

SERIES OXF-30K



INDUCED DRAUGHT
CROSSFLOW FRP
COOLING TOWER

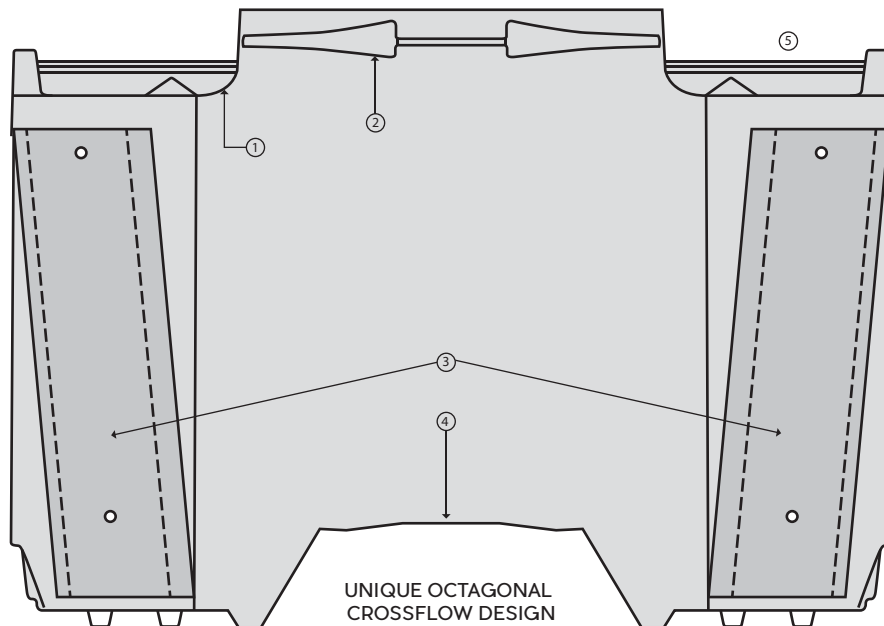


Your Full-Service Cooling Technologies Company

www.paharpur.com



FEATURES OF OXF-30K



The Paharpur Series OXF-30K is certified for thermal performance by the Cooling Technology Institute (CTI), Houston, USA as per CTI certification standard STD-201. Details are available at www.cti.org.

- ① **CORROSION-PROOF CONSTRUCTION**
Fibreglass hot and cold water basins won't corrode, rot or decay. All steel components including assembly hardware are hot dip galvanized steel. Stainless steel option also available.
- ② **PROVEN PAHARPUR MECHANICAL EQUIPMENT**
Quiet induced draught axial propeller fan is driven through a Paharpur right-angle gear reducer. The TEFC motor is located outside the moist air stream within an alcove at the tower corner structure.
- ③ **EFFICIENT PVC FILM-TYPE FILL**
Corrosion-proof PVC sheets are vacuum formed to maximize the available heat transfer surface. The design includes
- drift eliminators and honeycomb air inlet louvres integrated with the fill sheets.
- ④ **EASY MAINTENANCE**
All maintenance on the mechanical equipment can be accomplished from outside the tower. Access to the tower interior is available through the opening in the centre of the cold water basin.
- ⑤ **ARCHITECTURALLY COMPATIBLE**
The OXF-30K low profile design and pleasing appearance simplify siting and minimize the need for enclosures. The 'Paharpur Grey' exterior blends in naturally with any environment and the octagonal shape gives it a classy appearance - an architect's delight.

CONSTRUCTION AND COMPONENTS

The OXF-30K is a cooling tower, unique in its design, appearance, performance reliability in all seasons, maintainability and use of inert, non-corroding construction materials. The FRP structure and basins; PVC fill, louvres and eliminators; and the hot dip galvanized steel hardware and mechanical equipment support structure all combine to create a cooling tower capable of delivering a highly impressive performance. The following described components provide value not usually found elsewhere at any price.



