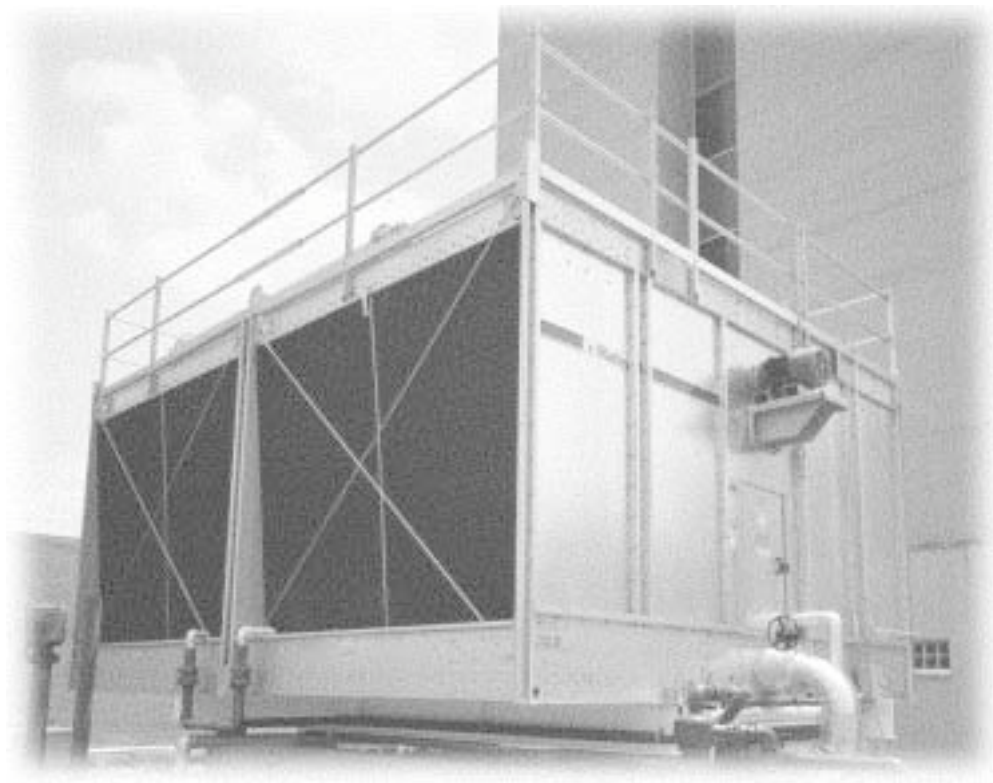


NC[®]class



Technical Reference



Marley

SOUND CONTROL

The NC Class—Quiet by Design

The NC Class is the result of extensive design studies focused on cooling tower sound control. These studies were complicated by the fact that the cooling tower market is typically driven by one of two powerful, yet often conflicting requirements. The most common is for a cooling tower that provides the required heat rejection capacity with a high level of reliability at low cost. Sound control, while important, is not the primary consideration for this application.

The other requirement, which is becoming ever more important in our crowded, fast-paced society, is driven by conditions that demand the lowest practical sound level. Energy efficiency, reliability, ease of maintenance and reasonable cost, while still extremely important, are not the highest priorities

In the first case, sound is important, while in the second case it is **extremely important**. To best satisfy these two competing market requirements Marley created a two-tiered approach, through key mechanical equipment selections, to sound control. The result is two distinct groupings within the NC Class model line.

All NC Class cooling towers are designed for low sound levels using high blade-count, wide-chord fans for maximum efficiency at low tip speeds. NC Class models with the “L” suffix in the model number are the special **low sound editions**. To achieve the very lowest possible sound levels while maintaining efficiency, Marley carefully selected the best available combination of motor, gear ratio, fan blade count and blade profile for all “L” models. If low sound levels are critical to your project, the slight additional cost of the “L” models provides the best value.

The result is a line of towers capable of meeting all but the most restrictive noise limitations—and that will react favorably to natural attenuation. Where the tower has been sized to operate within an enclosure, the enclosure itself will have a damping effect on sound. Sound also declines with distance—by about 5 dBA each time the distance doubles.

Where noise at a critical point is likely to exceed an acceptable limit, several other options are available—listed below in ascending order of cost impact:

- In many cases, noise concerns are limited to nighttime, when ambient noise levels are lower and neighbors are trying to sleep. You can usually resolve these situations by using two-speed motors—operating the fans at reduced speed **without cycling** “after hours”. The natural nighttime reduction in wet-bulb temperature makes this a very feasible solution in most areas of the world, but the need to avoid cycling may cause the cold water temperature to vary significantly.

- A Marley Variable Speed Drive automatically minimize the tower’s noise level during periods of reduced load and/or reduced ambient temperature without sacrificing the system’s ability to maintain a constant cold water temperature. This is a relatively inexpensive solution, and can pay for itself quickly in reduced energy costs.
- Where noise is a concern at all times—for example, near a hospital—the best solution is to oversize the tower so it can operate continuously at reduced motor speed. Typical sound reductions are 7 dBA at $\frac{2}{3}$ fan speed or 10 dBA at $\frac{1}{2}$ fan speed.
- Extreme cases may require inlet and discharge sound attenuator sections—however, the static pressure loss imposed by attenuators may necessitate an increase in tower size. This is the least desirable approach because of the significant cost impact—and because of the obstruction to normal maintenance procedures.

The advantage is yours. Marley gives you the choices you need to balance your project’s performance, space and cost requirements with your sound level needs for a win-win solution to your cooling system design.

Enclosures

Occasionally, cooling towers are located inside architectural enclosures for aesthetic reasons. Although NC Class towers adapt well to enclosures, the designer must realize the potential impact of a poorly arranged enclosure on the tower’s performance and operation. The designer must take care to provide generous air inlet paths, and the tower’s fan cylinder discharge height should not be lower than the elevation of the top of the enclosure. Obtain a copy of *Marley Technical Report #H-004 “External Influences on Cooling Tower Performance”* from your Marley sales representative.

As suggested in the aforementioned *Technical Report*, it may also be advisable to specify a design wet-bulb temperature 1°F higher than normal to compensate for potential recirculation initiated by the enclosure. You’ll benefit from discussing your project with your Marley sales representative.

OPERATING AND ENVIRONMENTAL AWARENESS

System Cleanliness

Cooling towers are very effective air washers. Atmospheric dust able to pass through the relatively small louver openings will enter the circulating water system. Increased concentrations can intensify system maintenance by clogging screens and strainers—and smaller particulates can coat system heat transfer surfaces. In areas of low flow velocity—such as the cold water basin—sedimentary deposits can provide a breeding ground for bacteria.

In areas prone to dust and sedimentation, you should consider installing some means for keeping the cold water basin clean. Typical devices include side stream filters and a variety of filtration media.

Water Treatment

To control the buildup of dissolved solids resulting from water evaporation, as well as airborne impurities and biological contaminants including Legionella, an effective consistent water treatment program is required. Simple blowdown may be adequate to control corrosion and scale, but biological contamination can only be controlled with biocides.

An acceptable water treatment program must be compatible with the variety of materials incorporated in a cooling tower—ideally the pH of the circulating water should fall between 6.5 and 8.0. Batch feeding of chemicals directly into the cooling tower is not a good practice since localized damage to the tower is possible. Specific startup instructions and additional water quality recommendations can be found in the **NC Class User Manual** which accompanies the tower and also is available from your local Marley sales representative. For complete water treatment recommendations, consult a competent, qualified water treatment supplier.

Most systems can be successfully treated with a **MARLEYOZONE™** System. This effective biocide usually removes the requirement for other chemical feed systems. In many installations there is the potential for significant water savings. For complete information, contact your local Marley sales representative.

△ CAUTION

The cooling tower must be located at such distance and direction to avoid the possibility of contaminated tower discharge air being drawn into building fresh air intake ducts. The purchaser should obtain the services of a Licensed Professional Engineer or Registered Architect to certify that the location of the tower is in compliance with applicable air pollution, fire, and clean air codes.

Typical Applications

The NC Class tower is an excellent choice for normal applications requiring cold water for the dissipation of heat. This includes condenser water cooling for air conditioning, refrigeration, and thermal storage systems, as well as their utilization for free-cooling in all of those systems. The NC Class can also be used in the cooling of jacket water for engines and air compressors, and are widely applied to dissipate waste heat in a variety of industrial and manufacturing processes.

Being constructed of stainless steel and other inert materials, the NC Class Diamond Series can be confidently applied in unusually corrosive processes and operating environments. However, no single product line can answer all problems, and selective judgement should be exercised in the following situations

Applications Requiring Alternative Cooling Tower Selections

Certain types of applications are incompatible with any cooling tower with PVC film fill—whether NC Class or a competitive tower of similar manufacture. PVC is subject to distortion in high water temperatures, and the narrow passages typical of film-type fill are easily clogged by turbid or debris-laden water. Some of the applications, which call for alternative tower designs are:

- **Water temperatures exceeding 125°F**—adversely affect the service life and performance of normal PVC fill.
- **Ethylene glycol content**—can plug fill passages as slime and algae accumulate to feed on the available organic materials.
- **Fatty acid content**—found in processes such as soap and detergent manufacturing and some food processing—fatty acids pose a serious threat for plugging fill passages.
- **Particulate carry over**—often found in steel mills and cement plants—can both cause fill plugging, and can build up to potentially damaging levels on tower structure.
- **Pulp carry over**—typical of the paper industry and food processing where vacuum pumps or barometric condensers are used. Causes fill plugging which may be intensified by algae.

Alternative Selections

In addition to the NC Class, Marley offers a full scope of products in various designs and capacities to meet the special demands of specific applications.

www.marleyct.com—visit Marley on the web for a complete list of products, services and to find your nearest sales representative.

TOWER MODEL SELECTION



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures											
		HW ° F	95	96	100	102	95	97	100	102	95	97	100	102
		CW ° F	85	86	85	87	85	87	85	87	85	87	85	87
		WB ° F	80	80	80	80	78	78	78	78	76	76	76	76
NC8301AL	2		245	278	198	247	297	360	235	282	344	404	269	314
NC8301BL	3		277	315	224	279	336	407	266	319	389	458	305	355
NC8301C	5		334	379	269	336	405	490	321	384	469	551	367	428
NC8301CL	5		334	379	269	336	405	490	321	384	469	551	367	428
NC8301D	7.5		371	421	299	374	450	545	356	427	521	613	408	476
NC8301DL	7.5		369	419	297	371	447	541	354	424	518	608	405	473
NC8301E	10		406	461	327	409	492	596	390	467	570	669	446	521
NC8301EL	10		413	469	333	416	501	607	397	475	581	682	454	530
NC8301F	15		445	506	359	448	540	654	427	512	626	735	489	571
NC8302AL	2		293	332	236	294	354	428	281	336	410	481	321	374
NC8302BL	3		337	382	272	339	408	493	324	387	472	554	370	431
NC8302CL	5		394	447	318	397	477	576	379	453	552	647	433	504
NC8302D	7.5		456	517	368	459	552	667	438	524	639	749	501	584
NC8302DL	7.5		456	517	368	459	552	667	438	524	638	749	501	584
NC8302E	10		506	573	408	509	612	740	485	581	708	830	555	647
NC8302EL	10		503	571	406	507	609	735	483	578	704	825	553	644
NC8302F	15		572	649	**	576	693	838	549	658	802	941	628	733
NC8302FL	15		568	644	457	571	687	830	545	652	795	931	623	726
NC8302G	20		599	680	483	603	726	878	575	689	840	986	658	768
NC8303AL	2		329	372	268	331	396	477	316	376	457	534	360	418
NC8303BL	3		384	434	312	387	462	556	369	439	532	622	420	488
NC8303CL	5		449	507	365	452	540	649	431	513	622	727	491	570
NC8303DL	7.5		509	575	413	512	612	736	489	582	705	823	557	646
NC8303E	10		571	645	464	575	687	825	549	653	791	924	625	725
NC8303EL	10		569	642	462	572	684	822	546	650	788	919	622	722
NC8303F	15		646	730	525	650	777	934	620	739	895	1045	707	820
NC8303FL	15		646	730	525	650	777	933	621	739	895	1043	707	820
NC8303G	20		708	800	575	712	852	1023	680	810	981	1143	775	899
NC8303H	25		741	837	601	745	891	1070	711	847	1026	1197	810	940
NC8304AL	3		445	502	363	448	534	641	428	508	614	717	487	563
NC8304BL	5		543	612	444	547	651	780	523	620	748	871	594	687
NC8304CL	7.5		619	697	505	622	741	887	595	706	851	990	676	781
NC8304D	10		676	762	552	680	810	969	651	771	930	1082	739	854
NC8304DL	10		679	764	554	683	813	972	653	774	933	1085	742	857
NC8304E	15		776	874	634	781	930	1112	747	886	1068	1241	848	981
NC8304EL	15		779	877	636	784	933	1115	750	889	1071	1244	851	984
NC8304F	20		850	956	694	855	1017	1215	817	969	1166	1353	928	1072
NC8304FL	20		849	956	693	855	1017	1215	817	969	1166	1353	928	1072
NC8304G	25		907	1021	740	912	1086	1298	872	1034	1246	1446	991	1145
NC8304GL	25		910	1024	742	915	1089	1300	875	1037	1249	1448	994	1148
NC8304H	30		927	1044	756	932	1110	1327	891	1057	1274	1478	1012	1170
NC8304HL	30		932	1049	760	937	1116	1333	897	1063	1280	1484	1018	1177
NC8305AL	3		515	581	423	519	618	746	496	589	713	839	563	654
NC8305BL	5		634	716	519	639	762	921	610	726	880	1036	694	806
NC8305CL	7.5		700	791	571	705	843	1020	673	802	975	1148	767	892
NC8305D	10		788	890	643	794	948	1147	758	902	1096	1291	862	1003
NC8305DL	10		777	878	634	783	936	1133	747	891	1083	1276	851	991

The NC Class has been designed to offer the widest selection of models, reduced sound levels, and increased performance. Models numbers that end with an "L" will have lower sound level characteristics. Refer to the schematics for actual dB specifications.



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures											
		HW ° F	95	96	100	102	95	97	100	102	95	97	100	102
		CW ° F	85	86	85	87	85	87	85	87	85	87	85	87
		WB ° F	80	80	80	80	78	78	78	78	76	76	76	76
NC8305E	15		904	1022	738	911	1089	1318	870	1037	1259	1483	990	1153
NC8305EL	15		911	1030	743	918	1098	1329	877	1045	1270	1495	998	1162
NC8305F	20		1004	1134	818	1011	1209	1462	965	1151	1398	1645	1099	1280
NC8305FL	20		977	1106	795	984	1179	1428	939	1122	1365	1608	1071	1249
NC8305G	25		1073	1213	875	1081	1293	1564	1032	1231	1495	1760	1175	1369
NC8305GL	25		1072	1213	874	1080	1293	1565	1031	1230	1496	1760	1175	1369
NC8305H	30		1128	1275	919	1136	1359	1643	1085	1293	1571	1848	1235	1439
NC8305HL	30		1108	1254	901	1116	1338	1621	1065	1273	1549	1825	1215	1417
NC8305J	40		1248	1410	1016	1257	1503	1816	1200	1431	1737	2040	1367	1591
NC8305JL	40		1199	1358	974	1208	1449	1756	1152	1378	1678	1977	1315	1535
NC8305K	50		1294	1464	1054	1304	1560	1885	1244	1485	1803	2118	1418	1651
NC8305KL	50		1285	1455	1045	1295	1551	1877	1235	1476	1794	2111	1409	1642
NC8306AL	3		573	646	470	577	687	828	552	655	792	931	626	726
NC8306BL	5		685	772	561	690	822	992	659	783	949	1116	749	869
NC8306CL	7.5		784	885	641	790	942	1137	755	897	1088	1279	858	997
NC8306D	10		838	946	684	844	1008	1219	806	960	1165	1372	917	1067
NC8306DL	10		873	986	714	880	1050	1268	841	1000	1212	1425	956	1111
NC8306E	15		990	1118	808	997	1191	1440	952	1134	1376	1620	1083	1260
NC8306EL	15		1010	1141	826	1018	1215	1466	972	1157	1403	1647	1106	1285
NC8306F	20		1100	1242	898	1108	1323	1597	1058	1260	1527	1794	1204	1400
NC8306FL	20		1108	1251	905	1116	1332	1606	1066	1269	1536	1802	1213	1409
NC8306G	25		1182	1335	964	1191	1422	1717	1137	1354	1642	1928	1294	1505
NC8306GL	25		1186	1338	968	1194	1425	1717	1141	1357	1643	1926	1297	1507
NC8306H	30		1254	1417	1023	1264	1509	1821	1207	1437	1742	2044	1373	1596
NC8306HL	30		1254	1415	1025	1263	1506	1812	1207	1435	1735	2029	1372	1592
NC8306J	40		**	**	**	**	1671	2012	**	**	1926	2254	**	1767
NC8306JL	40		**	**	**	**	1668	2006	**	**	1921	2246	**	1763
NC8306K	50		1453	1640	**	1464	1746	2101	**	1663	2011	2353	1590	1846
NC8307AL	3		629	707	518	634	750	898	606	716	860	1002	685	792
NC8307BL	5		756	850	620	761	903	1082	728	862	1036	1209	824	954
NC8307CL	7.5		860	968	705	867	1029	1234	828	982	1182	1379	939	1087
NC8307DL	10		947	1067	775	955	1134	1360	912	1082	1303	1520	1034	1198
NC8307E	15		1049	1184	856	1057	1260	1518	1009	1201	1452	1700	1147	1333
NC8307EL	15		1059	1194	866	1068	1269	1522	1020	1211	1457	1699	1157	1341
NC8307F	20		1171	1322	955	1180	1407	1694	1127	1341	1621	1897	1281	1488
NC8307FL	20		1172	1321	958	1181	1404	1683	1128	1339	1612	1877	1281	1483
NC8307G	25		1254	1416	1023	1264	1506	1811	1206	1436	1733	2025	1372	1592
NC8307GL	25		1255	1414	1026	1265	1503	1800	1208	1434	1725	2007	1371	1587
NC8307H	30		1329	1500	1084	1340	1596	1918	1279	1522	1836	2143	1454	1687
NC8307HL	30		1324	1491	1083	1334	1584	1894	1275	1512	1816	2109	1446	1672
NC8307J	40		1458	1643	1191	1469	1746	2090	1403	1666	2003	2329	1593	1844
NC8307JL	40		1452	1635	1187	1463	1737	2077	1397	1658	1991	2312	1585	1834
NC8307K	50		1560	1757	1276	1572	1866	2229	1502	1781	2137	2480	1704	1970
NC8307M	60		1635	1839	1337	1647	1953	2330	1574	1865	2234	2588	1784	2061

** Tower capacity less than minimum water flow limit.

• Thermal performance of the NC Class has been certified by CTI (Cooling Tower Institute) in accordance with CTI Standard STD-201(96), and has been assigned CTI certification validation number 92-14-01.

