432		1536		1574		1589			1 - 3 - 9
			16	0.52	24	1674		1820		1875		1897			2 - 4 - 11
			19	0.74	28	1893		2086		2159		2188			3 - 6 - 13
	M23	4	18	0.19	17	1698		1835	1887	1907	3.6	2 - 5 - 12			
			24	0.33	24	2085		2303	2386	2420		4 - 8 - 14			
			30	0.52	29	2421		2726	2844	2893		6 - 10 - 16			
			36	0.74	33	2710		3105	3264	3329		8 - 12 - 17			
	M31	4	35	0.21	23	2440		2740	2856	2905	3.0	8 - 12 - 17			
			45	0.35	29	2851		3281	3454	3526		10 - 14 - 19			
			55	0.52	34	3196		3756	3989	4087		12 - 15 - 21			
			65	0.69	27	3490		4181	4475	4601		13 - 16 - 23			
5	M17	4	12	0.17	15	1380	0.14	1468	0.58	1501	1.29	1513	2.08	4.4	1 - 2 - 7
			16	0.31	20	1729		1874		1928		1949			1 - 3 - 10
			20	0.48	26	2038		2246		2325		2356			2 - 5 - 12
			24	0.69	30	2311		2588		2696		2738			3 - 7 - 14
	M23	4	24	0.20	20	2167		2385	2467	2499	3.6	3 - 7 - 14			
			30	0.31	25	2525		2833	2954	3002		5 - 9 - 16			
			36	0.44	29	2839		3243	3404	3470		7 - 11 - 17			
			42	0.60	33	3117		3620	3823	3908		8 - 13 - 19			
	M31	6	40	0.16	15	2778		3149	3296	3355	3.0	8 - 12 - 18			
			55	0.31	19	3367		3949	4186	4287		11 - 15 - 21			
			70	0.50	25	3832		4628	4966	5109		14 - 17 - 24			
			85	0.74	30	4212		5216	5654	5844		15 - 19 - 27			
6	M17	4	15	0.18	16	1682	0.17	1813	0.69	1861	1.54	1880	2.47	4.4	1 - 2 - 8
			20	0.32	23	2092		2304		2383		2415			2 - 4 - 11
			25	0.50	28	2449		2750		2865		2912			2 - 5 - 14
			30	0.71	32	2761		3157		3313		3377			4 - 8 - 16
	M23	4	28	0.18	20	2486		2769	2875	2919	3.6	3 - 7 - 15			
			36	0.29	26	2940		3355	3518	3584		5 - 10 - 17			
			44	0.44	31	3325		3879	4103	4195		8 - 12 - 19			
			52	0.61	35	3657		4355	4642	4763		9 - 14 - 21			
	M31	6	50	0.17	15	3308		3835	4046	4132	3.0	9 - 14 - 20			
			70	0.34	22	3993		4825	5174	5322		13 - 17 - 24			
			90	0.56	28	4515		5647	6142	6355		16 - 19 - 27			
			110	0.84	32	4925		6340	6982	7265		17 - 21 - 30			