WATER DISTRIBUTION SYSTEM

Warm water flows through external piping (not included with the tower) into a chamber at the top of the tower. The splash box prevents the incoming water from spilling out of the basin and helps provide uniform water distribution. Water then flows by gravity from the fibreglass basins through nozzles to the fill.

All OXF-30K towers use Paharpur "spiral target" nozzles. These inert polypropylene plastic nozzles assure uniform water distribution throughout the fill. Nozzles are easy to remove and replace if you ever need to change the design water flow rate.

Fibreglass, removable covers prevent algae growth in the hot water basins and provide a finished appearance to the tower.



FILL / LOUVRES / DRIFT ELIMINATOR

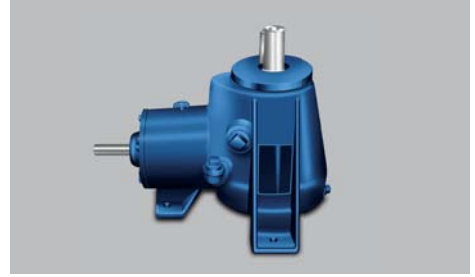
Fill sheets include both louvres and drift eliminators.

The louvres prevent water from escaping the fill sheets and assure proper heat transfer throughout wide variations in airflow. Unlike towers equipped with separate external louvres, users find this fill to operate ice-free even in extremely cold weather.

The integral drift eliminators prevent the costly nuisance of drift spotting on the surrounding environment. They reduce drift to only 0.005% of the circulating water flow rate.

The vacuum formed PVC fill sheets withstand hot water temperatures as high as 55°C. Their shape and configuration minimize resistance to airflow and squeeze out maximum cooling capability per unit volume of fill, resulting in a very high efficiency fill system. Steel structural tubes suspend, support and stabilize the fill. They also hold the bottom of the fill sheets above the cold water basin floor to simplify basin cleaning.

Screens between the side of the cold water basin and the base of the fill prevent trash and debris from contaminating the circulating water flow. These screens are easily removable.



MECHANICAL EQUIPMENT

The Paharpur Series 20T and 22.2 gear boxes used in OXF-30K towers have an overall mechanical efficiency of 94-97% and have a long record of dependability, long service life and low maintenance cost.

Each gear box is equipped with a lube line that extends outward to an oil level sight glass adjacent to the motor.

The gear box is coupled to the TEFC weather proof motor through a Paharpur full-floating driveshaft whose HDG steel tube and non-lubricated neoprene flexible elements assure long, maintenance-free service. Heavy-gauge HDG steel box beams support the gear box, fan and motor, maintaining correct alignment throughout the drive train. Driveshafts are dynamically balanced prior to shipment.





The Paharpur Type H-3 fans used in models 31K through 33K are equipped with cast aluminum blades. HP-7S fans used in 34K models have blades of fibreglass. Blades are adjustable in pitch, permitting maximum utilization of rated fan power or allowing field adjustment to compensate for abnormal job-site restrictions. Paharpur fans do not require costly accessories for pitch adjustment, as many other manufacturer's fans do. The entire fan assembly is statically balanced prior to shipment.

Paharpur manufactures all the mechanical equipment components (except the motor) in its own plants. So, service parts are readily available from a single source.

COLD WATER BASIN

The OXF-30K's fibreglass collection basin is entirely corrosion-proof. The basin floor is elevated under the fill area to minimize operating weight and to maintain active water flow into the basin's depressed section. Suction piping connects to the sump, depressed below the floor of the basin. Models 31K through 33K have a bottom outlet sump. The 34K models have a side outlet sump.

Standard equipment on each tower basin includes : a screened suction connection, a threaded overflow connection, a threaded and plugged



drain connection and a float-operated make-up valve.

Access to the interior of the tower is available through the centre section of the basin, which is elevated above the basin overflow level. A removable access cover seals the floor of the tower during normal operation. This opening provides access to adjust the mechanically operated float valve. Adjustment of the float valve is the only maintenance item which requires routine access to the tower interior. All other maintenance is performed from outside the tower.

