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For Enquiries Contact

### MAHAKAL COOLING TOWERS

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# Mahakal

## COOLING TOWERS

AN ISO 9001:2015



## CATALOGUE

### SPARE PARTS & SERVICE



## FRP AXIAL FLOW FAN

### DESIGN

"MCT" F.R.P. Fans are specially designed for cooling systems applications. The main reasons for the high efficiency is there tapered and twisted aerofoil design. Each transverse cross section of the blade is a true replica of AERODYNAMIC SECTION which is not possible in other makes of fans.

The fans are designed to operate in both the horizontal and the vertical plane. An improved characteristic of the fan outlet flow ensures optimum distribution of the air across of the cooling towers.

The fans are manufactured as per the design and performance approved by department of with whom we have a long term tie-up for the purpose of research and development of different type of fans with a special emphasis on energy saving with improved design and better efficiency.

More air with less power will mean less operating costs, as energy cost continue to escalate "MCT" F.R.P. Fans provide 15% to 25% or more power saving as compared with existing aluminum Fans.

FAN RPM- The Fans are designed to suit the RPM provide by existing mechanical drive system .(i.e. exiting Gear Box /motor)



## FAN BLADE

These Blades are Made Using Selected glass fiber Reinforcement, high Mechanical Grade of Isophthalates polyester resin system. Very special process is adopted to achieve a sound molding of blade. Each blade is finished, and accurately match moment. Finally two coats of polyurethane paint is provided which is UV resistant paint. At lead edge two coats of high abrasive resistance PU paint is provided to achieve high life of blade. Each blade is mark for blade no & set no and history is traceable.



## HUB

We have developed high-strength MSHDG hub with SS-304 fasteners. This design is with no casting & Welding and machined in final shape with lesser cut holes to achieve high degree of assembly & balancing. Hub are dynamically balance. Each hub is Mark for sent no and each block for blade no to make absolutely problem free assembly at site.



## FAN ASSEMBLY

Each fan assembly is finely statically balance

## PACKING

Generally good steel crate is used for packing the blades & hub so that material reaches up to site without damage.

## Unique Feature & Advantages

### Slim Blade -

Less Start - Up torque, Less Load on Drive, Easy Installation

### Steel Back Plate -

Blade Assembly Accurate, Prevent Shank From Damage

### Modern Aerofoil -

High Efficiency, Low power Consumption, high life

We also supply Cast Iron, Aluminum cast & Stainless Steel hub & cast aluminum Blades

### Range -

Presently we are Making Fan Diameter Up to 36 ft

## FAN STACK

FRP fan Stack for treated timber cooling tower is used and for MCT cooling tower fan Stack are integral part of MCT structure. Fan Stack are velocity recovery type.





## Excellence...



Led by a team of highly experienced professionals, the company with a vision and mission is ready to deliver ever improving quality. Our experiences evolving with ever advancing technologies have led us to become a highly competitive, full-service, engineering, designing, manufacturing and maintenance company.

## Mahakal Cooling Towers

We are specialist manufacturing company involved in the design, manufacture, test, supply and installation of cooling towers. Our services includes repairs, maintenance, onsite installations/construction of counter and cross flow cooling towers including supply of spare parts.

## Our People

There is no doubt that our people, having an experience of over 20 years, are our biggest and best competitive advantage. Through extensive training and an unmatched commitment to excellence, our people with our customers are the partners in success. At Mahakal Cooling, we focus not only on developing the right Skills, but also on a collaborative attitude. For us, teamwork is paramount. As trusted advisors to our clients, we bring real insight into trends in the industry, real experience from the outside world, and powerful solutions to your business issues. We place a premium on empowering our people right from the start of every project. Our approach to project delivery allows us to begin and size commercial or industrial projects before most of our competitors. Experience you can count on, insight from the source, people you can trust. The Mahakal Cooling technocrats are here to help you reach and exceed your goals.

