Cross Flow Horizontal Discharge Cooling Towers



FRS Series Cross Flow Cooling Towers







FRS Series

Cross Flow Design

Protec FRS Series cooling towers are factory or field assembled, cross flow cooling towers, designed to serve commercial, institutional and industrial loads. The range of cooling towers offered in the FRS Series is for single, double and multi-cell configurations. This heavy-duty cooling tower designed of non-corrosive materials is energy efficient and its cross flow design offers ease of maintenance. All major components of the Protec FRS Series: motors, axial fans, fan drive assembly and fill/media have been developed to ensure maximum efficiency with low energy consumption. The FRS Series' small footprint provides space savings, ensuring the cooling tower meets the limited space requirements of new construction projects as well as the strict space requirements of replacement projects.

Design Features





The FRP open type gravity flow hot water distribution system is non-corrosive and is designed for non-clogging operation and ease of inspection.

STEEL STRUCTURE & FASTENERS

All supporting steel members are available in stainless steel or galvanized. All fasteners are stainless steel.

FILL/MEDIA

The special designed fill is vacuum formed of PVC film with chemical and distortion resistance and is suitable for operation with inlet water of 130 degrees F. The configuration of the filler incorporates the function of drift eliminator, louver and wet deck surface.

MOTOR & DRIVE

The fan motors are totally enclosed fan cooled (TEFC) foot mounting. The fans are belt driven and are located in the fan stack ensuring free, and smooth air discharge together with high efficiency and low energy consumption.





AXIAL FAN

Corrosion resistant fan blades are adjustable pitch for maximum utilization of rated horsepower and optimum performance. The aerodynamic shape together with tip speed ensure a lower noise level.





(1) TEFC Motor

(2) Fiberglass reinforced polyester gravity flow hot water distribution basin

(3) Structural metal components available in stainless steel or galvanized steel. All fasteners stainless steel

(4) Fiberglass reinforced polyester cold water basin

(5) Belt drive assembly





Selection Chart

The capacities shown in this chart are for guidance purpose only. Please refer to the wet bulb of the area where the cooling tower will operate. For other values, please consult our local representative or our engineering. department.

	95	97	100	95	97	100	95	97	100	95	97	100
Model	85	87	90	85	87	90	85	87	90	85	87	90
	80	80	80	79	79	79	78	78	78	77	77	77
80-2.2	179	234	321	199	253	342	220	274	360	238	294	382
80-4.0	218	285	392	243	309	418	268	334	440	291	359	466
80-5.5	242	317	436	270	344	464	298	372	489	323	399	517
100-4.0	260	339	467	290	369	496	320	398	523	347	425	551
100-5.5	289	376	519	323	410	552	356	443	582	386	472	613
100-7.5	320	417	575	358	454	612	395	491	644	428	523	679
150-5.5	396	512	698	439	558	747	484	599	787	525	642	830
150-7.5	439	568	774	487	618	828	537	664	873	582	712	920
150-11	499	645	880	553	702	941	610	755	992	661	809	1045
250-11	663	849	1145	736	917	1214	799	989	1280	869	1050	1341
250-15	735	941	1270	816	1017	1346	887	1097	1420	964	1164	1487
250-18.5	788	1009	1362	876	1091	1443	951	1176	1523	1034	1249	1595
305-15	908	1158	1563	1006	1256	1654	1102	1345	1750	1190	1439	1830
450-15	1363	1737	2344	1510	1884	2481	1653	2018	2624	1785	2158	2745
610-15	1812	2309	3116	2007	2504	3298	2197	2683	3489	2372	2869	3650

CTI Certification applies to operation with the wet bulb temp. between 60°F and 85°F, max. entering water temp. of 125°F, min. temp.range of 5°F, min. temp approach of 5°F



Selection Chart

The capacities shown in this chart are for guidance purpose only. Please refer to the wet bulb of the area where the cooling tower will operate. For other values, please consult our local representative or our engineering. department.

	95	97	100	95	97	100	95	97	100	95	100	98	95	100	98
Model	85	87	90	85	87	90	85	87	90	85	88	88	85	88	88
	76	76	76	75	75	75	74	74	74	73	73	73	72	72	72
80-2.2	259	313	400	277	332	420	295	350	438	313	345	397	331	359	414
80-4.0	317	382	489	338	405	513	361	427	534	382	421	485	404	438	505
80-5.5	352	425	543	376	450	570	401	475	594	425	468	539	448	487	561
100-4.0	375	453	580	403	480	607	427	508	635	453	499	574	480	519	598
100-5.5	417	503	645	448	533	675	475	565	706	504	555	638	534	578	665
100-7.5	462	558	715	496	591	747	526	626	782	558	615	707	591	640	737
150-5.5	565	681	871	606	722	908	643	759	950	682	751	859	720	785	899
150-7.5	626	755	966	672	801	1007	713	841	1054	756	833	952	798	870	997
150-11	711	858	1097	763	910	1144	810	956	1197	859	946	1082	907	989	1132
250-11	933	1114	1404	991	1176	1471	1052	1237	1526	1112	1221	1387	1170	1269	1444
250-15	1035	1235	1557	1100	1304	1631	1167	1371	1692	1233	1354	1538	1297	1407	1602
250-18.5	1110	1325	1670	1179	1399	1749	1252	1471	1815	1322	1453	1649	1391	1509	1718
305-15	1275	1518	1921	1359	1607	2004	1440	1688	2078	1519	1668	1896	1597	1737	1967
450-15	1913	2277	2882	2038	2411	3006	2160	2532	3117	2279	2502	2843	2395	2606	2950
610-15	2543	3027	3831	2709	3205	3996	2872	3366	4144	3030	3326	3780	3184	3464	3922