SUPPORTING STEEL GRILLAGE (OPTIONAL)

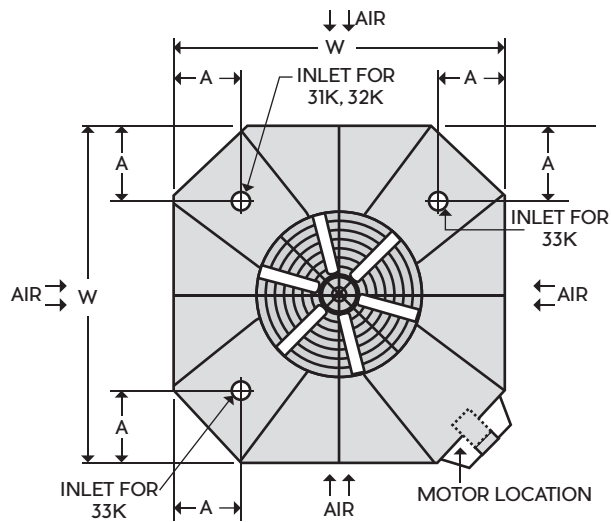
Paharpur can provide a grid of supporting steel with each OXF-30K tower. These wide flange beam assemblies are hot-dip galvanized after welding and are shipped together with the primary tower components. These beams simplify the customer's foundation requirements significantly. Ask Paharpur for details of customer support requirements.

Alternatively, the purchaser can opt to provide his own steel grillage or concrete slab support.

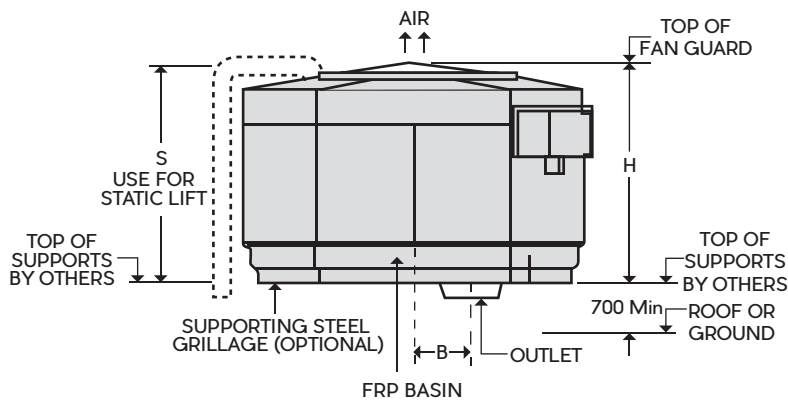
Note: OXF-30K towers can also be supplied without the FRP basin i.e. suitable for purchaser's concrete basin. When the tower is ordered without the basin, accessories are also excluded.

SCHEMATICS & PIPING

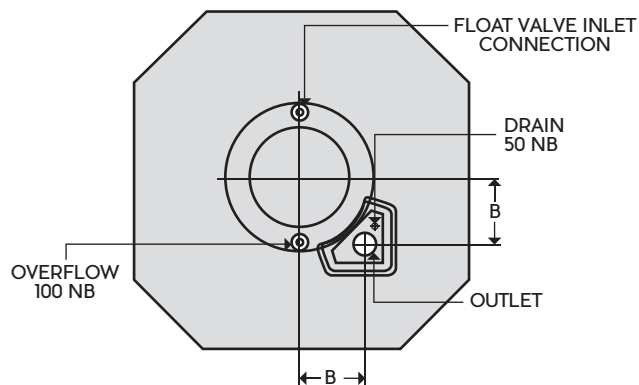
MODELS 31101-33205 (SINGLE CELL)



PLAN



ELEVATION



COLLECTION BASIN PLAN

Note: Dotted piping is out of our scope of supply.
All dimensions are in mm.