## Spare Parts Portfolio

### Gear Boxes

Mahakal Cooling Tower is pioneer in designing, manufacturing and supply of RCC /Timber/ FRP Cooling Towers. We render full services and support to cooling Tower Installations. Our customer service team stands ready to help you with any aspect of your order. We have complete range of gearboxes, fill, drive shafts, fans, nozzles and all other cooling tower components. We will ensure that you get the right part for your cooling tower.

U-44



T-33



V-55



W-66



X-77



Z-99

MCT gear boxes are heavy duty, right angle and both in spiral bevel as well as spiral bevel cum helical type design. They are specially designed for cooling tower duty conditions. Following table gives the reduction ratio for which it is available:

| Gear Box Model  | Reduction Ratios |         |         |       |
|---|------------------|---------|---------|-------|
|   | 2.133/1          | 2.615:1 | 4.11/1  | 6.5   |
| T-33  | 2.133/1          | 2.615:1 |         |       |
| U-44  | 2.71/1           | 3.27/1  | 4.11/1  |       |
| V-55  | 3.45/1           | 4.56/1  | 5.50/1  | 6.5   |
| W-66  | 5.77/1           | 7.77/1  |         |       |
| X-77  | 8.80/1           | 11.18/1 | 12.93/1 | 14.54 |
| Y-88  | 8.85/1           | 11.18/1 | 13/1    |       |
| Z-99  | 10.83/1          | 12.98/1 | 14.84/1 |       |
| Note 1. T-33 to W-66 are single reduction spiral bevel boxes                  |                  |         |         |       |
| Note 2. X-77 to Z-99 are double reduction spiral bevel cum helical gear boxes |                  |         |         |       |

All these boxes are designed for AGMA rating of Over 2.

## Gear Match Sets



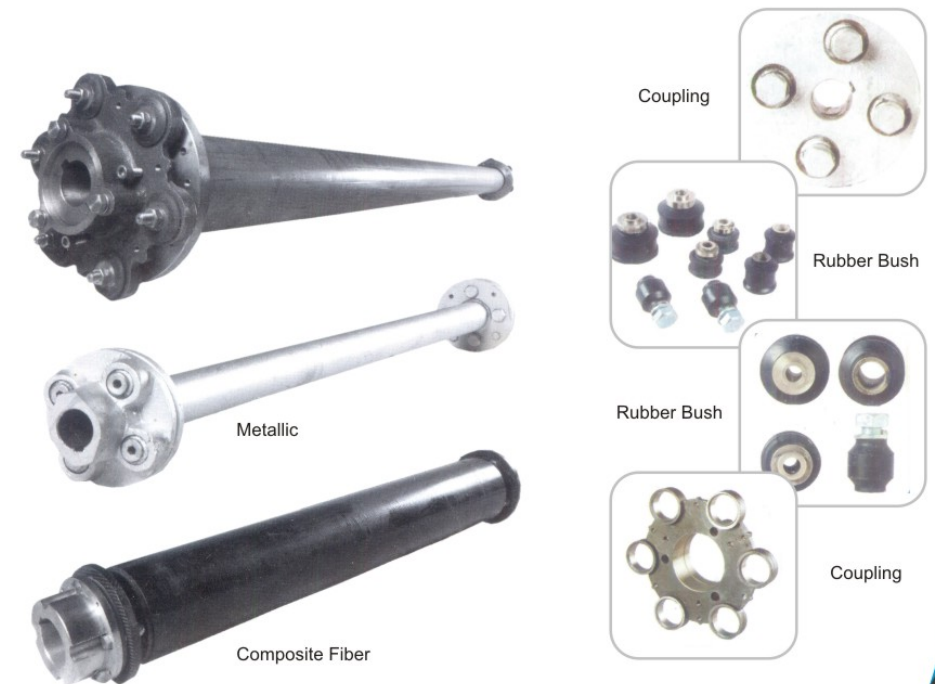
## Drive Shafts & it's Flexible Components

