

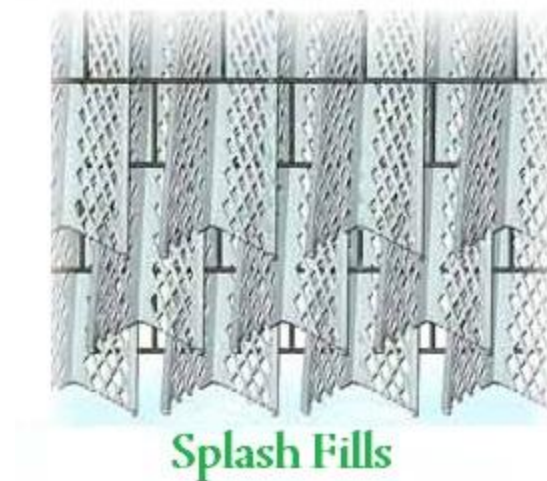
Cooling Tower Components

Major Components of Cooling Tower:

The major cooling tower components include Cold Water Basin, Cooling Tower Structure, Fills, Drift eliminators, Cooling Tower Fans, Water Distribution Piping's, Fan Deck & Fan cylinder, Cooling Tower Louvers, Gear box, Drive shafts & Mechanical Equipment Support, Valves, Nozzles and Electrical & Instrumentation systems. Let us see them in detail.

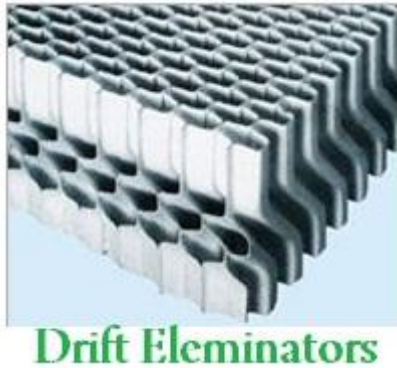
Fills:

Cooling Tower Fill is the main heat transfer area available for Heat transfer from Hot water to Cold Air. There are two types of fills available namely Splash fills & Film Fills. Splash fills disintegrates the hot water from vertical direction and it splits the water to pass through next level of splash bars. Film fills forms thin vertical film of water to make the air to contact in with to aid heat transfer. Fills are normally made of PVC, Polypropylene or Wood.



Drift Eliminators:

The purpose of Drift eliminator is to reduce the drift loss in cooling tower. Drift eliminators normally kept next to fills in the air flow path thereby reducing the drift loss. Drift loss is the loss of entrained water through hot air to atmosphere. Drift eliminators normally made up of PVC. More number of passes through drift eliminator decreases the drift loss but increases the pressure drop thereby increasing fan power consumption.



Cold Water Basin:

Cold Water Basin is normally made up of Reinforced Cement Concrete (RCC). It has got two functions. One is to collect the cold water from tower and acts as storage. The other is being strong it acts as a foundation for the main structure of cooling tower. The cold basin is either lies on the top of the soil or lies below the ground level. The height of the cooling tower is determined from the distance between the top of the cold basin to fan assembly.

Cooling Tower Structure:

Most of the Towers are made up of Chemically Treated Wood, while RCC & Fiber Reinforced Plastic (FRP) cooling towers are also available depending on the requirement of the user.

Cooling Tower Fans:

Main part of the cooling tower components. Cooling Tower fans are normally made from Aluminum, Fiber Reinforced Plastic (FRP), Glass fiber and hot-dipped galvanized steel are commonly used as fan materials. FRP being light in weight, impellers made up of FRP reduces the power requirements of the fan. Cooling tower fan blades pitch angle is varied depending on seasonal requirements. Cooling tower Fan blade Pitch angle is the angle made by the fan with the plane. Normally during summer season the air density is low. So the fan blade pitch angle is increased to increase the capacity of the fan.

Water Distribution Piping's:

Cooling Water Distributing pipes to hot basin must be buried underground or supported in ground to avoid thrust loading of the tower due to self weight and water pressure inside the pipe. Individual cell inlet piping is to be independently supported.

Fan Deck & Fan cylinder:

Fan deck provides a platform for the support of the fan cylinders and acts as access way to the fan and water distribution system.

Fan cylinder is venturi shaped for enhancing the proper flow of air through the tower. The clearance between fan blade tip and fan cylinder should be very less in order to have maximum efficiency.

Cooling Tower components – Louvers:

Louvers are made up of asbestos sheets. It serves two purposes. One is to retain circulating water within the tower, and other is to equally distribute the air flow into the fill.



Gear box, Drive shafts & Mechanical Equipment Support:

The drive shaft transmits power from the output shaft of the motor to the input shaft of gear reduction units. Gear box reduces the speed of the depending on the fan requirement. Torque tube unitized supports gives permanent alignment of the motor, driveshaft & gear reducer.

Distribution Valves:

Distribution Valves are used to regulate the hot water flow to distribute evenly in cells. The outlet is open to atmosphere. Valve body is designed to withstand the adverse corrosive environment. Valve should pose minimum pressure drop.

Nozzles:

Plastics are widely used for nozzles. Many nozzles are made of PVC, ABS, polypropylene, and glass-filled nylon. Nozzles are used to provide uniform distribution of hot water inside a cell of a cooling tower. Recent advancement of the design involves a non clogging type nozzle.

Cooling Tower Fan Motor:

Explosion proof motors are preferred for use in Petrochemical & Refinery cooling tower applications. As the Hot Cooling water from exchangers may have explosive gas if a heat exchanger is leaky. Motor is to be provided with Protection systems like Earth fault relay and over load relay etc.

Cooling Tower Instrumentation:

Vibration Switches, Low Oil Level Switches, Level Switches for Hot & Cold Water Basin, Thermocouples for Hot & Cold Water Temperature measurement and Flow meters for Cooling water makeup & Blow down rate are normal instrumentation system available in any cooling tower.

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