TOWER MODEL	NOMINAL TONS*	DIMENSIONS (MM)					FAN TYPE	FAN DIA. (INCH)	FAN RPM	MOTOR HP	GEARBOX SERIES (TYPE CC2)	GEARBOX RATIO	DRIVE SHAFT SERIES	APPROX. SHIPPING WT. (KG)	APPROX. OPERATING WT. (KG)
		W	H	S	A	B									
31101	110	3860	2180	2185	864	732	H-3-6	72	444	5	20T	3.27:1	6Q	1980	4755
31102	125	3860	2180	2185	864	732	H-3-6	72	444	7.5	20T	3.27:1	6Q	2000	4775
31103	139	3860	2180	2185	864	732	H-3-6	72	535	10	20T	2.71:1	6Q	2010	4785
31104	161	3860	2180	2185	864	732	H-3-8	72	535	15	20T	2.71:1	6Q	2050	4830
31201	163	3860	2565	2590	864	732	H-3-6	72	535	10	20T	2.71:1	6Q	2135	4915
31202	185	3860	2565	2590	864	732	H-3-8	72	535	15	20T	2.71:1	6Q	2180	4955
31301	179	3860	2980	3000	864	732	H-3-6	72	535	10	20T	2.71:1	6Q	2285	5040
31302	204	3860	2980	3000	864	732	H-3-8	72	535	15	20T	2.71:1	6Q	2305	5080
31303	225	3860	2980	3000	864	732	H-3-6	72	535	20	20T	2.71:1	6Q	2320	5100
32101	213	4280	2600	2590	802	835	H-3-6	96	352	10	20T	4.11:1	6Q	2480	6420
32102	242	4280	2600	2590	802	835	H-3-6	96	352	15	20T	4.11:1	6Q	2520	6460
32103	267	4280	2600	2590	802	835	H-3-6	96	444	20	20T	3.27:1	6Q	2535	6475
32201	274	4280	3010	3000	802	835	H-3-6	96	352	15	20T	4.11:1	6Q	2665	6605
32202	300	4280	3010	3000	802	835	H-3-8	96	444	20	20T	3.27:1	6Q	2680	6620
32203	323	4280	3010	3000	802	835	H-3-6	96	444	25	20T	3.27:1	6Q	2710	6850
32204	341	4280	3010	3000	802	835	H-3-6	96	535	30	20T	2.71:1	6Q	2735	6875
32205	373	4280	3010	3000	802	835	H-3-8	96	428	40	22.2	3.45:1	6Q	2870	6815
33101	342	5080	3010	2950	980	835	H-3-6	96	444	20	20T	3.27:1	6Q	3810	9995
33102	365	5080	3010	2950	980	835	H-3-6	96	444	25	20T	3.27:1	6Q	3840	10025
33103	384	5080	3010	2950	980	835	H-3-6	96	535	30	20T	2.71:1	6Q	3865	10050
33104	417	5080	3010	2950	980	835	H-3-8	96	428	40	22.2	3.45:1	6Q	4005	10190
33201	368	5080	3425	3355	980	835	H-3-6	96	444	20	20T	3.27:1	6Q	4085	10270
33202	393	5080	3425	3355	980	835	H-3-6	96	444	25	20T	3.27:1	6Q	4110	10295
33203	412	5080	3425	3355	980	835	H-3-6	96	535	30	20T	2.71:1	6Q	4140	10325
33204	449	5080	3425	3355	980	835	H-3-8	96	428	40	22.2	3.45:1	6Q	4255	10445
33205	481	5080	3425	3355	980	835	H-3-8	96	428	50	22.2	3.45:1	6Q	4311	10509

* Nominal tons are based on 95°F hot water, 85°F cold water, 78°F wet bulb and 3 USGPM per ton.
Multi-cell models also available. Details available on request.