### Drive Shafts & it's Flexible Components

MCT drive shafts are designed to transmit required torque for cooling tower application. It is tubular floating type and has flexible flanged couplings at both ends to absorb minor mis-alignment. Flexible elements are made of neoprene rubber. Length of drive shafts is tailor made as per customer's requirement. Drive shafts require a lot of precision in its manufacture. These are dynamically balanced prior to dispatch. Our quality control ensures that casting, machining and fabrication are closely inspected. It enables the smooth running of drive shaft. These drive shafts are available in galvanized steel or stainless steel material. MCT can also supply composite fibre drive shafts, which are of light but strong material which can transmit torque smoothly without vibration.

Inter-changeability : All these drive shafts and their components are completely inter-changeable.

Drive shaft's Flexible Element are Neoprene Bonded Metallic Inserts.





## Axial Flow Fans & Flow Control Valves

### Axial Flow Fans

MCT axial flow fans are available with cast aluminum as well as FRP blades. These fans are designed specially for cooling tower applications. Each fan assembly is statically balanced prior to dispatch. The hub is made of cast iron or MS. We also manufacture stainless steel hub.

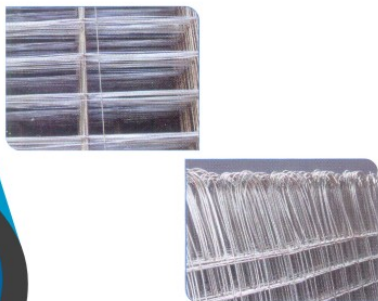


### Flow Control Valves

MCT flow control valves are available in 150 mm to 500 mm diameter range. They have a cast iron body, cast iron operating handle, cast iron locking bar, stainless steel spindle and neoprene rubber gaskets.

### Fill Support Grids

MCT fill support grids are made of stainless wire. They are designed to keep fill splash bars horizontal and also to take load of water as well as fill during operation. They are used for treated timber splash bars or PVC rectangular splash bars, PVC V type splash bars fills



### Splash Type Fill

#### (PVC V Bar & Timber Splash Bar)

MCT cooling tower fill is available for cross as well as counter flow cooling tower M.C.T. splash fills are available in treated timber and PVC material. These splash bars are specially designed so that provide the required surface area and allow uniform distribution of water over it and ensure smooth flow of air without much pressure drop. Treated timber splash bars are rectangular in cross-section and chemically treated as per IS:401



## Water Distribution Components

MCT non clog spray nozzles are made in polypropylene material so that it can withstand the high hot water temperature. As name indicates its large orifice keeps it free from clogging and ensure uniform distribution MCT spiral target nozzles are of orifice type and suitable for gravity distribution in cross flow cooling tower. Water splash is created with the integral target on which water strikes when passed through orifice. It ensures uniform distribution over fill. It is made in polypropylene material. MCT spray nozzles are suitable for water distribution in smaller cooling towers.



### Film Type Fill



MCT film type fills are cross corrugated, large fluted and made from PVC Sheets. Depending on the quantity required, they can be dispatched in glued or un-glued form.

### Drift Eliminators



MCT drift eliminators are available in PVC, treated timber material. They are designed to keep drift loss below 0.005% in PVC and 0.05% in treated timber.

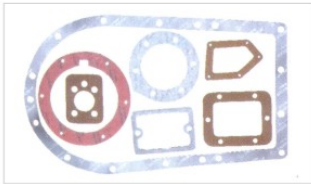
**Bearings**



**Grommet**



**Gasket**



**U Bolt**



**Vibration Switch**



**Oil level Switch**



**Hose pipe**



**Oil Seal**

**Oil Seal**



**Hose pipe**

**Timber Workshop**



**Timber Before Treatment**

**Timber After Treatment**



The Cooling Tower industry subjects its wooden towers to the harshest environments conceivable. The wet-dry cyclical conditions and structural designs intensify the undisciplined seasoning of the wooden members, resulting in warping, twisting and checking. Wood preservative treatment is based on two separate -- yet interdependent -- requirements: penetration and retention of the chemical preservative.