NOTES: Reference page C3-90 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	THROW ft
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		in	CFM	(in H ₂ O)		NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL		
3	M17	4	8	0.27	15	432	0.40	454	1.50	461	3.30	464	5.40	4.4	1 - 2 - 6
			10	0.42	19	516		548		559		564			1 - 2 - 8
			12	0.61	23	593		637		652		658			2 - 4 - 9
			14	0.83	27	665		720		741		749			2 - 5 - 11
	M23	4	14	0.23	16	617		660		676		682		3.6	2 - 5 - 11
			18	0.38	22	743		807		831		841			4 - 7 - 12
			22	0.57	27	853		941		975		989			5 - 8 - 13
			26	0.80	31	951		1064		1108		1126			7 - 10 - 15
	M31	4	24	0.18	19	821		899		928		941		3.0	6 - 9 - 14
			32	0.32	26	992		1112		1159		1179			8 - 12 - 16
			40	0.51	31	1137		1300		1366		1394			10 - 13 - 18
			48	0.71	25	1260		1467		1552		1589			12 - 14 - 20
4	M17	4	10	0.20	15	536	0.50	566	1.90	577	4.30	581	7.00	4.4	1 - 2 - 6
			13	0.35	20	660		708		725		732			1 - 3 - 9
			16	0.52	24	771		839		864		874			2 - 4 - 11
			19	0.74	28	872		961		995		1008			3 - 6 - 13
	M23	4	18	0.19	17	783		846		869		879		3.6	2 - 5 - 12
			24	0.33	24	961		1061		1099		1115			4 - 8 - 14
			30	0.52	29	1115		1256		1311		1333			6 - 10 - 16
			36	0.74	33	1249		1431		1504		1534			8 - 12 - 17
	M31	4	35	0.21	23	1124		1263		1316		1338		3.0	8 - 12 - 17
			45	0.35	29	1314		1512		1591		1625			10 - 14 - 19
			55	0.52	34	1473		1731		1838		1883			12 - 15 - 21
			65	0.69	27	1608		1927		2062		2120			13 - 16 - 23
5	M17	4	12	0.17	15	636	0.60	676	2.40	692	5.30	697	8.50	4.4	1 - 2 - 7
			16	0.31	20	797		863		889		898			1 - 3 - 10
			20	0.48	26	939		1035		1071		1086			2 - 5 - 12
			24	0.69	30	1065		1192		1242		1262			3 - 7 - 14
	M23	4	24	0.20	20	999		1099		1137		1152		3.6	3 - 7 - 14
			30	0.31	25	1163		1306		1361		1383			5 - 9 - 16
			36	0.44	29	1308		1495		1569		1599			7 - 11 - 17
			42	0.60	33	1436		1668		1762		1801			8 - 13 - 19
	M31	6	40	0.16	15	1280		1451		1519		1546		3.0	8 - 12 - 18
			55	0.31	19	1551		1820		1929		1975			11 - 15 - 21
			70	0.50	25	1766		2133		2288		2354			14 - 17 - 24
			85	0.74	30	1941		2404		2605		2693			15 - 19 - 27
6	M17	4	15	0.18	16	775	0.70	835	2.80	858	6.30	866	10.00	4.4	1 - 2 - 8
			20	0.32	23	964		1062		1098		1113			2 - 4 - 11
			25	0.50	28	1128		1267		1320		1342			2 - 5 - 14
			30	0.71	32	1272		1455		1527		1556			4 - 8 - 16
	M23	4	28	0.18	20	1146		1276		1325		1345		3.6	3 - 7 - 15
			36	0.29	26	1355		1546		1621		1652			5 - 10 - 17
			44	0.44	31	1532		1788		1891		1933			8 - 12 - 19
			52	0.61	35	1685		2007		2139		2195			9 - 14 - 21
	M31	6	50	0.17	15	1524		1767		1864		1904		3.0	9 - 14 - 20
			70	0.34	22	1840		2223		2384		2452			13 - 17 - 24
			90	0.56	28	2080		2602		2830		2928			16 - 19 - 27
			110	0.84	32	2269		2922		3217		3348			17 - 21 - 30

NOTES: Reference page C3-90 for operational conditions used for performance notes.