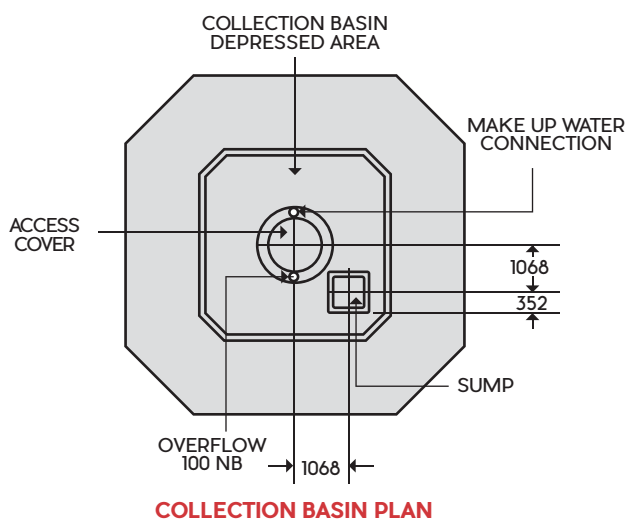
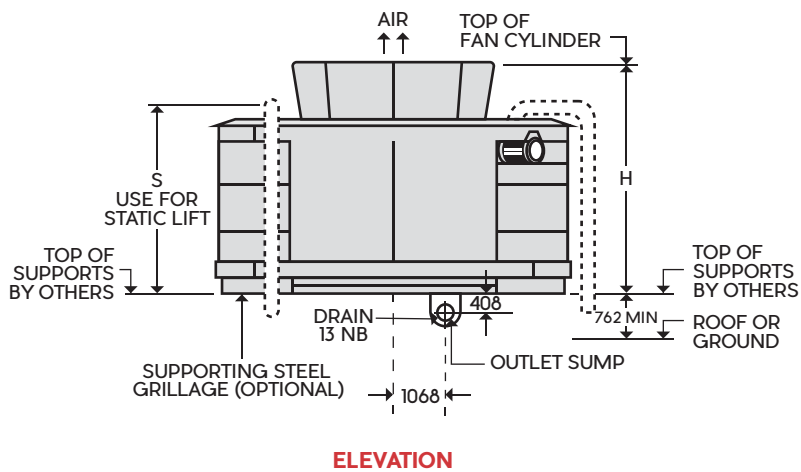
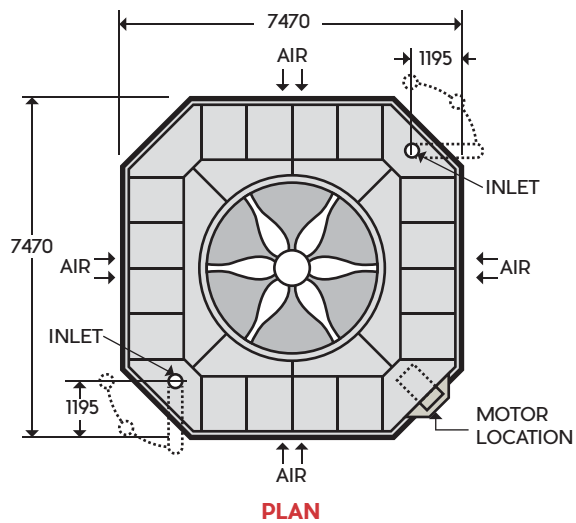
Note:

- Dimensions shown are for preliminary layout only. Obtain current engineering drawings (or CAD files) from your Paharpur Sales Engineer for final layout.
- Make-up water connection may be 25 NB or 50 NB, depending upon tower heat load, water pressure and desired connections.
- All table data is per cell.
- 31K and 32K models require only one inlet per cell and inlet piping may be located at any of the four tower corners. 33K models whose design water flow is 2025 USGPM per cell or less may use a single 250 NB inlet. Add 50 mm to "S" dimensions. Above 2025 USGPM per cell, two 200 NB inlets are required, located 180° apart.
- All piping loads must be supported independent of tower.
- All piping and supports are by others.
- When inlet riser is located directly behind motor, maintain 600 mm gap between out of tower and in of riser pipe.
- Outlet diameters shown are for maximum water flow. Smaller outlet diameters may be appropriate if design flow is less.



SCHEMATICS & PIPING

MODELS 34101-34205 (SINGLE CELL)



Note: Dotted piping is out of our scope of supply.
All dimensions are in mm.