Mahakal Cooling Towers maintain timber quality as per IS 2372 and have in house treated timber workshop having AsCu timber treatment Plant as per IS 401 wherein the preservatives (Copper, CHromium and Arsenic Salts) are pressure impregnated in the timber and designed to react with the wood cell comonents so that the active elements, copper (Cu), chromium (Cr) and arsenic (As) are fixed into the wood's structure. The arsenic component protects the elements into the timber, offering high resistance to leaching. Because the treatment is resistant to leaching, it can be used on timber that will be exposed to the elements or used in-ground.

Advantages of treated timber:-

- Flexibility: For designing economically to overcome difficult site environment.
- Durability : Long life under hazardous conditions.
- Effectiveness : It is cost efficient.p
- Versatility : Can be used in direct contact with fresh or salt water.



## Service Portfolio

Where do you turn when a cooling tower fails or when a momentary problem overwhelms the capacity of your tower? Today's experts call Mahakal Cooling Towers. The availability and effectiveness of temporary cooling towers has dramatically improved the options for process cooling at plants around the world.

**Maximize your production during hot summer months peak demand times.**  
**Maintain production while performing cooling tower repair and maintenance.**  
**Reduce costly down time after disaster strikes.**  
**Meet or exceed environmental and safety standards without compromise.**

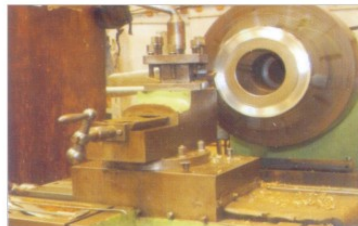
## Repair & Maintenance

Mahakal Cooling Tower repair and maintenance experts and service crews are standing by 24 hours a day to provide immediate assistance to any and all your industrial cooling tower repair or maintenance projects. We supply only the highest quality material and field labor services for all makes and models of cooling towers, at an unbeatable price.



## Inspection Services

In conjunction with inspection the written reports of Mahakal Cooling Tower can establish the current thermal and mechanical performance and present operating condition to evaluate the original conditions versus the conditions now or on an ongoing basis. This operations point can then be used to evaluate the many different options you have to increase the tower capability or upgrade the tower for expansions or increased load. Or as energy saving option to reduced the energy consumption and reduce the operating cost associated with the tower to earn a payback for the reduced energy cost. We Work closely with you to save your company thousands in energy costs or eliminate the need to add additional cooling towers by simply upgrading the existing tower to meet your needs.



## Upgradation

You must have planned the cooling tower for the heat load prevailing but due to change in the capacity of main equipment the heat has increased and it results in capacity shortfall in cooling tower.

You must have evaluated the cooling tower efficiency but in actual working conditions you are not getting performance out of it.

You must have expanded but there is space constraint and you are unable to fit in a new cooling tower hence wish to enhance the capacity of the existing cooling tower.

We are always there to assist you at the time of above mentioned needs. You have to simply call us and place the inspection order enabling us to collect the information on existing cooling tower to explore the possibility of its up-gradation to meet your requirement.

We Have rich experience of capacity enhancement in cooling tower, following are the few references.

There are many such examples where we have provided services to up-grade the cooling tower performance. Hence if you are thinking to go for new cooling tower, just wait and get your existing cooling tower inspected to explore the possibility of up-gradation to meet your new requirement.