• CTI Certification under STD-201(96) applies ONLY to selections with entering water temperature of 125°F or less, temperature ranges of 4°F or more, temperature approaches of 5°F or more, and wet bulb temperatures between 60°F and 85°F.

TOWER MODEL SELECTION



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures											
		HW ° F	95	96	100	102	95	97	100	102	95	97	100	102
		CW ° F	85	86	85	87	85	87	85	87	85	87	85	87
		WB ° F	80	80	80	80	78	78	78	78	76	76	76	76
NC8308AL	5		793	893	649	798	951	1147	763	906	1097	1289	866	1006
NC8308BL	7.5		902	1017	738	909	1083	1306	868	1032	1250	1468	986	1145
NC8308C	10		993	1121	812	1000	1194	1443	956	1137	1379	1622	1087	1263
NC8308CL	10		994	1122	814	1002	1194	1440	957	1137	1377	1617	1087	1263
NC8308D	15		1135	1282	928	1144	1365	1648	1093	1300	1576	1852	1242	1444
NC8308DL	15		1132	1277	926	1140	1359	1638	1089	1295	1567	1838	1238	1437
NC8308E	20		1256	1417	1027	1265	1509	1819	1209	1437	1740	2042	1374	1596
NC8308EL	20		1282	1446	1048	1291	1539	1854	1234	1466	1774	2079	1402	1627
NC8308F	25		1362	1536	1114	1372	1635	1968	1311	1558	1883	2205	1490	1728
NC8308FL	25		1365	1539	1117	1375	1638	1969	1314	1561	1886	2205	1493	1731
NC8308G	30		1456	1643	1189	1467	1749	2107	1401	1666	2016	2362	1593	1849
NC8308GL	30		1448	1633	1185	1459	1737	2087	1394	1655	1998	2334	1583	1835
NC8308H	40		1596	1799	1305	1607	1914	2300	1536	1824	2202	2573	1744	2023
NC8308HL	40		1610	1814	1318	1622	1929	2314	1550	1839	2217	2585	1759	2038
NC8308J	50		1664	1877	1359	1676	1998	2403	1601	1904	2301	2690	1820	2112
NC8308JL	50		1662	1873	1359	1674	1992	2391	1599	1899	2290	2671	1816	2104
NC8308K	50		1693	1909	1384	1705	2031	2441	1629	1936	2337	2730	1851	2146
NC8308KL	50		1695	1910	1388	1708	2031	2435	1632	1936	2333	2718	1853	2145
NC8309AL	7.5		947	1065	778	954	1131	1354	912	1080	1297	1510	1033	1194
NC8309BL	10		1052	1183	863	1060	1257	1505	1013	1200	1442	1679	1148	1327
NC8309C	15		1209	1363	989	1219	1449	1739	1164	1382	1665	1944	1321	1531
NC8309CL	15		1206	1358	988	1216	1443	1728	1162	1377	1655	1928	1317	1524
NC8309D	20		1333	1502	1091	1344	1596	1913	1283	1523	1832	2134	1456	1686
NC8309DL	20		1339	1508	1096	1350	1602	1918	1289	1529	1838	2139	1462	1692
NC8309E	25		1442	1624	1180	1453	1725	2065	1388	1646	1978	2301	1574	1821
NC8309EL	25		1436	1616	1176	1447	1716	2050	1383	1638	1965	2282	1567	1811
NC8309F	30		1526	1719	1247	1538	1827	2189	1468	1743	2097	2441	1667	1930
NC8309FL	30		1514	1704	1240	1526	1809	2160	1458	1727	2071	2403	1652	1909
NC8309G	40		1664	1873	1361	1677	1989	2376	1602	1899	2278	2644	1816	2099
NC8309GL	40		1661	1868	1360	1674	1983	2365	1599	1894	2268	2628	1812	2092
NC8309H	50		1761	1983	1440	1775	2106	2516	1696	2010	2412	2799	1923	2223
NC8309HL	50		1749	1967	1433	1763	2088	2488	1685	1994	2387	2763	1908	2202
NC8309J	60		**	2094	**	**	2223	2653	**	2122	2544	2949	2030	2346
NC8309JL	60		**	2089	**	1872	2217	2641	**	2118	2534	2932	2027	2338
NC8309K	60		**	**	**	**	2256	2689	**	**	2580	2987	**	2380
NC8309KL	60		**	**	**	**	2250	2677	**	**	2570	2970	**	2372
NC8310AL	10		1163	1304	959	1172	1383	1647	1121	1322	1580	1831	1266	1458
NC8310BL	15		1300	1459	1070	1310	1548	1630*	1253	1479	1630*	1630*	1416	1630*
NC8310C	20		1430	1604	1177	1440	1701	2026	1378	1626	1943	2252	1557	1793
NC8310CL	20		1429	1604	1176	1440	1701	2024	1377	1626	1942	2247	1557	1793
NC8310D	25		1541	1729	1269	1553	1833	2182	1486	1752	2093	2424	1678	1932
NC8310DL	25		1541	1729	1268	1553	1833	2179	1485	1752	2091	2416	1678	1932
NC8310E	30		1640	1839	1351	1652	1950	2319	1581	1864	2225	2574	1785	2055
NC8310EL	30		1642	1840	1352	1654	1950	2313	1583	1865	2221	2561	1787	2054
NC8310F	40		1783	1998	1468	1796	2118	2516	1718	2025	2415	2790	1940	2231
NC8310FL	40		1816	2034	1497	1830	2154	2549	1751	2061	2450	2818	1975	2267
NC8310G	50		1987	2223	1640	2002	2352	2776	1917	2252	2669	3062	2159	2474

The NC Class has been designed to offer the widest selection of models, reduced sound levels, and increased performance. Models numbers that end with an "L" will have lower sound level characteristics. Refer to the schematics for actual dB specifications.



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures											
		HW ° F	95	96	100	102	95	97	100	102	95	97	100	102
		CW ° F	85	86	85	87	85	87	85	87	85	87	85	87
		WB ° F	80	80	80	80	78	78	78	78	76	76	76	76
NC8310GL	50		1917	2147	1578	1931	2274	2500*	1848	2175	2500*	2500*	2085	2394
NC8310H	60		2115	2363	1747	2130	2499	2943	2040	2393	2832	3194*	2296	2627
NC8310HL	60		2063	2308	1702	2078	2442	2880	1990	2338	2770	2950*	2242	2568
NC8310J	75		2263	2526	1872	2279	2670	3138	2184	2558	3021	3194*	2455	2805
NC8310JL	75		2237	2498	1849	2253	2640	3102	2158	2529	2987	3194*	2427	2774
NC8310K	75		2361	2629	1959	2377	2775	3194*	2280	2662	3129	3194*	2557	2912
NC8310KL	75		2332	2600	1932	2349	2745	3194*	2252	2632	3097	3194*	2528	2881
NC8311AL	10		1272	1424	1050	1281	1509	1793	1226	1443	1721	1990	1383	1590
NC8311BL	15		1464	1640	1209	1475	1737	2061	1412	1661	1979	2284	1592	1829
NC8311C	20		1606	1799	1326	1618	1905	2258	1549	1822	2169	2501	1747	2006
NC8311CL	20		1607	1799	1326	1618	1905	2257	1549	1822	2168	2498	1747	2006
NC8311D	25		1736	1943	1432	1748	2058	2438	1674	1969	2342	2699	1887	2167
NC8311DL	25		1729	1935	1428	1742	2049	2425	1668	1961	2330	2681	1880	2157
NC8311E	30		1810	2028	1493	1824	2148	2547	1745	2054	2446	2821	1969	2262
NC8311EL	30		1840	2060	1519	1854	2181	2581	1775	2087	2480	2853	2000	2295
NC8311F	40		2018	2257	1667	2033	2388	2819	1947	2286	2711	3112	2192	2512
NC8311FL	40		2008	2245	1658	2022	2376	2805	1936	2274	2697	3094	2181	2499
NC8311G	50		2156	2408	1782	2171	2547	3001	2080	2439	2887	3307	2340	2678
NC8311GL	50		2155	2408	1781	2171	2547	3001	2079	2439	2887	3307	2340	2678
NC8311H	60		2308	2577	1910	2325	2724	3204	2228	2610	3084	3498*	2505	2862
NC8311HL	60		2294	2560	1898	2310	2706	3179	2214	2593	3061	3495	2489	2843
NC8311J	75		2470	2753	2049	2488	2907	3406	2385	2787	3282	3498*	2677	3051
NC8311JL	75		2462	2744	2040	2479	2898	3396	2377	2779	3272	3498*	2668	3042
NC8311K	75		2557	2844	2127	2575	3000	3498*	2471	2879	3377	3498*	2767	3146
NC8311KL	75		2556	2844	2123	2574	3000	3498*	2469	2879	3378	3498*	2766	3146
NC8311N	100		2760	3066	2299	2780	3231	3498*	2668	3103	3498*	3498*	2984	3385
NC8312AL	10		1362	1526	1124	1372	1617	1923	1313	1546	1845	2137	1481	1704
NC8312BL	15		1581	1772	1304	1593	1878	2100*	1524	1795	2100*	2100*	1720	1979
NC8312C	20		1752	1964	1445	1766	2082	2475	1690	1990	2375	2748	1907	2194
NC8312CL	20		1735	1945	1431	1748	2061	2448	1673	1971	2350	2714	1888	2171
NC8312D	25		1904	2132	1571	1918	2259	2680	1836	2161	2573	2970	2070	2379
NC8312DL	25		1903	2132	1569	1917	2259	2681	1834	2160	2574	2972	2070	2379
NC8312E	30		1987	2228	1638	2002	2361	2805	1916	2257	2692	3111	2163	2487
NC8312EL	30		2002	2243	1650	2017	2376	2817	1930	2272	2706	3119	2178	2502
NC8312F	40		2210	2473	1823	2226	2619	3100	2131	2506	2979	3428	2402	2757
NC8312FL	40		2188	2450	1804	2204	2595	3071	2110	2483	2951	3394	2380	2732
NC8312G	50		2410	2694	1992	2428	2850	3361	2325	2729	3233	3591*	2618	2997
NC8312GL	50		2401	2685	1983	2419	2841	3352	2316	2720	3224	3697	2608	2988
NC8312H	60		2546	2845	2105	2565	3009	3545	2457	2882	3411	3908	2765	3163
NC8312HL	60		2538	2837	2098	2557	3000	3533	2449	2873	3400	3892	2756	3154
NC8312J	75		2704	3021	2235	2724	3195	3764	2609	3060	3621	4100*	2936	3359
NC8312JL	75		2710	3026	2242	2730	3198	3759	2616	3064	3619	4100*	2941	3360
NC8312K	75		2805	3129	2324	2826	3306	3882	2708	3169	3738	4100*	3042	3472
NC8312KL	75		2809	3131	2329	2829	3306	3874	2712	3170	3733	4100*	3044	3470
NC8312N	100		3067	3413	2548	3089	3600	4100*	2963	3454	4054	4100*	3320	3775
NC8312R	125		3266	3627	**	3288	3822	4100*	3156	3671	4100*	4100*	3530	4004

* Tower capacity greater than maximum water flow limit. Maximum shown.

** Tower capacity less than minimum water flow limit.

• Thermal performance of the NC Class has been certified by CTI (Cooling Tower Institute) in accordance with CTI Standard STD-201(96), and has been assigned CTI certification validation number 92-14-01.

• CTI Certification under STD-201(96) applies ONLY to selections with entering water temperature of 125°F or less, temperature ranges of 4°F or more, temperature approaches of 5°F or more, and wet bulb temperatures between 60°F and 85°F.

TOWER MODEL SELECTION



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures											
		HW ° F	95	100	90	95	90	95	90	95	90	95	90	95
		CW ° F	85	85	80	80	80	80	80	80	80	80	80	80
		WB ° F	75	75	72	72	70	70	68	68	66	66	64	64
NC8301AL	2		366	285	287	225	328	255	367	282	402	307	436	331
NC8301BL	3		414	323	325	254	371	288	415	319	455	348	493	375
NC8301C	5		499	389	391	307	448	347	500	384	548	419	594	452
NC8301CL	5		499	389	391	307	448	347	500	384	548	419	594	452
NC8301D	7.5		555	432	435	340	497	385	556	427	610	466	660	502
NC8301DL	7.5		551	429	432	338	494	383	552	424	605	463	655	499
NC8301E	10		606	472	475	372	544	421	607	467	666	509	721	549
NC8301EL	10		618	481	484	379	554	429	618	475	679	519	735	559
NC8301F	15		666	518	522	408	597	462	666	512	731	559	791	603
NC8302AL	2		436	340	342	269	391	304	436	336	479	366	519	395
NC8302BL	3		502	392	394	310	451	350	503	387	551	422	597	455
NC8302CL	5		587	458	461	362	527	409	587	453	644	494	697	532
NC8302D	7.5		679	530	534	418	610	473	680	524	745	571	806	615
NC8302DL	7.5		679	530	534	419	609	473	680	524	745	571	805	615
NC8302E	10		753	588	592	464	676	525	754	581	826	633	893	682
NC8302EL	10		749	585	589	462	672	522	750	578	821	630	887	679
NC8302F	15		853	665	670	525	766	594	854	658	936	717	1013	773
NC8302FL	15		845	660	664	521	759	589	846	652	926	711	1001	766
NC8302G	20		845	660	664	521	759	589	846	652	926	711	1001	766
NC8303AL	2		485	381	383	303	436	341	486	377	532	410	576	441
NC8303BL	3		565	444	447	353	509	398	566	440	620	478	670	515
NC8303CL	5		661	519	522	413	595	465	662	514	724	559	783	602
NC8303DL	7.5		749	588	592	468	674	527	750	582	821	634	886	682
NC8303E	10		840	660	665	525	757	592	842	654	920	711	994	765
NC8303EL	10		836	658	662	523	753	589	838	651	916	708	989	762
NC8303F	15		950	747	752	594	856	670	952	739	1041	805	1124	865
NC8303FL	15		949	747	752	594	856	670	951	740	1040	804	1122	865
NC8303G	20		1041	819	824	651	938	734	1043	811	1139	882	1229	949
NC8303H	25		1089	856	862	681	982	768	1091	848	1192	923	1286	992
NC8304AL	3		652	514	517	410	587	461	653	508	713	552	770	593
NC8304BL	5		793	627	630	501	715	563	794	620	867	673	935	722
NC8304CL	7.5		902	713	717	570	814	641	903	706	985	766	1061	822
NC8304D	10		986	780	784	623	890	700	987	771	1077	837	1160	898
NC8304DL	10		989	783	787	625	893	703	990	774	1079	840	1162	901
NC8304E	15		1131	895	900	715	1021	804	1133	886	1235	961	1329	1031
NC8304EL	15		1134	898	903	718	1025	807	1136	888	1238	964	1332	1034
NC8304F	20		1235	979	985	783	1116	880	1236	969	1347	1051	1448	1127
NC8304FL	20		1235	979	985	783	1116	880	1236	969	1346	1051	1447	1127
NC8304G	25		1320	1045	1051	835	1192	939	1321	1034	1439	1122	1547	1203
NC8304GL	25		1322	1048	1054	838	1195	942	1324	1037	1441	1125	1549	1206
NC8304H	30		1349	1068	1075	853	1219	960	1351	1057	1471	1147	1582	1230
NC8304HL	30		1355	1074	1080	858	1225	965	1357	1063	1477	1153	1588	1237
NC8305AL	3		758	595	597	475	679	533	757	587	831	638	901	686
NC8305BL	5		936	733	735	584	838	656	935	723	1026	786	1113	846
NC8305CL	7.5		1037	810	813	644	928	724	1036	799	1137	870	1233	937
NC8305D	10		1166	912	915	724	1043	815	1164	899	1279	979	1387	1054
NC8305DL	10		1152	900	903	714	1030	804	1150	887	1263	966	1370	1041

The NC Class has been designed to offer the widest selection of models, reduced sound levels, and increased performance. Models numbers that end with an "L" will have lower sound level characteristics. Refer to the schematics for actual dB specifications.