TOWER MODEL	NOMINAL TONS*	DIMENSIONS (MM)		FAN TYPE	FAN DIA. (INCH)	FAN RPM	MOTOR HP	GEARBOX SERIES (TYPE CC2)	GEARBOX RATIO	DRIVE SHAFT SERIES	APPROX. SHIPPING WT. (KG)	APPROX. OPERATING WT. (KG)
		H	S									
34101	466	3874	2972	H-3-9	144	266	15	22.2	5.50:1	175	7115	23960
34102	516	3874	2972	H-3-9	144	266	20	22.2	5.50:1	175	7145	23990
34103	556	3874	2972	H-3-9	144	266	25	22.2	5.50:1	175	7165	24010
34104	591	3874	2972	H-3-9	144	320	30	22.2	4.56:1	175	7195	24025
34105	648	3874	2972	H-3-9	144	320	40	22.2	4.56:1	175	7260	24100
34106	696	3874	2972	H-3-9	144	428	50	22.2	3.45:1	175	7285	24125
34107	734	3874	2972	H-3-9	144	428	60	22.2	3.45:1	175	7410	24255
34201	699	4902	3988	H-3-9	144	266	25	22.2	5.50:1	175	8080	24925
34202	740	4902	3988	H-3-9	144	320	30	22.2	4.56:1	175	8110	24950
34203	809	4902	3988	H-3-9	144	320	40	22.2	4.56:1	175	8180	25020
34204	868	4902	3988	H-3-9	144	428	50	22.2	3.45:1	175	8205	25040
34205	919	4902	3988	H-3-9	144	428	60	22.2	3.45:1	175	8330	25170

* Nominal tons are based on 95°F hot water, 85°F cold water, 78°F wet bulb and 3 USGPM per ton.
Multi-cell models also available. Details available on request.

Note:

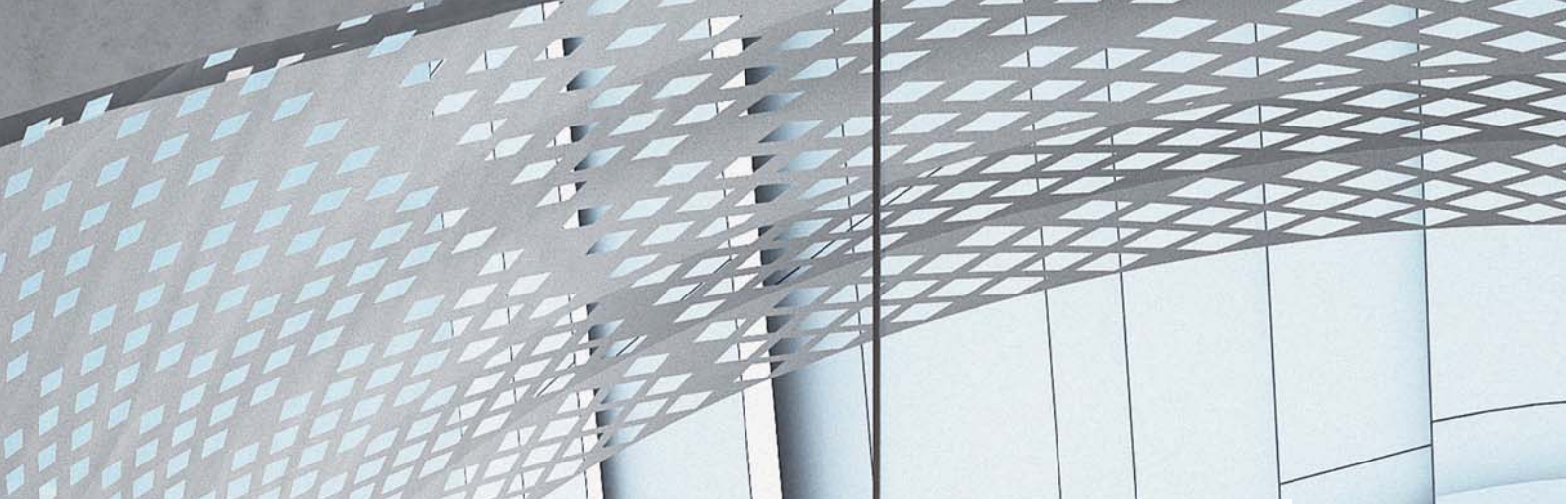
- Dimensions shown are for preliminary layout only. Obtain current engineering drawings (or CAD files) from your Paharpur Sales Engineer for final layout.
- Make-up water connection may be 25 NB or 50 NB, depending upon tower heat load, water pressure and desired connections.
- All table data is per cell.
- All piping loads must be supported independent of tower.
- All piping and supports are by others.
- When inlet riser is located directly behind motor, maintain 600 mm gap between out of tower and in of riser pipe.
- Outlet diameters shown are for maximum water flow. Smaller outlet diameters may be appropriate if design flow is less.
- Outlet sump may be installed rotated 90° or 180° provided outlet piping will clear tower support.



