

Thermal Testing of cooling tower

Testing of cooling tower is an intricate process. It is an exercise to compare the performance of a working cooling tower to the design parameters on which it was offered. These design parameters are listed below

1. Circulating water flow volume (GPM or m³/hr)
2. Hot Water Temperature (degree Centigrade or Fahrenheit)
3. Cold Water Temperature (degree Centigrade or Fahrenheit)
4. Wet Bulb temperature (degree Centigrade or Fahrenheit)

To assess the performance of the cooling tower, ideally all the design conditions must be fulfilled to get the estimate of cold water temperature but its not possible to get all the design conditions at the same time, particularly wet bulb temperature which is taken for the worst condition and is generally very high and unachievable. More over it's a very dynamic quantity which changes from cell to cell even in the same cooling tower. So the cooling tower is tested for off design condition and this is normally done using testing methods as suggested by CTI ATC 105 code or ASME PTC-23. The results that are achieved are compared to that of the design condition offered.

The OEM submits a Design Characteristic Curve and Design Point of his proposed cooling tower which is used for comparison of the cooling tower with the test data.

This testing can be done by GTPL, which has its own testing team which conducts the test using the procedure as specified in the test code or may be informally done by the operating personnel but the nature and level of technicality required suggests expertise in conducting the tests.

Fill Selection:

Comparison between type of Fills—performance

	Splash Fill	Film Fill	Low Clog Film Fill
Possible L/G Ratio	1.1-1.5	1.5-2.0	1.4-1.8
Effective Heat Exchange Area	30-45m ² /m ³	150m ² /m ³	85-100m ² /m ³
Required Fill Height	5-10m	1.2-1.5m	1.5-1.8m
Pumping Head Requirements	9-12m	5-8m	6-9m
Quantity of Air Required	High	Much Low	Low

Water Quality Requirements for different Fills

	CF-1900	OF-21ma	VF-19Plus	VF-3800	TURBO Splash
TSS (ppm):	<100	<150	<500	No Limit	No Limit
w/high Bio:	<25	<50	<200	<1000	No Limit
Bio & Scale Control	Good	Good	Good	Poor	Poor to none
Oil & Grease (ppm)	None	<1	<5	<25	<500
Fibers	None	None	None	None	Some

Distribution System and Nozzle Assembly:

The distribution system of the cooling tower consists of distribution channel, PVC pipes coupled with the channel and nozzles attached in the PVC pipes. The function of this arrangement is to collect hot water from riser pipe to distribution channel from where water moves to PVC pipes. Nozzles attached in the pipes spray the water on fills by sprinkling on it. The key to good performance of distribution system is uniformity. Below the distribution system there are fills and above it Drift Eliminator.