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures												
		HW ° F	95	100	90	95	90	95	90	95	90	95	90	95	
		CW ° F	85	85	80	80	80	80	80	80	80	80	80	80	80
		WB ° F	75	75	72	72	70	70	68	68	66	66	64	64	
NC8305E	15		1340	1047	1050	831	1199	935	1338	1033	1469	1124	1593	1211	
NC8305EL	15		1351	1056	1059	838	1209	943	1349	1041	1481	1133	1606	1221	
NC8305F	20		1487	1162	1166	922	1331	1038	1485	1146	1629	1248	1766	1344	
NC8305FL	20		1453	1133	1137	897	1299	1011	1450	1117	1593	1217	1727	1312	
NC8305G	25		1591	1243	1247	986	1423	1110	1588	1226	1743	1335	1889	1437	
NC8305GL	25		1591	1243	1247	985	1424	1110	1589	1226	1743	1335	1889	1438	
NC8305H	30		1671	1306	1311	1036	1496	1167	1669	1289	1830	1403	1983	1511	
NC8305HL	30		1649	1286	1290	1017	1474	1147	1646	1268	1807	1382	1959	1489	
NC8305J	40		1847	1445	1450	1146	1654	1291	1844	1425	2021	1551	2188	1670	
NC8305JL	40		1786	1392	1397	1100	1597	1241	1783	1373	1958	1496	2122	1613	
NC8305K	50		1917	1500	1505	1188	1717	1339	1914	1479	2098	1610	2270	1734	
NC8305KL	50		1909	1491	1496	1179	1708	1330	1906	1470	2091	1601	2264	1725	
NC8306AL	3		842	661	663	528	755	592	841	652	922	709	1000	762	
NC8306BL	5		1009	791	793	630	904	708	1007	780	1105	848	1198	913	
NC8306CL	7.5		1157	906	909	721	1036	811	1155	894	1266	972	1372	1046	
NC8306D	10		1240	969	973	770	1109	866	1238	956	1359	1040	1475	1120	
NC8306DL	10		1289	1010	1013	804	1155	903	1287	996	1411	1084	1529	1166	
NC8306E	15		1464	1145	1149	910	1310	1024	1462	1130	1604	1229	1739	1323	
NC8306EL	15		1491	1169	1172	929	1336	1045	1489	1153	1632	1254	1767	1349	
NC8306F	20		1624	1272	1277	1011	1455	1137	1621	1255	1777	1365	1923	1469	
NC8306FL	20		1633	1281	1286	1019	1464	1146	1630	1264	1785	1374	1931	1478	
NC8306G	25		1746	1367	1372	1086	1564	1222	1743	1349	1910	1467	2068	1579	
NC8306GL	25		1746	1371	1375	1090	1566	1226	1743	1352	1908	1470	2062	1581	
NC8306H	30		1852	1451	1456	1153	1659	1297	1848	1432	2025	1557	2191	1676	
NC8306HL	30		1842	1449	1454	1154	1654	1297	1839	1430	2011	1553	2171	1670	
NC8306J	40		2045	**	**	**	1835	**	2042	**	2234	1724	2413	1853	
NC8306JL	40		2039	**	**	**	1831	**	2036	**	2226	1721	2403	1849	
NC8306K	50		2136	1680	1685	**	1917	1503	2132	1657	2331	1801	2517	1936	
NC8307AL	3		911	722	724	579	819	648	908	712	991	771	1069	827	
NC8307BL	5		1099	869	871	695	987	779	1095	857	1195	929	1289	996	
NC8307CL	7.5		1253	991	992	791	1126	887	1249	976	1363	1058	1470	1136	
NC8307DL	10		1381	1092	1093	871	1241	977	1376	1075	1503	1167	1620	1252	
NC8307E	15		1541	1212	1214	963	1381	1083	1536	1193	1680	1297	1815	1394	
NC8307EL	15		1545	1221	1223	973	1388	1093	1540	1203	1680	1305	1700*	1401	
NC8307F	20		1720	1353	1356	1075	1542	1209	1714	1333	1875	1448	2024	1556	
NC8307FL	20		1708	1351	1354	1077	1536	1209	1702	1331	1856	1444	1998	1549	
NC8307G	25		1839	1449	1451	1151	1650	1294	1832	1427	2002	1550	2158	1665	
NC8307GL	25		1827	1447	1449	1153	1644	1295	1821	1425	1985	1546	2135	1658	
NC8307H	30		1947	1535	1538	1220	1748	1372	1941	1512	2119	1642	2283	1764	
NC8307HL	30		1923	1525	1528	1217	1731	1366	1916	1502	2086	1629	2140*	1746	
NC8307J	40		2122	1681	1684	1339	1909	1504	2114	1656	2303	1796	2477	1926	
NC8307JL	40		2108	1672	1675	1334	1898	1497	2101	1648	2287	1786	2458	1915	
NC8307K	50		2262	1797	1800	1434	2038	1609	2255	1770	2453	1919	2635	2056	
NC8307M	60		2364	1881	1884	1502	2132	1686	2356	1853	2560	2008	2747	2151	

* Tower capacity greater than maximum water flow limit. Maximum shown.

** Tower capacity less than minimum water flow limit.

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• CTI Certification under STD-201(96) applies ONLY to selections with entering water temperature of 125°F or less, temperature ranges of 4°F or more, temperature approaches of 5°F or more, and wet bulb temperatures between 60°F and 85°F.

TOWER MODEL SELECTION



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures												
		HW ° F	95	100	90	95	90	95	90	95	90	95	90	95	
		CW ° F	85	85	80	80	80	80	80	80	80	80	80	80	80
		WB ° F	75	75	72	72	70	70	68	68	66	66	66	64	64
NC8308AL	5		1166	915	918	730	1045	819	1164	903	1277	981	1383	1055	
NC8308BL	7.5		1328	1042	1045	830	1190	933	1326	1028	1454	1117	1575	1202	
NC8308C	10		1467	1148	1152	913	1313	1027	1465	1133	1607	1232	1742	1326	
NC8308CL	10		1464	1149	1152	915	1312	1028	1461	1133	1602	1232	1734	1325	
NC8308D	15		1676	1313	1317	1044	1501	1174	1673	1295	1834	1409	1987	1516	
NC8308DL	15		1665	1307	1312	1041	1493	1170	1662	1290	1821	1402	1970	1508	
NC8308E	20		1850	1452	1456	1155	1658	1299	1846	1432	2023	1557	2188	1674	
NC8308EL	20		1884	1481	1486	1180	1690	1325	1881	1461	2059	1588	2227	1707	
NC8308F	25		2000	1573	1578	1254	1795	1408	1997	1552	2184	1686	2360	1813	
NC8308FL	25		2002	1576	1581	1256	1798	1411	1998	1555	2185	1689	2359	1815	
NC8308G	30		2142	1683	1688	1339	1921	1505	2138	1660	2340	1804	2530	1940	
NC8308GL	30		2121	1672	1677	1333	1906	1497	2117	1650	2313	1791	2496	1924	
NC8308H	40		2337	1842	1848	1468	2100	1650	2333	1818	2550	1974	2751	2120	
NC8308HL	40		2351	1857	1863	1482	2115	1664	2347	1833	2562	1989	2761	2135	
NC8308J	50		2443	1923	1929	1531	2194	1721	2439	1897	2666	2061	2878	2215	
NC8308JL	50		2429	1917	1924	1529	2185	1718	2425	1892	2648	2054	2854	2206	
NC8308K	50		2480	1955	1961	1557	2229	1750	2476	1929	2706	2095	2919	2250	
NC8308KL	50		2474	1955	1962	1561	2226	1753	2470	1930	2694	2094	2903	2247	
NC8309AL	7.5		1374	1089	1091	872	1236	976	1369	1073	1493	1163	1570*	1247	
NC8309BL	10		1528	1210	1212	968	1374	1085	1522	1192	1660	1293	1788	1386	
NC8309C	15		1766	1395	1397	1111	1586	1248	1760	1374	1922	1491	2072	1600	
NC8309CL	15		1754	1389	1392	1109	1578	1244	1748	1369	1906	1484	2052	1592	
NC8309D	20		1942	1536	1539	1225	1745	1375	1935	1513	2110	1642	2272	1761	
NC8309DL	20		1947	1542	1545	1231	1751	1381	1940	1519	2115	1648	2277	1767	
NC8309E	25		2096	1661	1664	1325	1886	1487	2089	1636	2276	1774	2448	1902	
NC8309EL	25		2081	1653	1655	1320	1874	1481	2074	1628	2257	1764	2425	1891	
NC8309F	30		2222	1759	1762	1401	1998	1574	2214	1732	2414	1879	2598	2016	
NC8309FL	30		2192	1742	1745	1392	1975	1561	2185	1717	2376	1860	2553	1993	
NC8309G	40		2412	1915	1919	1529	2173	1716	2404	1887	2616	2045	2810	2192	
NC8309GL	40		2400	1910	1913	1527	2164	1713	2392	1882	2600	2039	2790	2183	
NC8309H	50		2553	2028	2031	1619	2300	1817	2545	1998	2769	2166	2974	2321	
NC8309HL	50		2525	2012	2015	1609	2278	1804	2516	1982	2734	2146	2933	2298	
NC8309J	60		2692	2141	2145	**	2427	1919	2683	2110	2917	2285	3131	2448	
NC8309JL	60		2680	2136	2140	**	2418	1916	2671	2105	2901	2279	3112	2440	
NC8309K	60		2729	**	**	**	2462	**	2720	**	2955	2319	3171	2483	
NC8309KL	60		2716	**	**	**	2453	**	2707	**	2939	2312	3150	2474	
NC8310AL	10		1671	1333	1335	1072	1508	1198	1665	1314	1811	1421	1945	1521	
NC8310BL	15		1630*	1492	1494	1197	1630*	1340	1630*	1470	1630*	1591	1630*	1630*	
NC8310C	20		2056	1640	1642	1317	1855	1473	2049	1616	2227	1748	2392	1871	
NC8310CL	20		2053	1640	1642	1317	1854	1473	2047	1616	2223	1748	2385	1870	
NC8310D	25		2213	1767	1770	1420	1998	1588	2206	1742	2398	1883	2574	2015	
NC8310DL	25		2210	1767	1770	1420	1997	1588	2203	1742	2391	1883	2510*	2014	
NC8310E	30		2353	1880	1883	1512	2125	1690	2345	1853	2547	2003	2732	2143	
NC8310EL	30		2346	1881	1884	1513	2123	1691	2338	1854	2535	2003	2714	2141	
NC8310F	40		2552	2042	2046	1643	2307	1837	2544	2013	2761	2176	2959	2326	
NC8310FL	40		2585	2078	2081	1675	2342	1871	2577	2049	2789	2212	2982	2362	
NC8310G	50		2814	2270	2274	1834	2554	2046	2805	2239	3031	2414	3194*	2575	

The NC Class has been designed to offer the widest selection of models, reduced sound levels, and increased performance. Models numbers that end with an "L" will have lower sound level characteristics. Refer to the schematics for actual dB specifications.



Tower Model	Motor bhp	temp	GPM Cooling capability at indicated Hot Water, Cold Water and Wet-Bulb temperatures												
		HW ° F	95	100	90	95	90	95	90	95	90	95	90	95	
		CW ° F	85	85	80	80	80	80	80	80	80	80	80	80	80
		WB ° F	75	75	72	72	70	70	68	68	66	66	64	64	
NC8310GL	50		2500*	2194	2197	1767	2472	1975	2500*	2163	2500*	2335	2500*	2493	
NC8310H	60		2983	2413	2417	1952	2711	2177	2974	2380	3194*	2564	3194*	2733	
NC8310HL	60		2919	2357	2361	1903	2651	2125	2910	2324	2950*	2506	2950*	2673	
NC8310J	75		3180	2579	2583	2091	2894	2329	3170	2544	3194*	2739	3194*	2917	
NC8310JL	75		3143	2550	2554	2066	2861	2302	3134	2515	3194*	2708	3194*	2884	
NC8310K	75		3194*	2683	2687	2184	3001	2428	3194*	2647	3194*	2845	3194*	3025	
NC8310KL	75		3194*	2653	2657	2156	2970	2400	3194*	2618	3194*	2814	3194*	2993	
NC8311AL	10		1819	1455	1458	1173	1643	1310	1813	1435	1969	1550	2113	1657	
NC8311BL	15		2090	1675	1678	1351	1891	1508	2084	1652	2260	1784	2423	1907	
NC8311C	20		2290	1838	1841	1482	2073	1654	2283	1812	2474	1956	2650	2090	
NC8311CL	20		2289	1838	1841	1482	2072	1655	2282	1812	2472	1956	2610*	2090	
NC8311D	25		2473	1985	1989	1601	2239	1788	2465	1957	2671	2113	2860	2258	
NC8311DL	25		2459	1977	1980	1596	2228	1781	2451	1949	2654	2104	2839	2246	
NC8311E	30		2583	2072	2075	1669	2337	1865	2575	2042	2792	2206	2990	2357	
NC8311EL	30		2617	2104	2108	1698	2371	1895	2608	2075	2824	2239	3020	2391	
NC8311F	40		2858	2305	2309	1863	2594	2078	2849	2273	3081	2451	3291	2615	
NC8311FL	40		2843	2293	2297	1853	2580	2067	2834	2261	3064	2439	3271	2602	
NC8311G	50		3041	2459	2463	1991	2764	2219	3032	2425	3274	2614	3493	2786	
NC8311GL	50		3042	2459	2463	1990	2764	2219	3032	2425	3274	2614	3493	2786	
NC8311H	60		3247	2631	2635	2133	2953	2376	3237	2595	3492	2795	3498*	2977	
NC8311HL	60		3221	2614	2618	2119	2932	2361	3212	2578	3461	2776	3498*	2956	
NC8311J	75		3450	2810	2814	2285	3146	2542	3440	2772	3498*	2981	3498*	3171	
NC8311JL	75		3440	2801	2805	2276	3137	2533	3430	2763	3498*	2972	3498*	3161	
NC8311K	75		3498*	2902	2906	2368	3241	2630	3498*	2864	3498*	3074	3498*	3266	
NC8311KL	75		3498*	2901	2906	2366	3242	2628	3498*	2863	3498*	3075	3498*	3267	
NC8311N	100		3498*	3127	3131	2558	3486	2838	3498*	3086	3498*	3310	3498*	3498*	
NC8312AL	10		1951	1559	1562	1256	1762	1403	1945	1537	2114	1661	2270	1777	
NC8312BL	15		2100*	1811	1814	1458	2046	1629	2100*	1785	2100*	1929	2100*	2063	
NC8312C	20		2511	2008	2011	1616	2268	1805	2503	1979	2718	2139	2917	2288	
NC8312CL	20		2483	1987	1991	1600	2244	1788	2475	1959	2685	2117	2879	2263	
NC8312D	25		2718	2179	2182	1756	2459	1961	2709	2148	2939	2320	3149	2480	
NC8312DL	25		2720	2179	2182	1754	2459	1960	2711	2148	2941	2320	3152	2480	
NC8312E	30		2845	2277	2280	1832	2571	2047	2836	2244	3078	2425	3300	2593	
NC8312EL	30		2857	2292	2295	1846	2586	2062	2848	2259	3087	2440	3305	2607	
NC8312F	40		3143	2527	2531	2039	2848	2276	3133	2491	3393	2689	3630	2872	
NC8312FL	40		3114	2504	2508	2018	2822	2254	3104	2468	3360	2665	3592	2845	
NC8312G	50		3407	2751	2756	2225	3094	2482	3396	2713	3591*	2925	3591*	3119	
NC8312GL	50		3398	2742	2747	2216	3085	2472	3387	2704	3660	2916	3907	3110	
NC8312H	60		3594	2905	2910	2351	3265	2621	3583	2865	3869	3088	4100*	3292	
NC8312HL	60		3581	2897	2901	2344	3255	2613	3570	2857	3854	3078	4100*	3281	
NC8312J	75		3815	3085	3090	2497	3466	2784	3803	3043	4100*	3279	4100*	3495	
NC8312JL	75		3810	3089	3094	2504	3467	2790	3798	3047	4096	3281	4100*	3494	
NC8312K	75		3933	3194	3199	2593	3581	2887	3922	3151	4100*	3391	4100*	3610	
NC8312KL	75		3925	3195	3200	2597	3578	2890	3913	3152	4100*	3390	4100*	3607	
NC8312N	100		4100*	3482	3487	2839	3890	3154	4100*	3436	4100*	3690	4100*	3920	
NC8312R	125		4100*	3699	3704	3026	4100*	3357	4100*	3651	4100*	3915	4100*	4100*	

* Tower capacity greater than maximum water flow limit. Maximum shown.

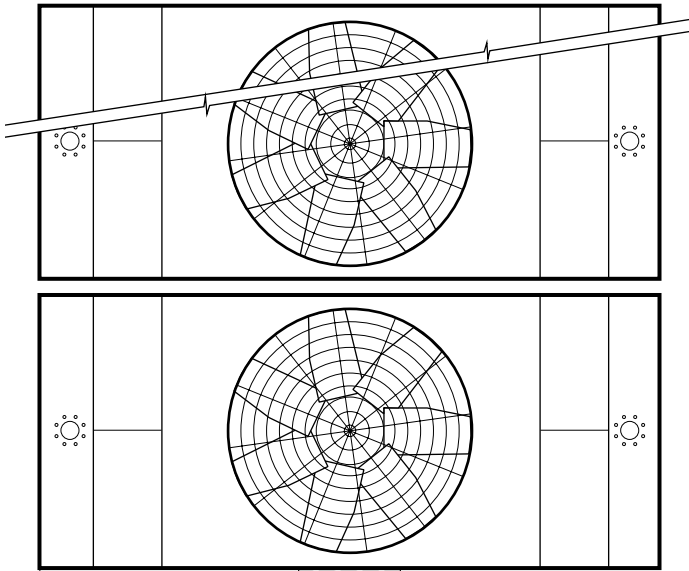
** Tower capacity less than minimum water flow limit.

• Thermal performance of the NC Class has been certified by CTI (Cooling Tower Institute) in accordance with CTI Standard STD-201(96), and has been assigned CTI certification validation number 92-14-01.

• CTI Certification under STD-201(96) applies ONLY to selections with entering water temperature of 125°F or less, temperature ranges of 4°F or more, temperature approaches of 5°F or more, and wet bulb temperatures between 60°F and 85°F.