PERFORMANCE DATA | 2-PIPE HEATING

NOMINAL LENGTH ft	NOZZLE SIZE	PRIMARY AIR			SOUND	COIL HEATING (Btu/h)								INDUCTION RATIO	THROW ft
		INLET DIA.	FLOW RATE	INLET ΔPs		1.0 GPM		2.0 GPM		3.0 GPM		4.0 GPM			
		in	CFM	(in H ₂ O)	NC	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL	TOTAL	ΔP COIL		
3	M17	4	8	0.27	15	1201	0.37	1260	1.49	1281	3.35	1289	5.37	4.4	1 - 2 - 6
			10	0.42	19	1435		1521		1553		1566			1 - 2 - 8
			12	0.61	23	1648		1768		1812		1828			2 - 4 - 9
			14	0.83	27	1846		2000		2057		2079			2 - 5 - 11
	M23	4	14	0.23	16	1715		1833		1877		1893		3.6	2 - 5 - 11
			18	0.38	22	2063		2242		2309		2336			4 - 7 - 12
			22	0.57	27	2371		2614		2708		2746			5 - 8 - 13
			26	0.80	31	2642		2955		3077		3128			7 - 10 - 15
	M31	4	24	0.18	19	2280		2496		2579		2613		3.0	6 - 9 - 14
			32	0.32	26	2757		3090		3220		3275			8 - 12 - 16
			40	0.51	31	3159		3612		3795		3872			10 - 13 - 18
			48	0.71	25	3499		4074		4312		4414			12 - 14 - 20
4	M17	4	10	0.20	15	1489	0.48	1572	1.93	1603	4.34	1615	6.96	4.4	1 - 2 - 6
			13	0.35	20	1833		1966		2015		2034			1 - 3 - 9
			16	0.52	24	2143		2330		2401		2429			2 - 4 - 11
			19	0.74	28	2424		2670		2763		2800			3 - 6 - 13
	M23	4	18	0.19	17	2174		2349		2415		2441		3.6	2 - 5 - 12
			24	0.33	24	2669		2948		3054		3097			4 - 8 - 14
			30	0.52	29	3099		3489		3641		3703			6 - 10 - 16
			36	0.74	33	3469		3975		4178		4261			8 - 12 - 17
	M31	4	35	0.21	23	3123		3507		3656		3718		3.0	8 - 12 - 17
			45	0.35	29	3650		4199		4421		4513			10 - 14 - 19
			55	0.52	34	4091		4808		5106		5232			12 - 15 - 21
			65	0.69	27	4467		5352		5728		5889			13 - 16 - 23
5	M17	4	12	0.17	15	1766	0.59	1879	2.37	1921	5.33	1937	8.54	4.4	1 - 2 - 7
			16	0.31	20	2213		2398		2468		2495			1 - 3 - 10
			20	0.48	26	2608		2875		2975		3016			2 - 5 - 12
			24	0.69	30	2958		3312		3450		3505			3 - 7 - 14
	M23	4	24	0.20	20	2774		3053		3157		3199		3.6	3 - 7 - 14
			30	0.31	25	3232		3627		3781		3843			5 - 9 - 16
			36	0.44	29	3633		4152		4357		4442			7 - 11 - 17
			42	0.60	33	3990		4634		4893		5003			8 - 13 - 19
	M31	6	40	0.16	15	3556		4031		4219		4295		3.0	8 - 12 - 18
			55	0.31	19	4309		5054		5359		5487			11 - 15 - 21
			70	0.50	25	4905		5924		6356		6540			14 - 17 - 24
			85	0.74	30	5391		6677		7237		7481			15 - 19 - 27
6	M17	4	15	0.18	16	2152	0.69	2320	2.78	2383	6.25	2407	10.03	4.4	1 - 2 - 8
			20	0.32	23	2678		2949		3050		3091			2 - 4 - 11
			25	0.50	28	3134		3519		3667		3727			2 - 5 - 14
			30	0.71	32	3534		4041		4241		4322			4 - 8 - 16
	M23	4	28	0.18	20	3182		3544		3680		3736		3.6	3 - 7 - 15
			36	0.29	26	3763		4294		4503		4588			5 - 10 - 17
			44	0.44	31	4255		4966		5252		5370			8 - 12 - 19
			52	0.61	35	4680		5574		5942		6096			9 - 14 - 21
	M31	6	50	0.17	15	4234		4909		5179		5289		3.0	9 - 14 - 20
			70	0.34	22	5112		6176		6623		6812			13 - 17 - 24
			90	0.56	28	5779		7228		7861		8134			16 - 19 - 27
			110	0.84	32	6304		8116		8937		9299			17 - 21 - 30

NOTES: Reference page C3-90 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.

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:

$$q_{\text{SENSPA}} = 1.085 \times \text{CFM}_{\text{PA}} \times (T_{\text{ROOM}} - T_{\text{PA}})$$

- Primary air latent cooling can be calculated by the following equation:

$$q_{\text{LATENT}} = 0.69 \times \text{CFM}_{\text{PA}} \times (W_{\text{ROOM}} - W_{\text{PA}})$$

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 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:

$$q_{\text{SENSPA}} = 1.085 \times \text{CFM}_{\text{PA}} \times (T_{\text{PA}} - T_{\text{ROOM}})$$

- 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