

CONDENSER COOLING WATER TREATMENT - AN OVERVIEW.

In a Utility Power plant using steam for power generation, the Boiler and the Condenser are the two crucial components as their functions are interrelated. If the Boiler is regarded as the 'heart', the Condenser is the 'brain'. The importance of an efficient Condenser performance, therefore, need not be overstated. The Condenser converts the exhaust steam from the Turbines into ultra pure Condensate, which in turn serves as the Boiler Feed water. Depending on design, this phase change from steam to water involves a volume reduction to the extent of 1/25000 to 1/30000, sometimes, more. This volume reduction creates a Vacuum, which is important for the Condenser to continuously draw steam and maintain the turbine loads and in turn, the Boiler load. Any drop in the performance efficiency of the Condenser would disturb this vacuum, leading to a cascading effect on the Turbine and Boiler loads. The key factors that influence the efficiency of Condenser performance are (i) efficient removal of air and other non condensibles from the Condenser (ii) Maintaining clean surfaces and Heat transfer efficiency of the Condenser and (iii) efficient Condensate removal from the Condenser. Among these, Air removal and Condensate extraction are generally done efficiently, as they are apparent and the system is equipped with proper mechanical devices to achieve these. The one area which is beyond the control of a Utility Manager is, maintenance of clean heat transfer surface. This is because, the cooling medium of a Condenser is water, which signifies the problems discussed ahead. It has been established practically, that a sub Millimeter thickness of a Mineral deposit or a physical fouling on the Condenser heat transfer surface could lead to a loss in heat transfer of 10% and thereon. This loss in heat transfer, translated to loss of Power generation or Plant Load Factor, can be quite alarming. Though, present generation Condensers are built of deposit resistant metals like Stainless Steel, Titanium or Brass, the compulsion of increasing the water recycle, not just to maximize the use of available fresh water, but also for environmental obligations, place a premium on the Condenser heat transfer surfaces due to water side stresses. It is amply evident hence, that "only a clean Condenser can determine the Plant Load Factor and only an efficient Water treatment program can maintain the best Condenser efficiency"