TOWER SCHEMATIC

NC8301 NC8302 NC8303 NC8304

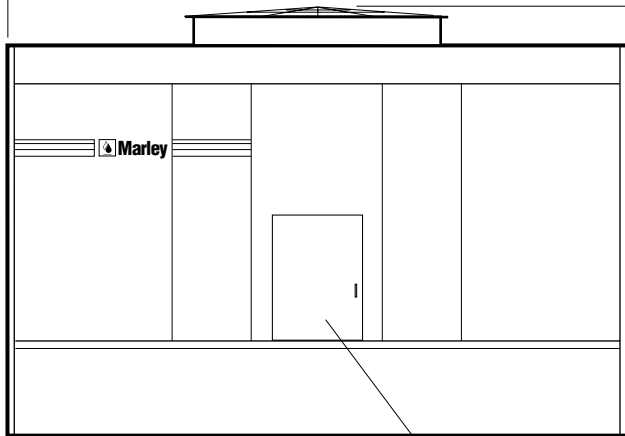


PLAN

MOTOR ENCLOSURE PROTRUSION MODELS
NC8301E, NC8301EL AND NC8301F ONLY

W

EXCEPT FOR MODELS NC8301E, NC8301EL AND NC8301F,
DIMENSION "A" REPEATS FOR ANY NUMBER OF CELLS.
MODELS NC8301E, NC8301EL AND NC8301F
REQUIRE SPECIAL SPACING FOR 3 OR MORE CELLS.

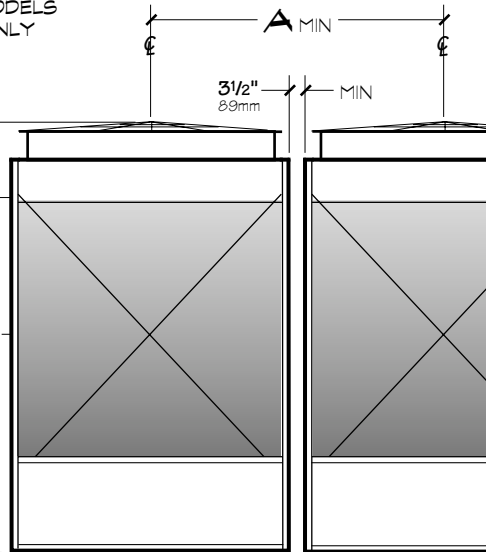


SIDE ELEVATION

HINGED ACCESS
DOOR

H
INSTALLED
HEIGHT

10 1/8"
257mm

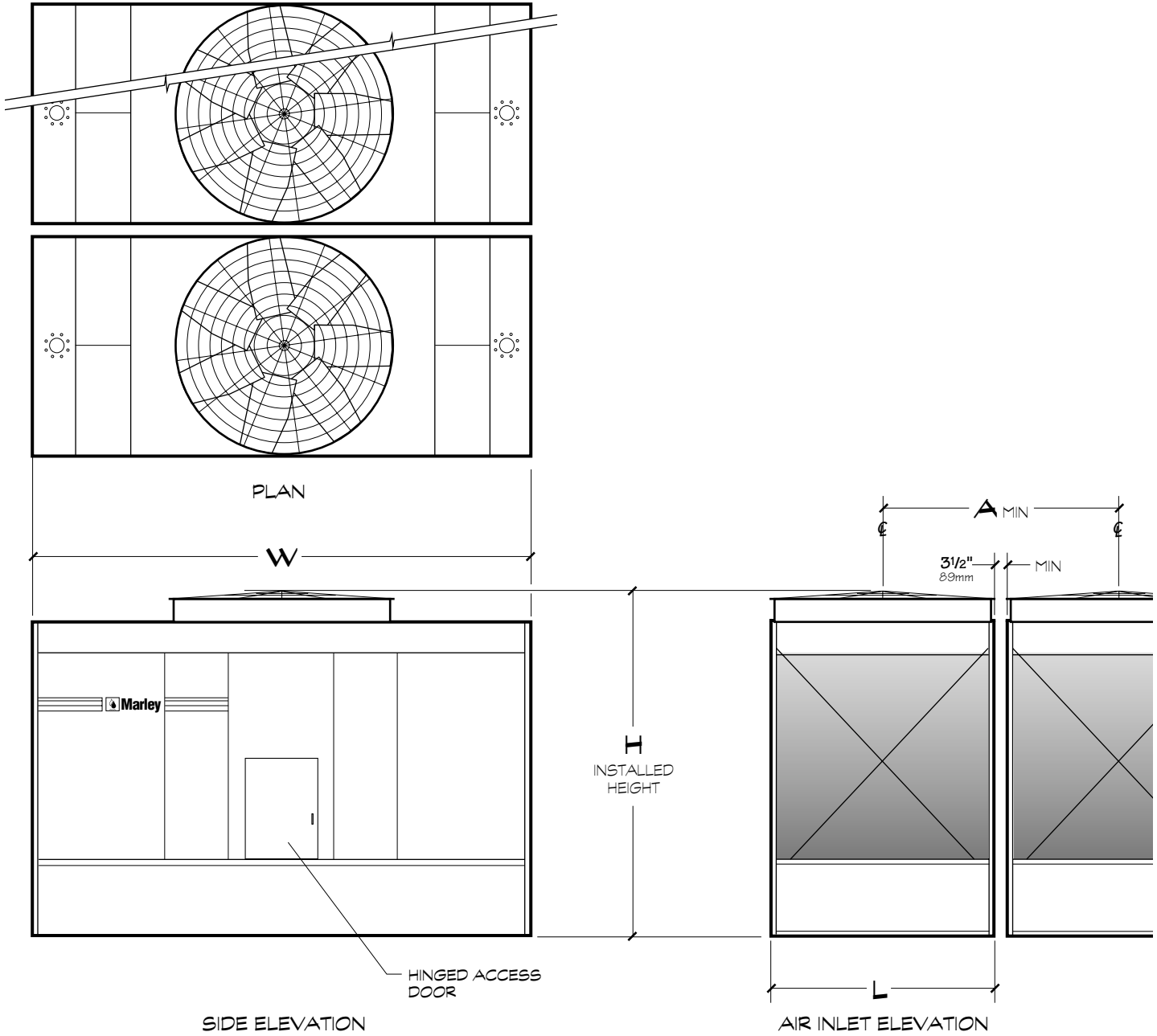


AIR INLET ELEVATION

Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb	DIMENSIONS			
						W	L	H	A
NC8301AL-1	99	2	63	8995	4407	14'-0" 4268mm	6'-4 3/4" 1950mm	10'-1 5/8" 3090mm	6'-8 1/4" 2039mm
NC8301BL-1	112	3	67	8995	4407				
NC8301C-1	135	5	75	8929	4341				
NC8301CL-1	135	5	69	9021	4433				
NC8301D-1	150	7 1/2	77	8984	4396				
NC8301DL-1	149	7 1/2	73	9138	4550				
NC8301E-1	164	10	78	9153	4565				
NC8301EL-1	167	10	74	9164	4576				
NC8301F-1	180	15	79	9245	4657				
NC8302AL-1	118	2	64	11463	5206	15'-6" 4725mm	7'-10 3/4" 2407mm	10'-2 3/8" 3109mm	8'-2 1/4" 2496mm
NC8302BL-1	136	3	65	11531	5274				
NC8302CL-1	159	5	68	11557	5300				
NC8302D-1	184	7 1/2	74	11518	5261				
NC8302DL-1	184	7 1/2	72	11638	5381				
NC8302E-1	204	10	76	11544	5287				
NC8302EL-1	203	10	74	11699	5442				
NC8302F-1	231	15	79	11638	5381				
NC8302FL-1	229	15	76	11638	5381				
NC8302G-1	242	20	80	11699	5442	15'-6" 4725mm	7'-10 3/4" 2407mm	11'-11 1/4" 3639mm	8'-2 1/4" 2496mm
NC8303AL-1	132	2	64	11933	5676				
NC8303BL-1	154	3	65	11988	5731				
NC8303CL-1	180	5	68	12014	5757				
NC8303DL-1	204	7 1/2	72	12095	5838				
NC8303E-1	229	10	76	12001	5744				
NC8303EL-1	228	10	74	12156	5899				
NC8303F-1	259	15	79	12095	5838				
NC8303FL-1	259	15	76	12095	5838				
NC8303G-1	284	20	80	12156	5899	17'-0" 5182mm	8'-10 3/4" 2712mm	12'-11 3/4" 3956mm	9'-2 1/4" 2801mm
NC8303H-1	297	25	81	12214	5957				
NC8304AL-1	178	3	64	14420	6745				
NC8304BL-1	217	5	65	14446	6771				
NC8304CL-1	247	7 1/2	66	14527	6852				
NC8304D-1	270	10	72	14406	6731				
NC8304DL-1	271	10	68	14588	6913				
NC8304E-1	310	15	76	14507	6832				
NC8304EL-1	311	15	72	14646	6971				
NC8304F-1	339	20	77	14568	6893	17'-0" 5182mm	8'-10 3/4" 2712mm	12'-11 3/4" 3956mm	9'-2 1/4" 2801mm
NC8304FL-1	339	20	73	14708	7033				
NC8304G-1	362	25	82	14626	6951				
NC8304GL-1	363	25	76	14853	7178				
NC8304H-1	370	30	83	14688	7013				
NC8304HL-1	372	30	77	14919	7244				

NOTE

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- 3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- 4 Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- 5 Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- 6 Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.



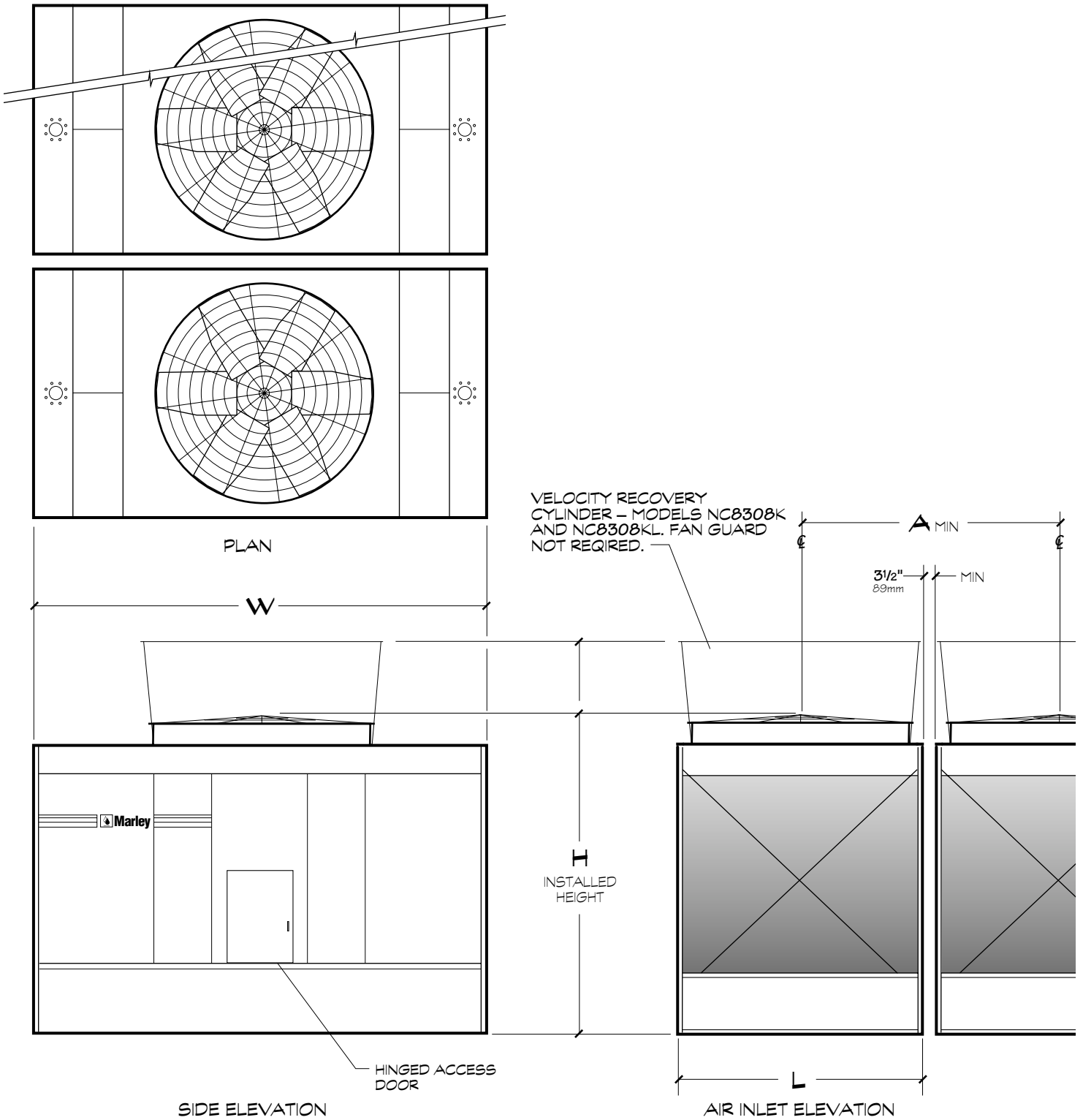
Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb	DIMENSIONS			
						W	L	H	A
NC8305AL-1	206	3	64	18877	8582	18'-9" 5715mm	10'-10 3/4" 3321mm	12'-11 3/4" 3956mm	11'-2 1/4" 3410mm
NC8305BL-1	254	5	65	18903	8608				
NC8305CL-1	281	7 1/2	66	18984	8689				
NC8305D-1	316	10	72	18863	8568				
NC8305DL-1	312	10	68	19045	8750				
NC8305E-1	363	15	76	18964	8669				
NC8305EL-1	366	15	72	19103	8808				
NC8305F-1	403	20	77	19025	8730				
NC8305FL-1	393	20	73	19165	8870				
NC8305G-1	431	25	82	19083	8788				
NC8305GL-1	431	25	76	19310	9015				
NC8305H-1	453	30	83	19145	8850				
NC8305HL-1	446	30	77	19376	9081				
NC8305J-1	501	40	86	19442	9147				
NC8305JL-1	483	40	80	19310	9015				
NC8305K-1	520	50	87	19508	9213				
NC8305KL-1	517	50	84	19528	9233				
NC8306AL-1	229	3	63	21781	9968	19'-10" 6046mm	11'-10 3/4" 3626mm	12'-11 3/4" 3956mm	12'-2 1/4" 3715mm
NC8306BL-1	274	5	64	21862	10049				
NC8306CL-1	314	7 1/2	66	21862	10049				
NC8306D-1	336	10	72	21543	9730				
NC8306DL-1	350	10	67	21923	10110				
NC8306E-1	397	15	73	21624	9811				
NC8306EL-1	405	15	71	21981	10168				
NC8306F-1	441	20	74	21685	9872				
NC8306FL-1	444	20	72	22043	10230				
NC8306G-1	474	25	77	21743	9930				
NC8306GL-1	475	25	74	22188	10375				
NC8306H-1	503	30	79	21805	9992				
NC8306HL-1	502	30	77	22243	10430				
NC8306J-1	557	40	81	21972	10159				
NC8306JL-1	556	40	78	22534	10721				
NC8306K-1	582	50	82	22254	10441				

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- 3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- 4 Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- 5 Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- 6 Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.