CTI Certification applies to operation with the wet bulb temp. between 60°F and 85°F, max. entering water temp. of 125°F, min. temp.range of 5°F, min. temp approach of 5°F



FRS Series

Dimensions







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FRS Series

Dimensions

Model	Nominal Tons	Length	Width	Height	Inlet	Outlet	Fan Diameter	Qty. of Fans	Motor H.P.	Qty. of Motors	Dry Weight	Operating Weight
FRS 80-2.2	73	118	90 1/2"	123 1/2"	4"	4"	70 3/4"	1	3	1	2061	5059
FRS 80-4	89	118	90 1/2"	123 1/2"	5"	5"	70 3/4"	1	5	1	2093	5091
FRS 80-5.5	98	118	90 1/2"	123 1/2"	5"	5"	70 3/4"	1	7.5	1	2125	5124
FRS 100-4	115	118	102 1/2"	141"	6"	6"	70 3/4"	1	5	1	2257	5596
FRS 100-5.5	128	118	102 1/2"	141"	6"	6"	70 3/4"	1	7.5	1	2290	5628
FRS 100-7.5	142	118	102 1/2"	141"	6"	6"	70 3/4"	1	10	1	2323	5661
FRS 150-5.5	160	132	118"	158 1/2"	6"	6"	94 1/2"	1	7.5	1	2875	6897
FRS 150-7.5	178	132	118"	158 1/2"	8"	8"	94 1/2"	1	10	1	2908	6930
FRS 150-11	201	132	118"	158 1/2"	8"	8"	94 1/2"	1	15	1	3003	7025
FRS 250-11	266	185 1/2"	145 3/4"	175 3/4"	6" x 2	8"	118"	1	15	1	4640	11348
FRS 250-15	294	185 1/2"	145 3/4"	175 3/4"	6" x 2	8"	118"	1	20	1	4651	11358
FRS 250-18.5	315	185 1/2"	145 3/4"	175 3/4"	6" x 2	8"	118"	1	25	1	4849	11557
FRS 305-15	207	186 1/2"	167"	207"	5" x 2	8" x 2	70 3/4"	2	20 x 2	2	8756	19800
FRS 450-15	363	186 1/2"	250"	207"	5" x 3	8" x 2	70 3/4"	3	20 x 3	3	13134	31240
FRS 610-15	545	186 1/2"	332 1/2"	207"	5" x 4	10" x 2	70 3/4"	4	20 x 4	4	17512	39600

NOTES:

1. Nominal tons are based upon 95°F Hot Water – 85°F Cold Water – 78°F Wet Bulb and 3 GPM/Ton

2. For foundation dimensions and weight distribution, consult factory.

3. Continuing engineering research results in steady improvements. Therefore, these specifications and data are subject to change without notice. Consult with factory for current certified dimensions.





COOLING TOWER SPECIFICATIONS

- A. Provide and install a cross flow induced draft horizontal discharge cooling tower PROTEC Series FRS, flow rates, capacities and design temperatures shall be as indicated on the drawings.
- B. Tower manufacturer must be a member of the Cooling Technology Institute (CTI) and cooling tower shall be certified as per CTI Std. 201. Cooling tower manufacturer shall also guarantee capacities.
- C. Structural framework shall be bolted with stainless steel fasteners. Casing and basin shall be molded of corrosion-resistant fiberglass reinforced polyester (FRP) material.
- D. The fill/media shall be film-type polyvinyl chloride (PVC). The fill shall have integral louvers and drift eliminators. The fill shall be able to withstand operating temperatures up to 130 degrees F. Fill shall be hung from longitudinal support tubes.
- E. Hot water basin shall be molded of corrosion-resistant fiberglass reinforced polyester (FRP) material of the open gravity type. Standard inlet connection for customer piping shall be through a support attached to the splash boxes. A water diverter is to be provided on the hot water basin floor under the splash box to break the velocity of water and distribute it evenly throughout the hot water basin floor.

Mechanical Equipment:

- F. Fan shall be belt driven multi-blade adjustable pitch axial type, corrosion resistant construction. Motors shall be single speed, TEFC, 1.15 service factor with class F insulation, 1800 RPM and suitable for the electrical rating shown on the drawings.
- G. Fan cylinder shall be constructed of corrosion-resistant fiberglass reinforced polyester (FRP) multi-segment type bolted together at vertical joints. A welded steel fan guard shall be furnished with all models.
- H. A ladder to allow inspection and accessibility to the fan motor and upper portion of the tower cell shall be provided for all models. Each tower cell shall have an internal walkway.
- I. All fiberglass reinforced polyester (FRP) materials shall contain UV (Ultraviolet) inhibitors and an exterior gel coat.
- J. All fasteners shall be stainless steel and the rest of the structural steel components shall be (1) _____

Note: (1) Stainless steel or galvanized



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