Mahakal Cooling Tower provides repairs and maintenance of all types of cooling towers from small pack towers to large mechanical draft units, We can keep your plant operating at peak performance with minimal downtime.

cooling tower Services:

We are one of the country's vast-experienced cooling tower company, providing complete systems from inlet to outlet including design, engineering, supply and construction of industrial duty cooling towers. Mahakal Cooling Tower are installed in major industries and power generating plants across the India and around the world. A team of experienced engineers, project managers, construction superintendents and craftsmen, combined with out financial strength, enable us to offer Total Capacity and Total Responsibility

## Cross Flow Cooling Towers

In cross flow cooling tower, through fill, air shall be moving horizontally and water shall be falling vertically. It is available with splash type fill and suitable for all cooling load application. However, it is more suitable for the application where water has higher suspended solids which can be a problem for film fill cooling tower operation. These cooling towers are made in chemically treated wood or RCC construction. Splash fill is available in chemically treated timber for high hot water applications and in PVC for normal water applications. It can be given in rectangular and V-bar shape. Fill are supported on SS-304L grid. Cooling towers are fitted with high efficiency mechanicals which are axial flow fans, gear box and drive shafts. For smaller load application cooling tower are offered with direct driven arrangement where fans are directly mounted on motor shafts. Available from 100 m<sup>3</sup>/hr to 3000 m<sup>3</sup>/hr capacity in single cell.

## Counter Flow Cooling Towers

In counter flow cooling tower, through fill, air shall be moving vertically upward and water shall be falling vertically downward. It is available with film type fill and suitable for all cooling load application however it is more suitable for the application where cold water temperature is critical and water quality is good. These cooling towers are made in chemically treated wood or RCC construction. Film type fill is made of PVC for normal water applications. These cooling towers are fitted with the fills of wider flute so that it can withstand most of the application where water. The film type fill should be avoided for the application where water has traces of oil. Cooling towers are fitted with high efficiency mechanicals which are axial flow fans, gear box and drive shafts. For smaller load application cooling tower are offered with direct driven arrangement where fans are directly mounted on motor shafts. Available from 100 m<sup>3</sup>/hr capacity in single

## Industrial Usage

Thanks to its belief "progress through technology" and continued commitment to the emerging technologies, Mahakal Cooling enjoys a large footprint the global cooling tower industry. North Street's expertise are already proven in each of the following industrial segments:

**Gas Based Power Plants Thermal Power Plants Nuclear Power Plants DG Power Plants Fertilizer Plants Petrochemicals Oil Refineries Steel Plants Cement Plants Chemical Plants Synthetic Polyester Plants Solvent Extraction Plants Vanaspati Plants Paper Industry Pharmaceutical Plants Tyre Plants Dairies Breweries Distilleries Oxygen Plants**

## STRUCTURE

Cooling tower structure is either in RCC or ASCU treated timber. Wood as per IS-2372 treated with (ASCU). Chromate Copper Arsenate as per IS-401 are used in structure. The standard structural design is based on wind loading of 150 kg/sq m. For RCC super-structure we follow IS 456 and RCC cold water basin designed is based on IS 3370.

## FRP FANS

Designed, tested and manufactured by us, fan material include cast aluminum alloy and FRP. Material is selected to be suitable to individual application requirements.

## DRIVESHAFTS

Mahakal Cooling drive shafts are tubular floating type and manufactured from hot dip galvanized or stainless tubes with HDG / stainless steel flanges. Full assembly contain flexible coupling and neoprene rubber bush. All drive shafts are dynamically balanced at the factory to minimize operating vibrations.

## Fill

Cooling Towers are designed based on the application it is going to serve and accordingly we select the fill type. Splash type Fills in the form of ASCU treated timber splash bar, PVC 'V' Bar fill and alternately high efficiency PVC film pack fill are available. Splash fill is supported on stainless steel grid. Film type fill packs are supported on structure members.

## ELIMINATORS

High efficiency drift eliminators are available in treated timber and PVC. They are in profile as well as cellular configuration.

## DISTRIBUTION SYSTEM

Mahakal Cooling non-clogging, large diameter low pressure spray nozzles for counter flow cooling tower make sure, uniform flow of water with minimal operating pump head. For gravity flow system in cross flow cooling tower orifice type polypropylene nozzles are used.