TOWER SCHEMATIC

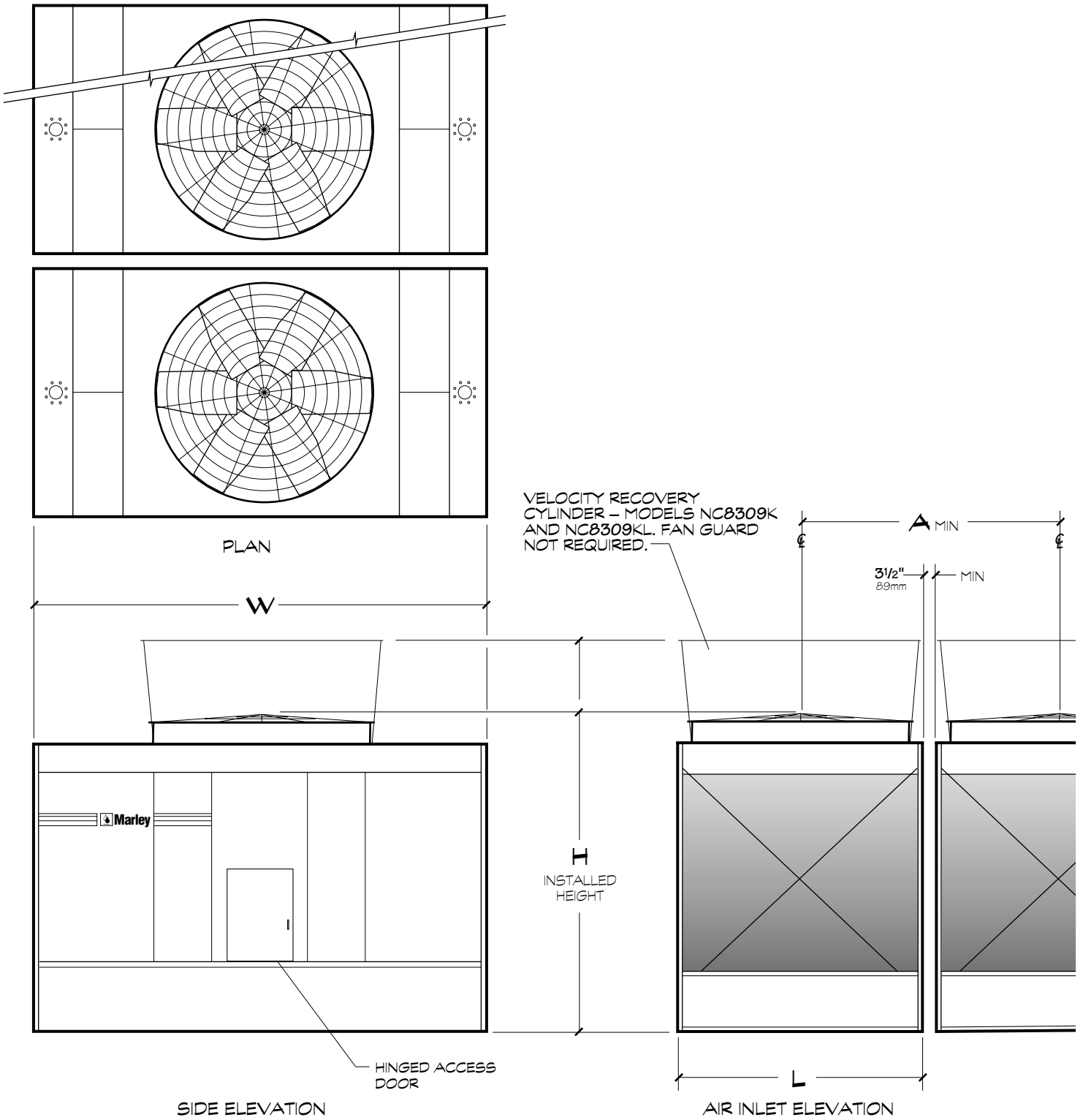
NC8307 NC8308



Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb	DIMENSIONS							
						W	L	H	A				
NC8307AL-1	250	3	63	26251	11193	22'-5" 6833mm	11'-10 3/4" 3626mm	13'-3 3/4" 4058mm	12'-2 1/4" 3715mm				
NC8307BL-1	301	5	64	26332	11274								
NC8307CL-1	343	7 1/2	66	26332	11274								
NC8307DL-1	378	10	67	26393	11335								
NC8307E-1	420	15	73	26094	11036								
NC8307EL-1	423	15	69	26451	11393								
NC8307F-1	469	20	76	26155	11097								
NC8307FL-1	468	20	72	26513	11455								
NC8307G-1	502	25	77	26213	11155								
NC8307GL-1	501	25	74	26658	11600								
NC8307H-1	532	30	79	26275	11217								
NC8307HL-1	528	30	77	26713	11655								
NC8307J-1	582	40	82	26442	11384								
NC8307JL-1	579	40	78	27004	11946								
NC8307K-1	622	50	83	26724	11666								
NC8307M-1	651	60	83	27004	11946								
NC8308AL-1	317	5	63	27501	12235	22'-5" 6833mm	13'-10 3/4" 4236mm	12'-11 3/4" 3956mm	14'-2 1/4" 4325mm				
NC8308BL-1	361	7 1/2	64	27562	12296								
NC8308C-1	398	10	70	27336	12070								
NC8308CL-1	398	10	64	27620	12354								
NC8308D-1	455	15	71	27417	12151								
NC8308DL-1	453	15	67	27620	12354								
NC8308E-1	503	20	72	27478	12212								
NC8308EL-1	513	20	70	27923	12657								
NC8308F-1	545	25	73	27536	12270								
NC8308FL-1	546	25	71	28068	12802								
NC8308G-1	583	30	77	27682	12416								
NC8308GL-1	579	30	73	28134	12868								
NC8308H-1	638	40	77	27827	12561								
NC8308HL-1	643	40	74	28414	13148								
NC8308J-1	666	50	81	27893	12627								
NC8308JL-1	664	50	75	28474	13208								
NC8308K-1	677	50	81	27958	12692					22'-5" 6833mm	13'-10 3/4" 4236mm	16'-6" 5029mm	14'-2 1/4" 4325mm
NC8308KL-1	677	50	75	28539	13272								

NOTE

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- Last numeral of model number indicates number of cells. Change as appropriate for your selection.
- Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.



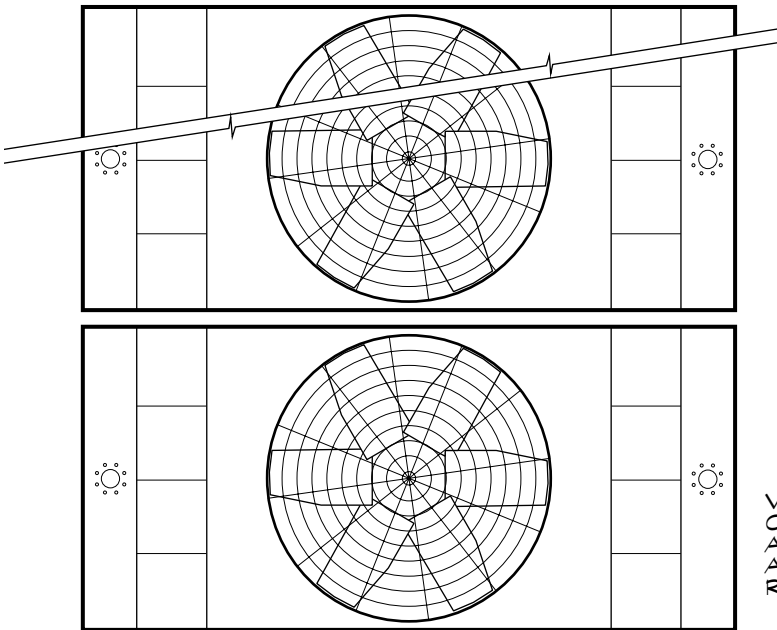
Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb	DIMENSIONS			
						W	L	H	A
NC8309AL-1	377	7 ½	63	30945	13349	22'-5" 6833mm	13'-10 ¾" 4236mm	13'-3 ¾" 4058mm	14'-2 ¼" 4325mm
NC8309BL-1	419	10	64	31003	13407				
NC8309C-1	483	15	71	30800	13204				
NC8309CL-1	481	15	67	31003	13407				
NC8309D-1	532	20	72	30861	13265				
NC8309DL-1	534	20	70	31306	13710				
NC8309E-1	575	25	73	31003	13407				
NC8309EL-1	572	25	71	31451	13855				
NC8309F-1	609	30	77	31065	13469				
NC8309FL-1	603	30	73	31517	13921				
NC8309G-1	663	40	77	31210	13614				
NC8309GL-1	661	40	74	31797	14201				
NC8309H-1	702	50	81	31276	13680				
NC8309HL-1	696	50	75	31857	14261				
NC8309J-1	741	60	83	31556	13960				
NC8309JL-1	739	60	78	32105	14509				
NC8309K-1	752	60	83	31621	14025	22'-5" 6833mm	13'-10 ¾" 4236mm	16'-10" 5131mm	14'-2 ¼" 4325mm
NC8309KL-1	750	60	78	32170	14574				

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- 2 Last numeral of model number indicates number of cells. Change as appropriate for your selection.
- 3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- 4 Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- 5 Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- 6 Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.

TOWER SCHEMATIC

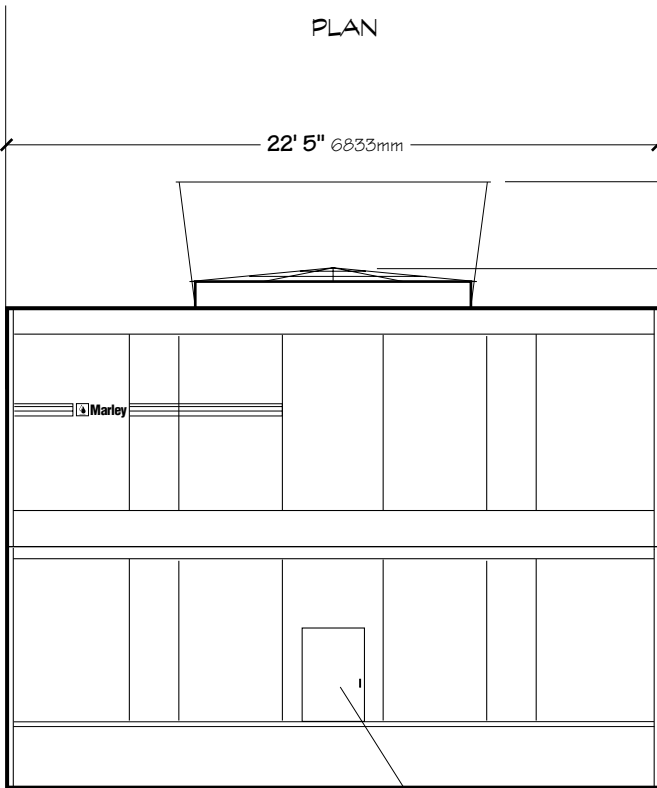
NC8310 NC8311



PLAN

VELOCITY RECOVERY
CYLINDER - MODELS NC8310K
AND NC8310KL, NC8311K, NC8311KL
AND NC8311N. FAN GUARD NOT
REQUIRED.

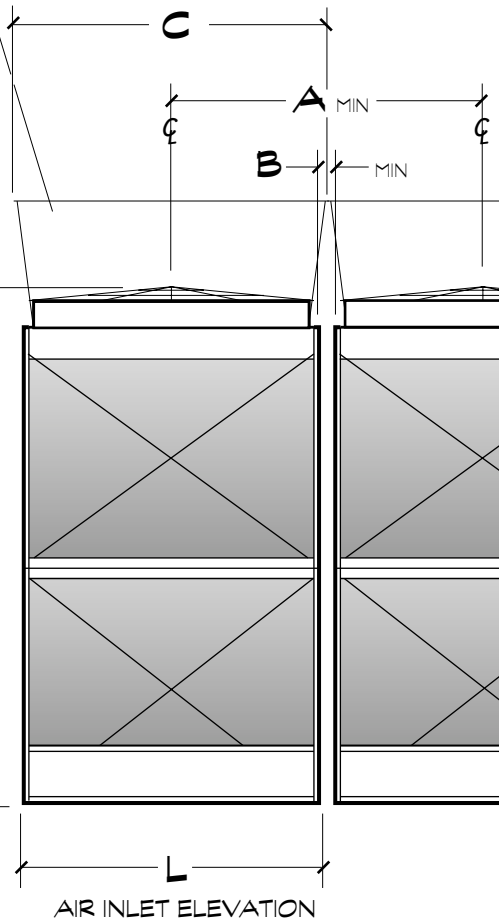
22' 5" 6833mm



SIDE ELEVATION

HINGED ACCESS
DOOR

H
INSTALLED
HEIGHT



AIR INLET ELEVATION

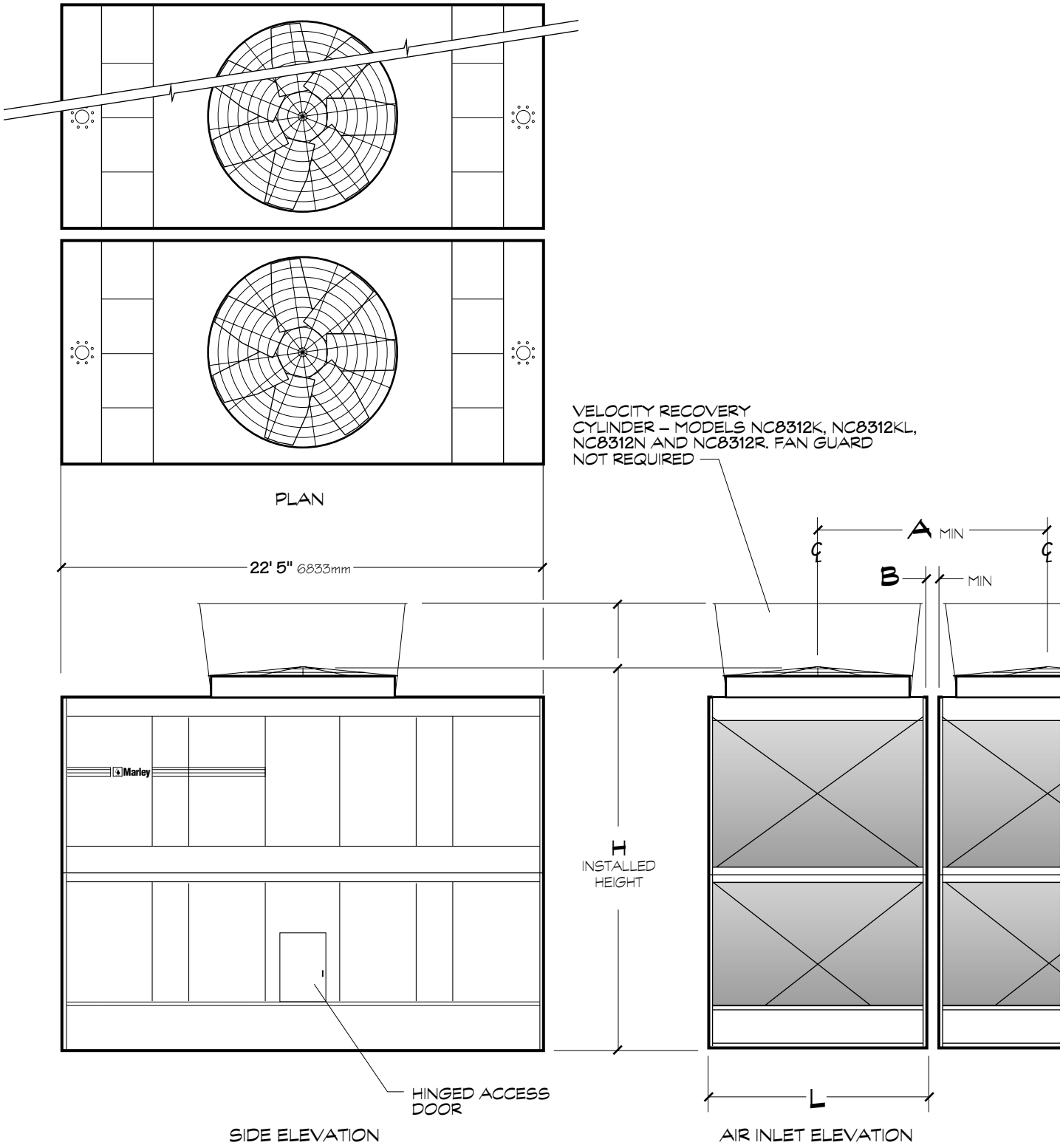
Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb		DIMENSIONS				
					Weight/Cell	Heaviest Section	L	H	A	B	C
NC8310AL-1	461	10	64	31591	13914	7152	10'-10 3/4" 3321mm	19'-9 3/4" 6039mm	11'-2 1/4" 3410mm	3 1/2" 89mm	
NC8310BL-1	516	15	67	31649	13972	7210					
NC8310C-1	567	20	70	31353	13676	6914					
NC8310CL-1	567	20	68	31711	14034	7272					
NC8310D-1	611	25	73	31411	13734	6972					
NC8310DL-1	611	25	70	31856	14179	7417					
NC8310E-1	650	30	75	31473	13796	7034					
NC8310EL-1	650	30	72	31911	14234	7472					
NC8310F-1	706	40	77	31618	13941	7179					
NC8310FL-1	718	40	75	32202	14525	7763					
NC8310G-1	784	50	78	31922	14245	7483					
NC8310GL-1	758	50	76	32262	14585	7823					
NC8310H-1	833	60	81	32202	14525	7763					
NC8310HL-1	814	60	78	32510	14833	8071					
NC8310J-1	890	75	86	32262	14585	7823					
NC8310JL-1	880	75	81	32625	14948	8186					
NC8310K-1	925	75	86	32462	14785	8023	10'-10 3/4" 3321mm	23'-4" 7112mm	11'-9 1/2" 3595mm	10 3/4" 273mm	11'-8 5/8" 3572mm
NC8310KL-1	915	75	81	32825	15148	8386					
NC8311AL-1	503	10	64	35879	16526	9029	11'-10 3/4" 3626mm	19'-9 3/4" 6039mm	12'-2 1/4" 3715mm	3 1/2" 89mm	
NC8311BL-1	579	15	67	35937	16584	9087					
NC8311C-1	635	20	70	35879	16526	9029					
NC8311CL-1	635	20	68	35999	16646	9149					
NC8311D-1	686	25	73	35937	16584	9087					
NC8311DL-1	683	25	70	36144	16791	9294					
NC8311E-1	716	30	76	36071	16718	9221					
NC8311EL-1	727	30	71	36456	17103	9606					
NC8311F-1	796	40	77	36216	16863	9366					
NC8311FL-1	792	40	73	36736	17383	9886					
NC8311G-1	849	50	78	36282	16929	9432					
NC8311GL-1	849	50	76	36796	17443	9946					
NC8311H-1	908	60	83	36562	17209	9712					
NC8311HL-1	902	60	77	37044	17691	10194					
NC8311J-1	969	75	84	36622	17219	9722					
NC8311JL-1	966	75	79	37159	17806	10309					
NC8311K-1	1000	75	84	36824	17471	9974	11'-10 3/4" 3626mm	23'-4" 7112mm	12'-9 1/2" 3899mm	10 3/4" 273mm	12'-8 5/8" 3877mm
NC8311KL-1	1000	75	79	37361	18008	10511					
NC8311N-1	1077	100	85	38291	18938	11441					

NOTE

- Use this bulletin for preliminary layouts only. Obtain current drawings from your Marley sales representative. All table data is per cell.
- Last numeral of model number indicates number of cells. Change as appropriate for your selection.
- Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.

TOWER SCHEMATIC

NC8312



Tower Model Note 2	Nominal Tons Note 3	Motor hp	dBA 5'-0" from air inlet face	Design Operating Wt/Cell lb	Shipping Weight lb		DIMENSIONS			
					Weight/Cell	Heaviest Section	L	H	A	B
NC8312AL-1	539	10	64	41973	19333	10425	13'-10 3/4" 4236mm	19'-9 3/4" 6039mm	14'-2 1/4" 4325mm	3 1/2" 89mm
NC8312BL-1	626	15	66	42119	19479	10571				
NC8312C-1	694	20	71	41915	19275	10367				
NC8312CL-1	687	20	67	42119	19479	10571				
NC8312D-1	753	25	72	41973	19333	10425				
NC8312DL-1	753	25	69	42504	19864	10956				
NC8312E-1	787	30	73	42119	19479	10571				
NC8312EL-1	792	30	70	42570	19930	11022				
NC8312F-1	873	40	74	42264	19624	10716				
NC8312FL-1	865	40	71	42850	20210	11302				
NC8312G-1	950	50	75	42330	19690	10782				
NC8312GL-1	947	50	73	42910	20270	11362				
NC8312H-1	1003	60	79	42610	19970	11062				
NC8312HL-1	1000	60	75	43158	20518	11610				
NC8312J-1	1065	75	84	42671	20030	11122				
NC8312JL-1	1066	75	78	43840	21200	12292				
NC8312K-1	1102	75	84	42896	20256	11348	13'-10 3/4" 4236mm	23'-4" 7112mm	14'-2 1/4" 4325mm	3 1/2" 89mm
NC8312KL-1	1102	75	78	44066	21426	12518				
NC8312N-1	1200	100	83	44429	21789	12881				
NC8312R-1	1274	125	85	44714	22074	13166				

NOTE

- 1 Use this bulletin for preliminary layouts only. Obtain current drawings from your Marley sales representative. All table data is per cell.
- 2 Last numeral of model number indicates number of cells. Change as appropriate for your selection.
- 3 Nominal tons are based upon 95°F HW, 85°F CW, 78°F WB and 3 GPM/ton.
- 4 Standard overflow is a 4" dia. standpipe in the collection basin floor. The standpipe removes for flush-out and draining. See page 30 for side overflow option.
- 5 Outlet sizes vary according to GPM and arrangement. See pages 30 and 31 for outlet sizes and details.
- 6 Makeup water connection may be 1" or 2" dia., depending upon tower heat load, water pressure, and desired connections. See page 25 for additional information.