OXF-30K ON-SITE ASSEMBLY

OXF-30K towers are factory-fabricated and are designed to be assembled at the jobsite. This allows the design flexibility that results in the uniquely pleasant OXF-30K configuration and permits a wide variety of orientations.

Normally this assembly is included as part of the cooling tower contract and is performed by a team of workmen supervised by an experienced Paharpur erection foreman. Their knowledge and expertise assure proper fit-up, alignment, sealing and warrantability of the various tower components, and contributes significantly to the



trouble-free long-term operation of the tower. Therefore, Paharpur strongly recommends that complete tower erection be included as part of your order.

Although a reasonable concern for safety is inherent in the design of Paharpur cooling towers, specifiers, purchasers and users must understand that there is always some risk involved in operating and maintaining this type of equipment. Accordingly, cautionary warning decals dealing with safety are placed on all Paharpur towers. Refer to the tower's Operation and Maintenance

manual for more complete safety precautions.

CAUTION

The cooling tower must be located at such distance and direction to avoid the possibility of contaminated tower discharge air being drawn into a building's 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.





OPERATIONAL AND ENVIRONMENTAL CONSIDERATIONS

ENCLOSURES

Occasionally, cooling towers are located inside architectural enclosures for aesthetic reasons. Although Paharpur cooling towers adapt well to enclosures, the designer must realise 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 minimum distance specified should be observed.

NOISE LEVEL

Sound produced by a series OXF-30K tower operating in an unobstructed environment will meet all but the most restrictive noise limitations and will react favourably to natural attenuation. Where the tower has been designed to operate within an enclosure, the enclosure itself will usually have a dampening 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, you have several options listed in ascending order of cost impact:

- In many cases, noise concerns are limited to night-time, when ambient noise levels are lower. Such situations are tackled by using two (2) speed motors in either 1500/1000 or 1500/750 rpm configuration; and operating the fans at reduced speed instead of 'cycling' at full speed. Typical sound reductions are 9 dBA at two-third fan speed or 13 dBA at halfspeed. This is a relatively inexpensive solution and pays 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 horse power.
- 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 significant cost impact and because of obstruction to normal maintenance procedures.

APPROPRIATE OXF-30K APPLICATIONS

TYPICAL APPLICATIONS

Although OXF-30K is a premium-value cooling tower targeted for those applications that demand a high degree of corrosion resistance as well as an aesthetically pleasing appearance, it is routinely applied in virtually all normal systems requiring cold water for the dissipation of heat. Some common applications include:

- Condenser water service for air conditioning and refrigeration systems. (They are especially adaptable to Free Cooling applications.)
- Jacket water cooling for engines and air compressors.
- Chemical and industrial processes.
- Batch cooling.
- Welder cooling.
- Plastic industry processes.
- Dairy, citrus and other food industry processing where water contamination is not likely to occur.



