

A.T.E. helps pharma major improve cooling tower COC

Background

One of the main factors in assessing the health of a cooling tower is the Cycles of Concentration (COC), which needs to be maintained at an optimal level. A too low COC indicates increased loss of water through evaporation and frequent blowdown, which means a substantial addition of makeup water, and thus high fresh water consumption. A too high COC on the other hand indicates an increased concentration of salts in water, which can lead to scaling, fouling and microbiological growth of undesirable bacteria and microbes. Moreover, high levels of salt in the water can also lead to an increased chiller condenser approach temperature, causing sub-optimal performance of the chiller.

Challenges

One of India's largest pharmaceutical companies has a plant in Goa, where they faced issues of scaling, corrosion, fouling, and microbiological contamination in their cooling tower. Most of the maintenance processes of the cooling tower were manual, which meant that there was a lag between measurement of parameters, dosing of chemicals, and blowdown. The blowdown, too, was manual and at fixed intervals with no strong correlation to other system parameters. After a deeper analysis, it was observed that they were operating the cooling tower at an 11.6 COC, as opposed to the target of 3-7.

The improperly maintained cooling tower also negatively impacted their chiller, leading to an increase in the condenser approach temperature of the chiller. A lower condenser approach temperature means lower chances of scaling, fouling of chiller tubes and smooth water flow through the condenser, leading to enhanced chiller efficiency.

Typically, every 1°C increase in the condenser approach temperature leads to a 5% increase in energy consumption, adding to the energy cost.

Solution

The company then decided to take corrective action by installing a Walchem W600 controller on the cooling tower to automate the dosing and blowdown processes. The W600 monitors system parameters such as pH, ORP, residual product, and conductivity, online. Online monitoring and automatic dosing helps maintain the levels of critical parameters precisely. Blow down is automatic as well.

Result

The Walchem W600 controller improved their COC considerably – from 11.6 to 6.7. The improved COC value means a lower salt concentration in the system, which helped reduce the condenser approach temperature to 1.6°C. By automating blowdown, the need for manual intervention too was eliminated. The chiller operating efficiency improved, and cooling was better than before. Furthermore, since ad hoc measurement and manual dosing of chemicals were eliminated, scaling, corrosion, fouling, and microbiological contamination are all issues of the past.