GET CONNECTED

Tired of having to design your piping and tower layout to accommodate the standards of cooling tower manufacturers? Marley's SystemConnect™ variety of piping systems accommodates your design intentions to make your layout of the NC Class both expedient and economical.

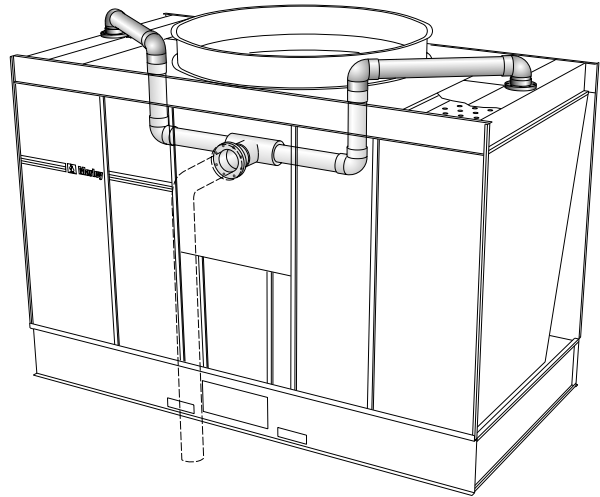
- Single or dual hot water inlet connections.
- Side inlet, bottom inlet or top inlet connections.
- Side or bottom cold water outlet connections.
- A variety of makeup, overflow and drain options.

All piping from the single inlet connection to the distribution basins is part of the tower package. Installation and design costs are reduced and the need for extra piping and supports are eliminated. The single bottom inlet connection is perfect for multicell applications—keeping all the inlet piping below the tower.

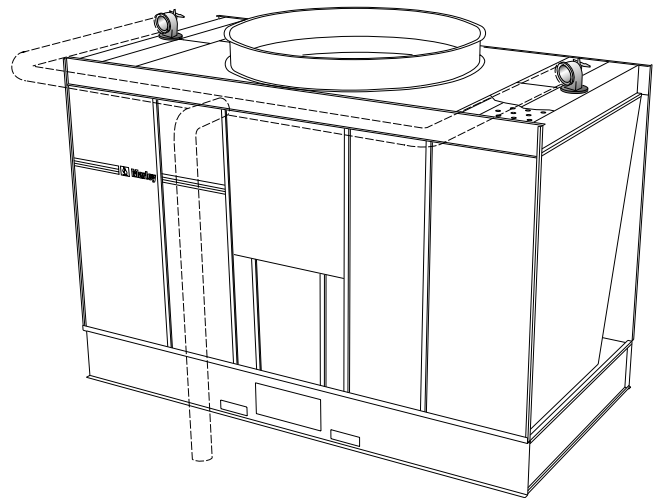
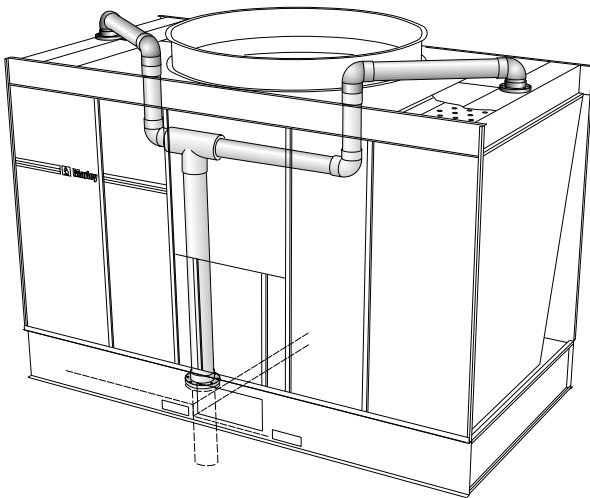
Unless otherwise specified, single-cell towers normally have a side-outlet suction appropriate for the design water flow rate—see pages 30 and 31. This usually assures the lowest possible installed tower elevation. Side-suction connection pipes extend roughly 3" outside the basin, and are beveled for weld connection and also grooved for a mechanical coupling.

Outlet piping can be kept below the cold water basin level by choosing either a depressed sump or a bottom outlet connection in lieu of the side suction. Both outlet designs conform to standard class 125 ANSI pipe flange specifications. Easily removable debris screens are optional on bottom outlets and are standard on all other outlet arrangements.

Depressed sumps are made of inert FRP or heavy-gauge welded stainless steel. Unless otherwise specified towers with galvanized steel collection basins are supplied with FRP sumps and towers with stainless steel basins are supplied with stainless sumps.



Multicell towers, intended to operate together as a common unit, are joined by steel flumes between the collection basins. These flumes equalize the operating water level between basins and also provide a flow passage from cells not equipped with outlets or makeup valves, often eliminating the need to specify an outlet and makeup valve for each cell on a multicell installation. Select the number of outlets required to maintain a maximum flow of 1,371 GPM through each flume for NC8301 through NC8306 and NC8308 models and 2,203 GPM for NC8307 and NC8309 through NC8312 models. Flow values are for side-suctions or bottom-outlets without trash screen. Refer to NC sales drawings to obtain flow values for sumps and bottom outlets with trash screens.



If each cell is to be equipped with an outlet, side-suctions can be used on end cells of multicell towers, but not on interior cells. For direct outlet from each cell on installations of three or more cells, use either the depressed sump or bottom outlet on interior cells.

The best choice for a tower used with a remote or indoor storage tank—see page 34—or on a concrete cold water basin is usually a bottom outlet.

A side-suction equipped tower can be installed on a flat concrete slab if a side drain and overflow are also specified—see page 30. Consult your Marley sales representative for complete information.

Makeup

The amount of water constantly evaporated from a cooling tower varies directly with the heat load applied. In addition to evaporation, water is normally lost to the blow-down (bleed-off) necessary to maintain dissolved solids concentration at an acceptable level in the circulating water system.

The NC is equipped with one or more float-operated, mechanical makeup valves to automatically replenish this lost water. The tables on this page, calculated for a concentration of 3 times normal, indicate the rate of water loss—and the size of valve(s) required. If your installation’s cold water basin will drain by gravity to a remote storage tank—or if you plan a separate means of controlling makeup water—a price reduction is available for deleting the Marley-supplied valve(s). Marley also offers an optional electronic liquid-level control.

Makeup Water Flow Required—GPM to Maintain Three (3) Concentrations						
Tower GPM	Cooling "Range" (hot water minus cold water)					
	5° F	10° F	15° F	20° F	30° F	40° F
200	2	3	4	5	8	10
400	3	5	8	10	15	20
600	4	8	12	15	23	30
800	5	10	15	20	30	40
1,000	7	13	19	25	38	50
1,500	10	19	29	38	57	75
2,000	13	25	38	50	75	100
3,000	19	38	57	75	113	150
4,000	25	50	75	100	150	200
5,000	32	63	94	125	188	250
6,000	38	75	113	150	225	300
8,000	50	100	150	200	300	400

NOTE

If circulating water is to be maintained at 2 concentrations instead of 3, multiply table GPM values by 1.36 before sizing makeup valve.

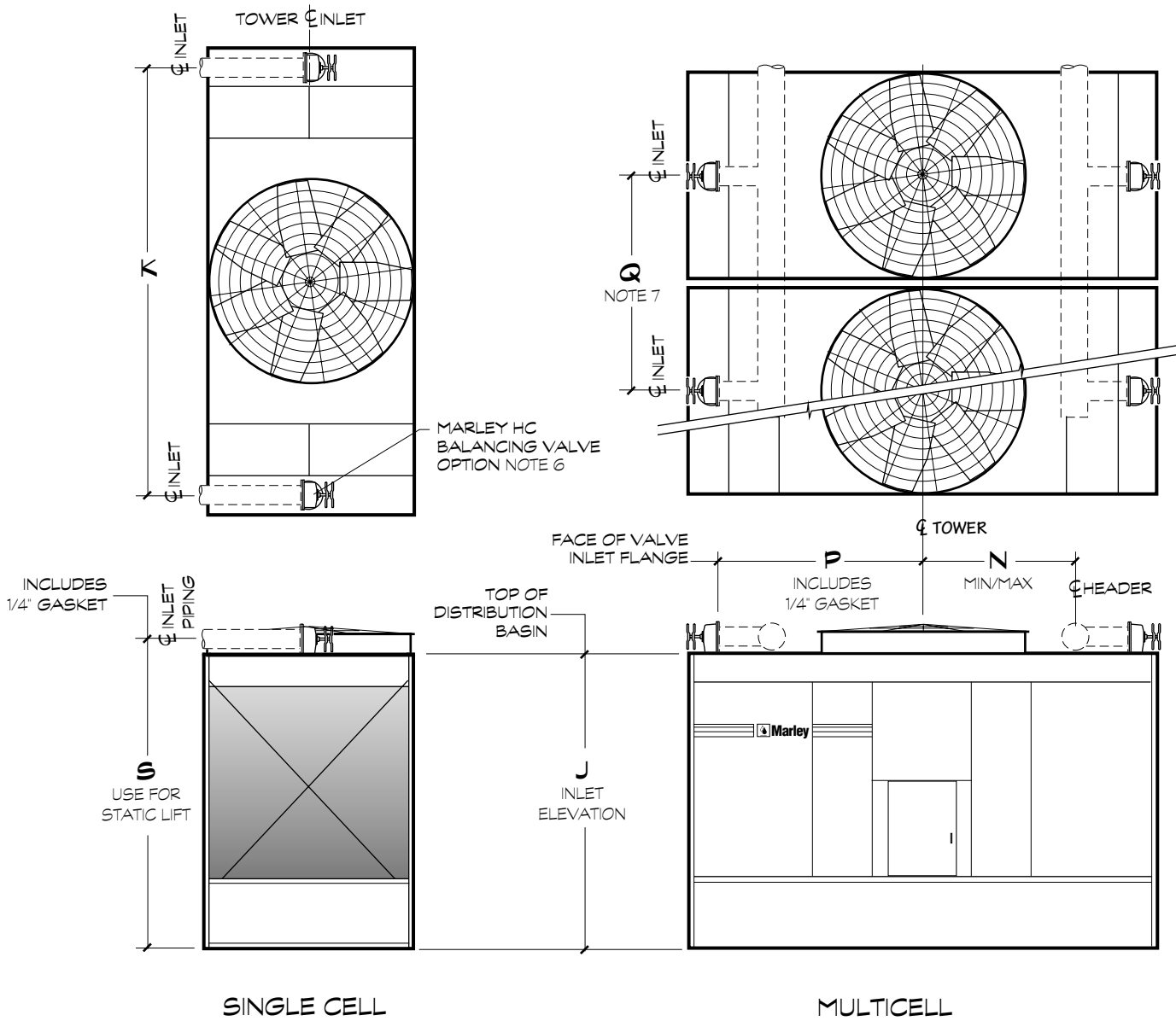
Makeup Valve Flow Capacities—GPM		
Pressure at Valve Inlet while flowing—psig	1" Diameter Valve	2" Diameter Valve
10	56	90
20	78	120
30	92	143
40	106	160
50	117	167

NOTE

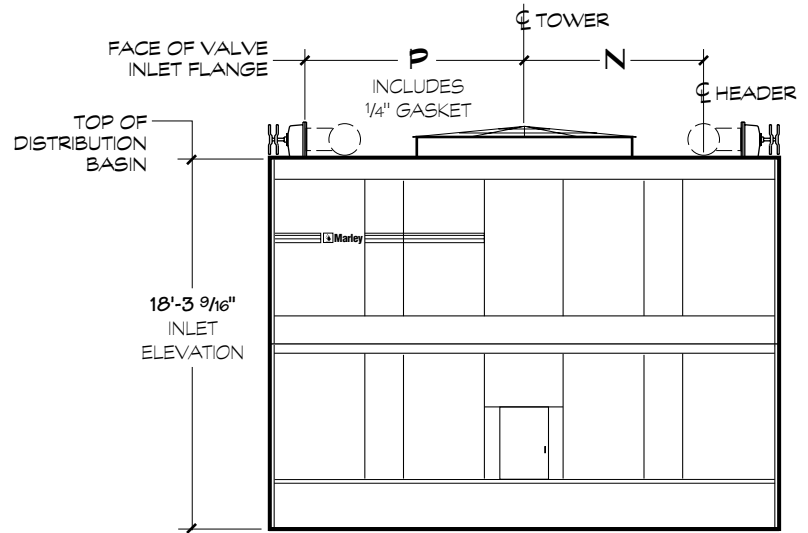
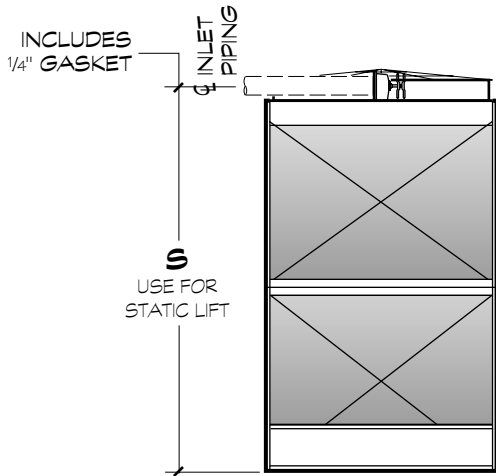
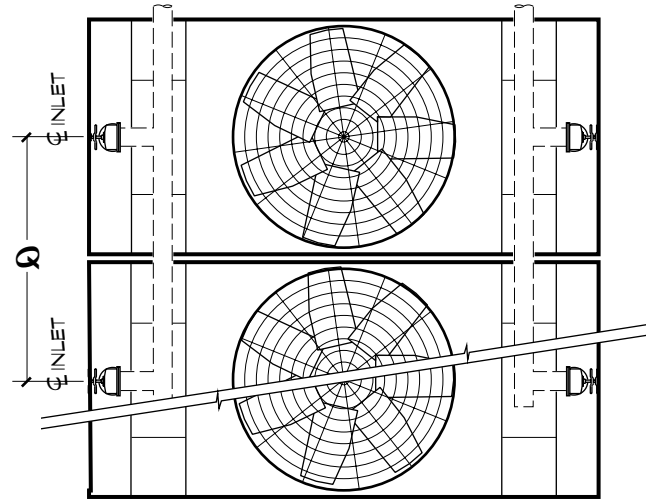
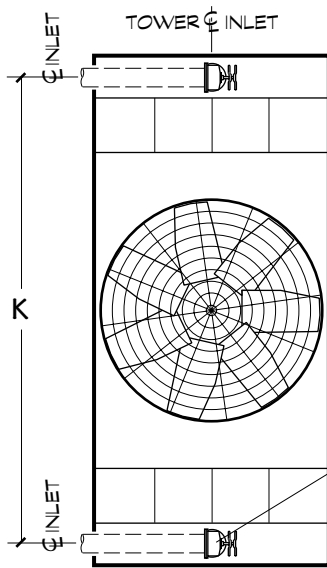
- If makeup water pressure exceeds 50 psig, use pressure reducer ahead of valve.
- For flow requirements exceeding the above limitations, use multiples of the same size valve.