PAHARPUR SERIES OXF-30K COOLING TOWER SPECIFICATIONS

BASE

Furnish and install a CTI Certified (as per CTI STD-201) induced draught, crossflow, field-erected, FRP cooling tower of cells, as shown on plans. Tower shall be similar and equal in all respects to Paharpur Series OXF-30K Model

PERFORMANCE

The tower shall be capable of cooling CMH of water from °C to °C at a design wet-bulb temperature of °C. The cooling tower manufacturer shall guarantee the performance of the tower as installed according to plans.

CONSTRUCTION

The cold water basin, structural columns, hot water distribution basins, basin covers, fan cylinder and access cover shall be formed of inert fibre-reinforced plastic (FRP). All hardware, including the supporting grillage, shall be fabricated of HDG steel. This shall include the mechanical equipment support structure, fan guards and all bolts, nuts and fasteners used in the construction of the tower.

MECHANICAL EQUIPMENT

Fan(s) shall be axial propeller type, incorporating heavy duty blades of cast aluminium alloy or FRP. Blade pitch angle shall be individually adjustable.


Fan(s) shall be driven through a right-angle, industrial-duty, oil-lubricated, geared speed reducer. Speed reducers employing pulleys and belts shall not be acceptable.

Motor(s) shall be HP, TEFC weatherproof squirrel cage induction type. Speed and electrical characteristics shall be RPM, single winding, 3 phase, hertz, volts. Motor shall be located outside the humid interior of tower, within an alcove in the tower's corner structure.

The motor shall be connected to the gear reducer by a tubular HDG steel driveshaft equipped with neoprene flexible coupling elements. A neoprene oil gauge and drain line shall extend from the gear reducer to the motor enclosure and shall be equipped with an easily visible oil sight glass. The mechanical equipment for each cell shall rest on a rigid HDG steel box-beam assembly that resists misalignment between the motor and the gear reducer.

FILL, LOUVRES & DRIFT ELIMINATORS

Fill shall be film-type, vacuum-formed PVC, with louvres and drift eliminators formed as part of the fill sheets. Fill sheets shall be individually suspended



from steel structural tubing supported by the tower columns and intermediate panels and shall be elevated above the floor of the cold water basin to facilitate cleaning. Air inlet faces of the tower shall be free of water splash-out and guaranteed drift losses shall not exceed 0.005% of the design water flow rate.

HOT WATER DISTRIBUTION SYSTEM

The FRP hot water distribution basin shall be equipped with metering orifice-type polypropylene nozzles to deliver incoming water by gravity to the fill. Nozzles shall be easily removable and replaceable. The hot water basin shall be covered by removable FRP covers that keep out sunlight to prevent growth of algae and subsequent fouling, and give a finished appearance to the tower.

COLD WATER BASIN & ACCESSORIES

The FRP cold water basin shall be sealed water-tight and shall include a float-operated mechanical make-up valve, an overflow connection and a depressed FRP sump complete with HDG steel debris screen. The top of the basin to the base of the fill shall be covered with heavy gauge HDG steel screens to keep out airborne leaves and debris. The cold water basin shall be supported by a structural beam

assembly (Hot Dip Galvanized after fabrication) or by a concrete slab.

SCOPE OF WORK

The cooling tower manufacturer shall be responsible for the design, fabrication, and delivery of materials to the project site and for the erection of the tower over supporting piers or dunnage provided by others.

WARRANTY

The manufacturer shall warrant the entire tower (including the motor) against deficiency in performance and failure due to defects in materials and workmanship for a period of at least eighteen(18) months following shipment to the site, or 12 months after the date of startup, whichever is sooner.

OPTIONAL

- Steel grillage or concrete slab support (FRP basin jobs)
- FRP cold water basin can be substituted by concrete basin (by purchaser). In this case, basin accessories will also be deleted from Paharpur's scope.





Your Full-Service Cooling Technologies Company
www.paharpur.com

Paharpur Cooling Towers Ltd

(ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 Certified)

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Our sales representatives are located in several countries and Indian cities.
Contact information shall be made available on request.

Information contained in this document is correct as at the time of printing, and is subject to change without notice. For the latest information, please contact Paharpur.