SYSTEM CONNECT

DUAL INLET CONNECTION



Tower Model	DIMENSIONS						Inlet Diameter	
	J	K	S	N MIN/MAX		P		Q
NC8301	8'-8 1/16"	12'-3"	9'-4 15/16"	3'-11 1/2"	4'-10"	5'-10"	6'-8 1/4"	2 at 6"
NC8302	8'-8 1/16"	13'-9"	9'-4 15/16"	5'-10 1/4"	Fit "P"	6'-7"	8'-2 1/4"	2 at 6"
NC8303	10'-5 9/16"	13'-9"	11'-1 13/16"	5'-10 1/4"	Fit "P"	6'-7"	8'-2 1/4"	2 at 6"
NC8304	11'-5 9/16"	15'-3"	12'-1 13/16"	5'-10 1/4"	Fit "P"	7'-4"	9'-2 1/4"	2 at 6"
NC8305	11'-5 9/16"	16'-10"	12'-2 13/16"	5'-11 3/4"	Fit "P"	8'-1 1/2"	11'-2 1/4"	2 at 8"
NC8306	11'-5 9/16"	17'-11"	12'-2 13/16"	6'-1 5/8"	Fit "P"	8'-8"	12'-2 1/4"	2 at 8"
NC8307	11'-9 9/16"	20'-6"	12'-6 13/16"	6'-1 5/8"	Fit "P"	9'-11 1/2"	12'-2 1/4"	2 at 8"
NC8308	11'-5 9/16"	20'-6"	12'-2 13/16"	6'-10 5/8"	Fit "P"	9'-11 1/2"	14'-2 1/4"	2 at 8"
NC8309	11'-9 9/16"	20'-3 1/2"	12'-8 13/16"	6'-10 5/8"	Fit "P"	9'-9 1/2"	14'-2 1/4"	2 at 10"



SINGLE CELL

MULTICELL

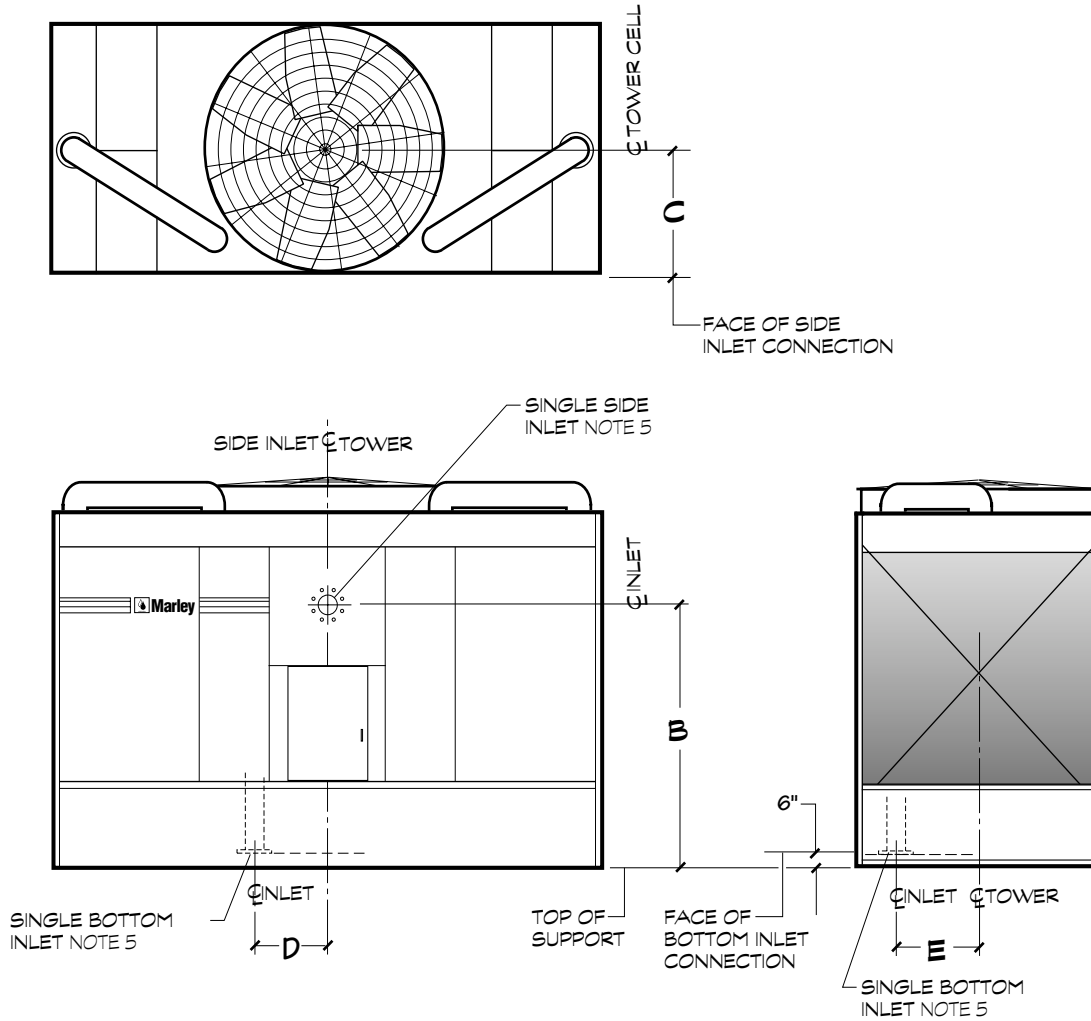
Tower Model	DIMENSIONS					Inlet Diameter
	K	S	N	Q	P	
NC8310AL thru NC8310JL	20'-6"	19'-0 13/16"	6'-1 5/8"	11'-2 1/4"	9'-11 1/2"	2 at 8"
NC8310K and NC8310KL	20'-6"	19'-0 13/16"	6'-1 5/8"	11'-9 1/2"	9'-11 1/2"	2 at 8"
NC8311AL thru NC8311JL	20'-6"	19'-0 13/16"	6'-1 5/8"	12'-2 1/4"	9'-11 1/2"	2 at 8"
NC8311K thru NC8311N	20'-6"	19'-0 13/16"	6'-1 5/8"	12'-9 1/2"	9'-11 1/2"	2 at 8"
NC8312	20'-3 1/2"	19'-2 9/16"	6'-10 5/8"	14'-2 1/4"	9'-9 1/2"	2 at 10"

NOTE

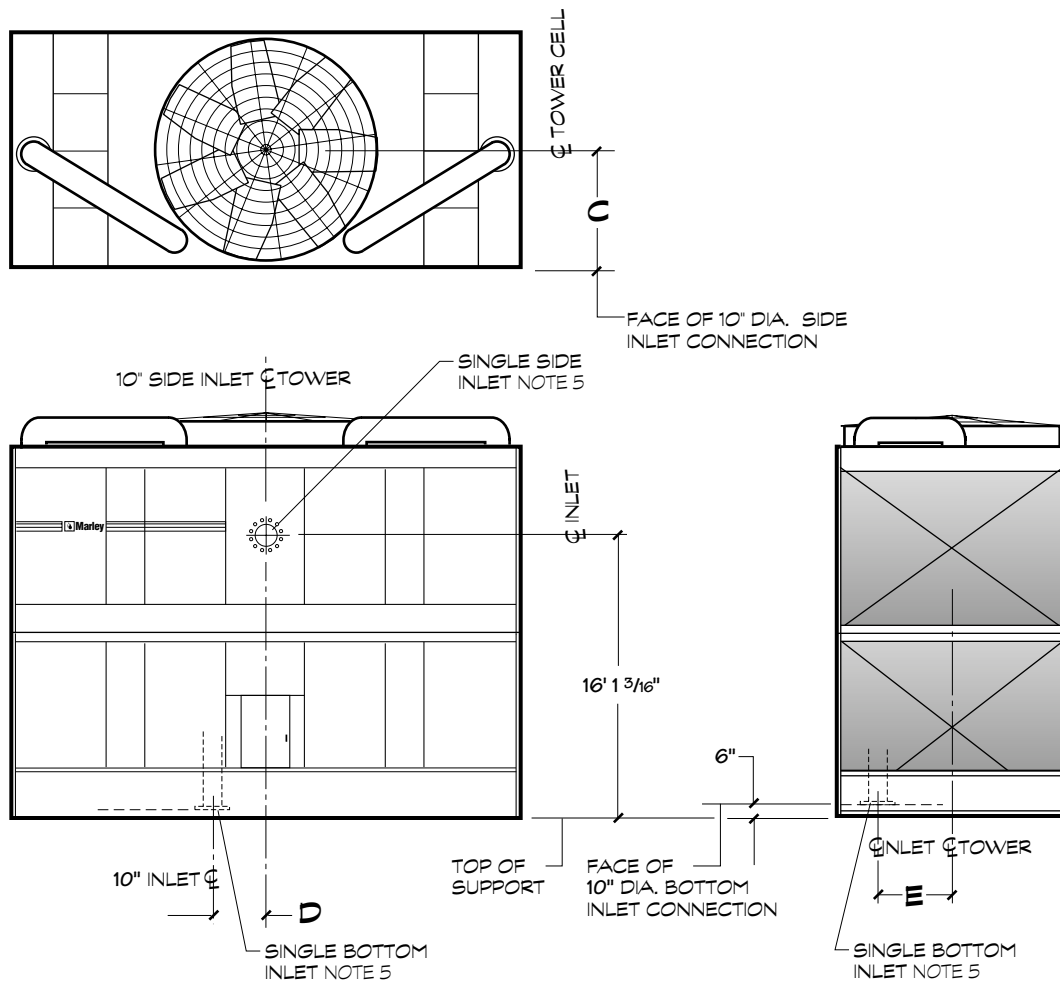
- 1 Use this bulletin for preliminary layouts only. Obtain current drawings from your Marley sales representative.
- 2 Pumping head contributed by the tower is static lift "S". Add your system dynamic pipe losses for total.
- 3 The tower will support the vertical weight of piping shown within the plan area of the tower only. All piping loads, including thrust and lateral loads of riser and horizontal piping must be supported independent of the tower. See inlet piping drawings for details.
- 4 All piping and supports—and their design—are by others.
- 5 Allow adequate clearance for entry to tower access doors and safe use of optional ladder. Refer to appropriate Marley drawings.
- 6 You may choose to use 90° short radius flanged elbows in place of HC balancing valves on single-cell towers where inlet piping is balanced for equal flow. Pipe elevation remains as shown.
- 7 Because of the motor enclosure protrusion models NC8301E, NC8301EL and NC8301F requires special spacing for 3 or more cells.

SYSTEM CONNECT

SINGLE INLET CONNECTION OPTION



Tower Model	DIMENSIONS				Inlet Diameter
	B	C	D	E	
NC8301	6'-8 1/4"	3'-0 5/16"	2'-8"	1'-11 13/16"	6"
NC8302	6'-6 15/16"	3'-9 5/16"	2'-8"	2'-5 5/16"	8"
NC8303	8'-3 13/16"	3'-9 5/16"	2'-8"	2'-5 5/16"	8"
NC8304	9'-3 13/16"	4'-3 5/16"	2'-10 3/8"	2'-11 5/16"	8"
NC8305	9'-3 3/16"	5'-3 5/16"	2'-8 7/8"	3'-10 1/8"	10"
NC8306	9'-3 3/16"	5'-9 5/16"	2'-8 7/8"	4'-4 1/8"	10"
NC8307	9'-7 3/16"	5'-9 5/16"	2'-8 7/8"	4'-4 1/8"	10"
NC8308	9'-3 3/16"	6'-9 5/16"	2'-4"	3'-9"	10"
NC8309	9'-7 3/16"	6'-9 5/16"	2'-4"	3'-9"	10"



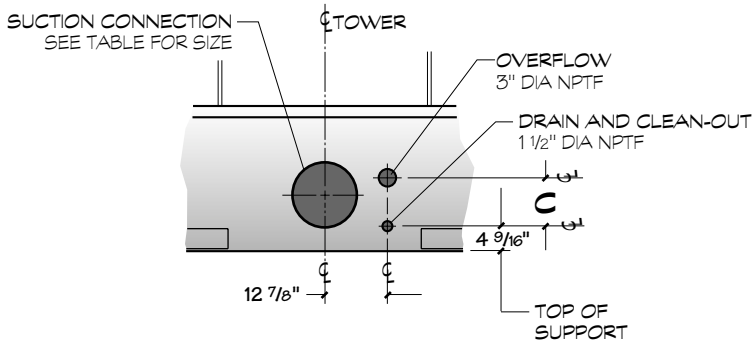
Tower Model	DIMENSIONS		
	C	D	E
NC8310	5'-3 5/16"	2'-8 7/8"	3'-10 1/8"
NC8311	5'-9 5/16"	2'-8 7/8"	4'-4 1/8"
NC8312	6'-9 5/16"	2'-4"	3'-9"

NOTE

- 1 Use this bulletin for preliminary layouts only. Obtain current drawings from your Marley sales representative.
- 2 All external piping loads, including weight, thrust and lateral loads of riser and horizontal piping plus the weight of water in the internal riser must be supported independent of the tower. Internal riser adds additional vertical operating loads to external piping at the bottom inlet flange.
- 3 All piping and supports beyond the inlet connection—and their design—are by others.
- 4 Allow adequate clearance for entry to tower access doors and safe use of optional ladder. Refer to appropriate Marley drawings.
- 5 You may choose either a bottom inlet connection or a side inlet connection. The bottom inlet connects at the tower collection basin floor. Refer to appropriate Marley drawings.
- 6 Contact your Marley sales representative for the required pump head for single-inlet applications.
7. Weight of internal piping must be added to tower weights. Contact your Marley sales representative for combined tower weight information.

SYSTEM CONNECT

OUTLET CONNECTION

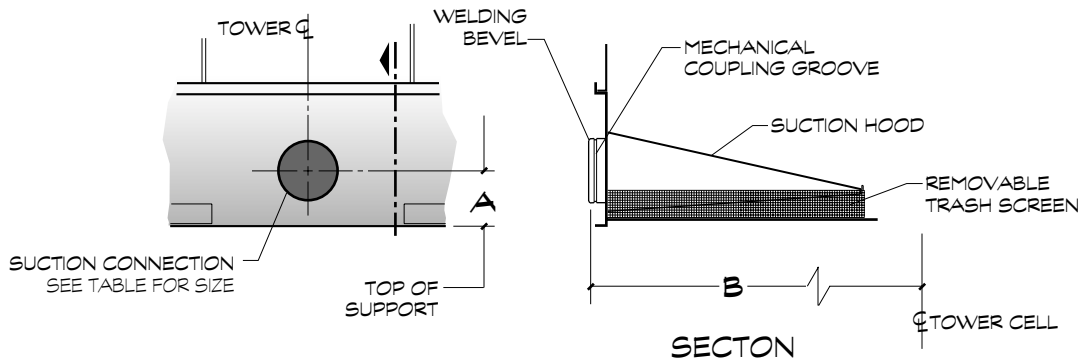


DRAIN AND OVERFLOW CONNECTION
OPTION

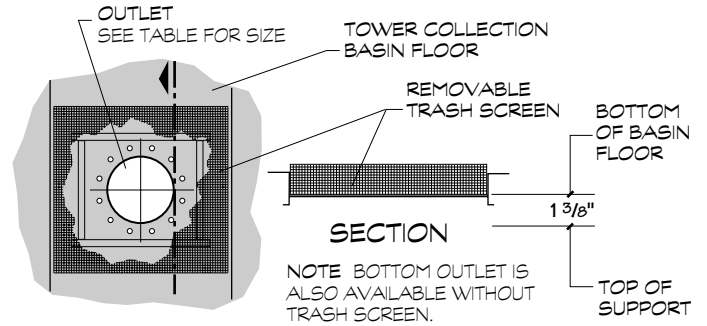
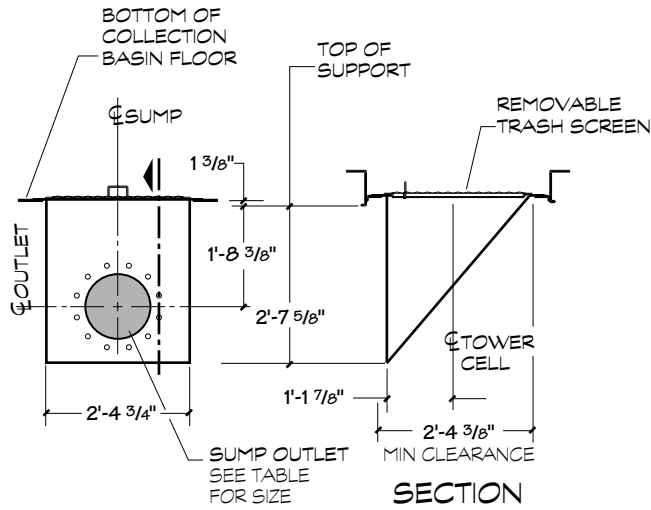
Tower Model	DIMENSIONS		
	A	B	C
NC8301	10"	3'-3 3/16"	6 7/8"
NC8302	10"	4'-0 3/16"	6 7/8"
NC8303	10"	4'-0 3/16"	6 7/8"
NC8304	10"	4'-6 3/16"	6 7/8"
NC8305	10"	5'-6 3/16"	6 7/8"
NC8306	10"	6'-0 3/16"	6 7/8"
NC8307	11 1/4"	6'-0 3/16"	10 3/16"
NC8308	10"	7'-0 3/16"	6 7/8"
NC8309	11 1/4"	7'-0 3/16"	10 3/16"
NC8310	11 1/4"	5'-6 3/16"	10 3/16"
NC8311	11 1/4"	6'-0 3/16"	10 3/16"
NC8312	11 1/4"	7'-0 3/16"	10 3/16"

NOTE

Standard overflow is a 4" dia. standpipe in the collection basin floor.
The standpipe removes for flush-out and draining.



SIDE-OUTLET SUCTION CONNECTION



BOTTOM OUTLET CONNECTION

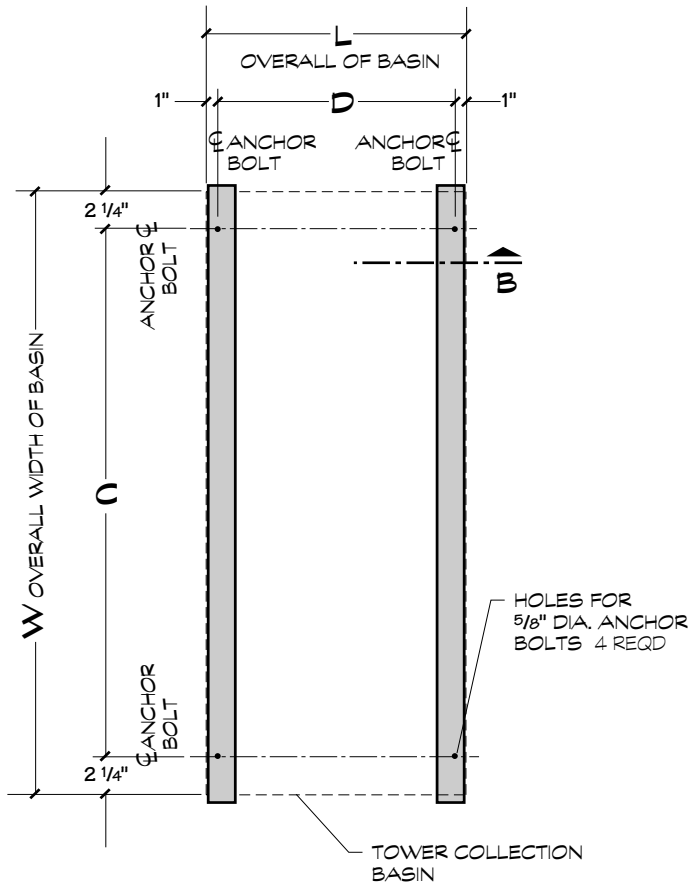
DEPRESSED SIDE-OUTLET SUMP CONNECTION STAINLESS STEEL OR FRP

Maximum GPM per Outlet								
Outlet Dia	Side Suction pump flow		Sump pump flow w/o anti-vortex plate	Sump pump flow w/ anti-vortex plate or gravity flow w/ or w/o anti-vortex plate		Bottom Outlet pump flow w/o anti-vortex plate	Bottom Outlet pump flow w/ anti-vortex plate or gravity flow w/ or w/o anti-vortex plate	
	NC8301 thru NC8306 and NC8308	NC8307 and NC8309 thru NC8312	NC8301 thru NC8312	NC8301 thru NC8306 and NC8308	NC8307 and NC8309 thru NC8312	NC8301 thru NC8312	NC8301 thru NC8306 and NC8308	NC8307 thru NC8309 thru NC8312
4"						71	157	
6"	900		630	895	900	162	355	
8"	1,595	1,595	1,116	1,584	1,595	287	629	673
10"	2,515	2,515	1,760	2,498	2,515	453	992	1,061
12"	2,720 NC8301 thru NC8304	3,578	2,504	3,458	3,578	644	1,412	1,509
	3,501 NC8305 NC8306 NC8308							
14"		4,252	3,065	3,458	4,378	788	1,728	1,847
16"						1,041	2,283	2,441
18"						1,349	2,958	3,162
20"						1,675	3,321	4,045
24"						2,433	4,018	4,897

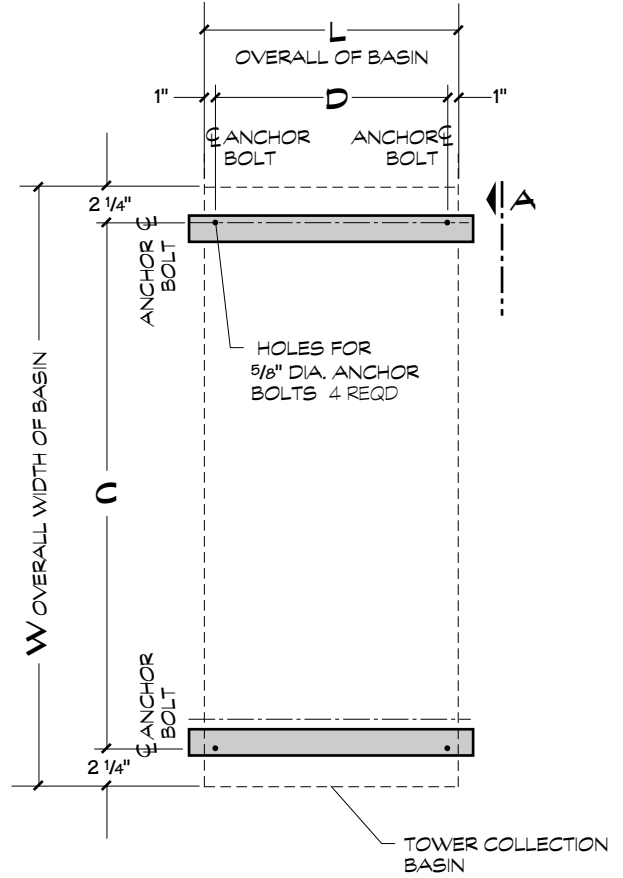
NOTE

- For gravity-flow situations (as to an indoor tank), use bottom outlet or depressed side outlet sump. **Side outlet suction is not recommended for gravity flow.**
- GPM limits are the outlet capacities per outlet based on the design operating water level—8½" above the top of support on models NC8301 through NC8306 and NC8308—9½" on NC8307, and NC8309 thru NC8312.

TOWER SUPPORT

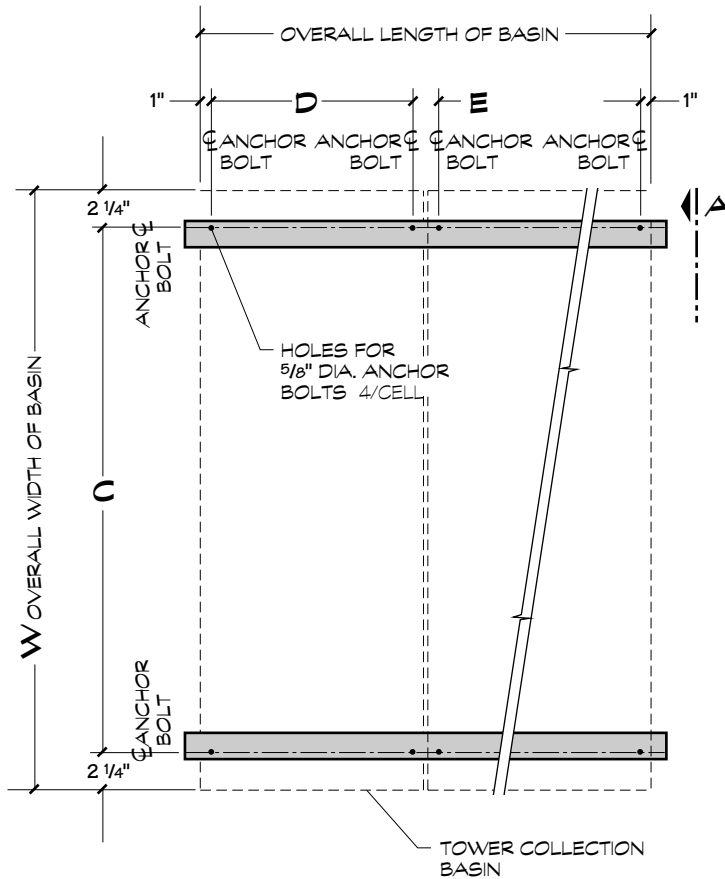


SUPPORTING STEEL
SINGLE CELL

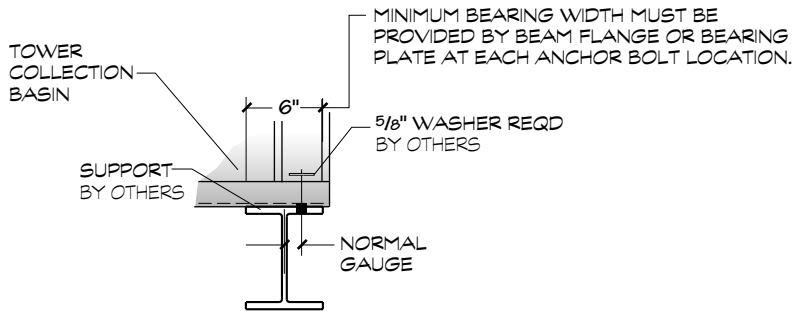


SUPPORTING STEEL ALTERNATE
SINGLE CELL

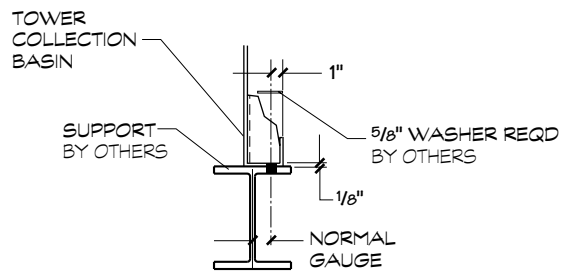
Tower Model	DIMENSIONS					Design Operating Wt/Cell lb	Design Operating Load at Anchor lb	Wind/Seismic Loads lb	
	W	L	C	D	E Note 7			Max. Vertical Reaction at Anchor	Max. Horizontal Reaction at Anchor
NC8301	14'-0" 4268mm	6'-4 3/4" 1950mm	13'-7 1/2" 4153mm	6'-2 3/4" 1899mm	5 1/2" 140mm	9245	2311	1364/1056	943/693
NC8302	15'-6" 4725mm	7'-10 3/4" 2407mm	15'-1 1/2" 4611mm	7'-8 3/4" 2356mm	5 1/2" 140mm	11699	2925	1221/1092	1046/877
NC8303	15'-6" 4725mm	7'-10 3/4" 2407mm	15'-1 1/2" 4611mm	7'-8 3/4" 2356mm	5 1/2" 140mm	12214	3054	1737/1413	1248/916
NC8304	17'-0" 5182mm	8'-10 3/4" 2712mm	16'-7 1/2" 5068mm	8'-8 3/4" 2661mm	5 1/2" 140mm	14919	3730	2019/1827	1498/1119
NC8305	18'-9" 5715mm	10'-10 3/4" 3321mm	18'-4 1/2" 5601mm	10'-8 3/4" 3271mm	5 1/2" 140mm	19528	4882	1803/2585	1648/1465
NC8306	19'-10" 6046mm	11'-10 3/4" 3626mm	19'-5 1/2" 5931mm	11'-8 3/4" 3576mm	5 1/2" 140mm	22254	5564	1759/2995	1750/1725
NC8307	22'-5" 6833mm	11'-10 3/4" 3626mm	22'-0 1/2" 6719mm	11'-8 3/4" 3576mm	5 1/2" 140mm	27004	6751	2090/2558	2029/2025
NC8308AL thru NC8308JL	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	28474	7118	1704/2517	1982/2136
NC8308K and NC8308KL	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	28539	7135	2164/2540	2200/2140
NC8309AL thru NC8309JL	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	32105	8026	1801/3051	2037/2408
NC8309K and NC8309KL	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	32170	8042	2271/3155	2256/2413
NC8310AL thru NC8310JL	22'-5" 6833mm	10'-10 3/4" 3321mm	22'-0 1/2" 6719mm	10'-8 3/4" 3271mm	5 1/2" 140mm	32625	8156	5405/4561	3121/2447
NC8310K and NC8310KL	22'-5" 6833mm	10'-10 3/4" 3321mm	22'-0 1/2" 6719mm	10'-8 3/4" 3271mm	1'-0 3/4" 324mm	32825	8206	2606/4597	3304/2462
NC8311AL thru NC8311JL	22'-5" 6833mm	11'-10 3/4" 3626mm	22'-0 1/2" 6719mm	11'-8 3/4" 3576mm	5 1/2" 140mm	37159	9290	4958/5254	3126/2787
NC8311K thru NC8311N	22'-5" 6833mm	11'-10 3/4" 3626mm	22'-0 1/2" 6719mm	11'-8 3/4" 3576mm	1'-0 3/4" 324mm	37361	9340	5779/5457	3353/2872
NC8312AL thru NC8312JL	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	43840	10960	4248/6474	3131/3288
NC8312K thru NC8312R	22'-5" 6833mm	13'-10 3/4" 4236mm	22'-0 1/2" 6719mm	13'-8 3/4" 4185mm	5 1/2" 140mm	44714	11179	4971/6631	3364/3354



SUPPORTING STEEL
MULTICELL



VIEW A



SECTION B

NOTE

- 1 **Use this bulletin for preliminary layouts only.** Obtain current drawings from your Marley sales representative for final design.
- 2 Purchaser to provide tower support complete with holes and anchor bolts. Do not use studs! Anchor points must be framed flush and level at top.
- 3 Design operating weight occurs with collection basin full to overflow level. Actual operating weight varies with GPM and piping scheme.
- 4 Wind loads are based on 30 psf and are additive to operating loads. Seismic loads based on .3g.
- 5 Tower may be placed on a flat concrete slab. Side outlet and optional side drain and overflow must be specified. See pages 24 and 30 and consult your Marley sales representative.
- 6 Tower may be supported from piers at each anchor bolt location, as a support alternative.
7. Dimensions between anchor bolts "E" may vary depending on the number of cells and options. Dimensions shown are for a standard two cell arrangement. Obtain current drawings from your Marley sales representative for final dimension.

FREEZE PREVENTION

When the ambient air temperature falls below 32°F, the water in a cooling tower can freeze. *Marley Technical Report #H-003 “Operating Cooling Towers in Freezing Weather”* describes how to prevent freezing during operation. Ask your Marley sales representative for a copy.

During shutdown, water collects in the cold water basin and may freeze solid. You can prevent freezing by adding heat to the water left in the tower—or, you can drain the tower and all exposed pipework at shutdown.

Electric Basin Heaters

Marley offers an automatic basin water heater system, consisting of the following components:

- Stainless steel electric immersion heater(s).
—Threaded couplings are provided in the side of the collection basin.
- NEMA 4 enclosure containing:
—Magnetic contactor to energize heater.
—Transformer to convert power supply to 24 volts for control circuit.
—Solid state circuit board for temperature and low-water cutoff.
Enclosure may be mounted on the side of the tower.
- Control probe in the collection basin to monitor water temperature and level.

Heater components are normally shipped separately for installation by others.

Note: any exposed piping that is still filled with water at shutdown—including the makeup water line—should be electrically traced and insulated (by others).

Steam Jet Basin Heaters

Penberthy Houdaille bronze steam jet heaters ($\frac{1}{4}$ " to $\frac{3}{4}$ ") are available from Marley for freeze protection (installation by others). Injectors install in a coupling provided in the side of the collection basin. Live steam, as required, is injected directly into the water. Condensed steam adds water to the basin, and the excess will exit the overflow of the tower.

Indoor Storage Tank

With this type of system, water flows from an indoor tank, through the load system, and back to the tower, where it is cooled. The cooled water flows by gravity from the tower to the tank located in a heated space. At shutdown, all exposed water drains into the tank, where it is safe from freezing.

The table on page 35 lists typical drain-down capacities for all NC Class tower models. Although Marley does not produce tanks, many of our representatives offer tanks supplied by reputable manufacturers.

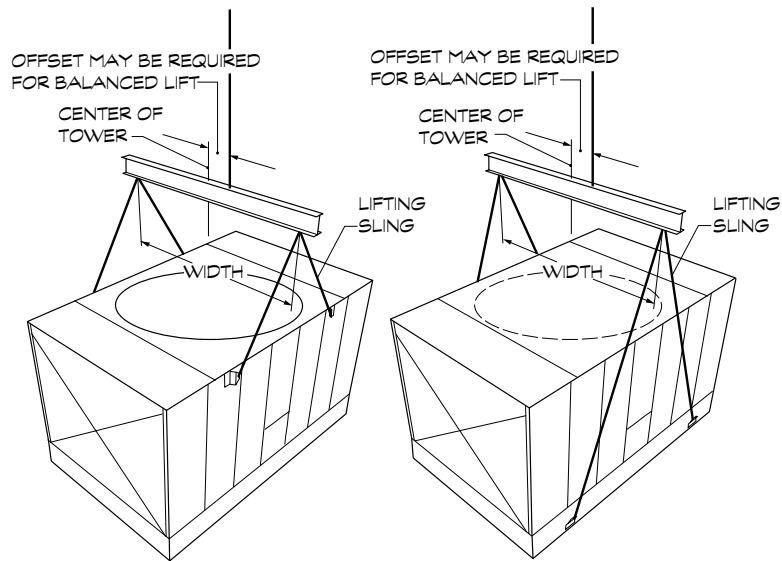
The amount of water needed to successfully operate the system depends on the tower size and GPM and on the volume of water contained in the piping system to and from the tower. You must select a tank large enough to contain those combined volumes—plus a level sufficient to maintain a flooded suction on your pump. Control makeup water according to the level where the tank stabilizes during operation.

NC Class Drain Down Capacity					
Tower Model	Range of Tower Design GPM	Maximum Gallons of Drain-Down	Tower Model	Range of Tower Design GPM	Maximum Gallons of Drain-Down
NC8301	130-280	391	NC8307	480-830	1256
	290-480	413		840-1440	1415
	490-700	436		1450-2090	1508
	710-920	458		2100-2730	1589
	930-1200	476		2740-3410	1656
NC8302	160-340	488	NC8308	480-1040	1231
	350-500	512		1050-1640	1318
	510-680	531		1650-2090	1384
	690-1140	578		2100-2730	1463
	1150-1530	601		2740-3620	1557
NC8303	160-340	585	NC8309	480-1220	1575
	350-500	546		1230-1930	1683
	510-680	570		1940-2460	1762
	690-1140	627		1270-3210	1855
	1150-1530	656		3220-4100	1962
NC8304	190-390	622	NC8310	350-630	1394
	400-570	655		640-950	1507
	580-770	683		960-1320	1607
	780-1290	755		1330-1910	1746
	1300-1730	791		1920-3120	1974
NC8305	310-650	928	NC8311	480-690	1526
	660-940	977		700-1040	1649
	950-1280	1029		1050-1440	1755
	1290-2140	1146		1450-2090	1909
	2150-2810	1208		2100-3410	2156
NC8306	340-710	1019	NC8312	480-810	1773
	720-1240	1115		820-1220	1917
	1250-1790	1189		1230-1690	2042
	1800-2340	1258		1700-2460	2226
	2350-3080	1325		2470-4100	2549

NOTE

Volumes shown are maximums for the GPM ranges indicated. Actual volumes will usually be less. Contact your Marley sales representative for more specific information.

HOISTING INFORMATION



Model	Width	Minimum Sling Length
NC8301	6'-6"	5'-6"
NC8302-NC8303	8'-0"	7'-0"
NC8304	9'-0"	8'-6"
NC8305	11'-0"	8'-6"
NC8306	12'-0"	8'-6"
NC8307	12'-0"	10'-0"
NC8308-NC8309	14'-0"	17'-5"
NC8310 Top	11'-0"	10'-0"
NC88310 Bottom	11'-0"	17'-6"
NC8311 Top	12'-0"	10'-0"
NC8311 Bottom	12'-0"	17'-6"
NC8312 Top	14'-0"	10'-0"
NC8312 Bottom	14'-0"	17'-6"

NOTE

- All hoisting clip holes are 1¼".
- Overall length of shackle pins should not exceed 5¼".
- For overhead lifts or where additional safety is required, add slings beneath the tower unit.



Marley Cooling Tower

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In the interest of technological progress, all products are subject to design and/or material change without notice.

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