

Successful Implementation – Energy Conservation Measure

Measure
Thermostat based operation of cooling tower fan
Equipment
Cooling tower
Industry / Sector
Glass
Year of Implementation
1999
Cost Benefit Analysis
⊞ Type of Measure: Short term
⊞ Annual Energy Savings: 0.51 lakh kWh
⊞ Actual cost savings: Rs. 1.53 lakh
⊞ Actual investment : Rs. 0.25 lakh
⊞ Payback: 2 months
Implementation Highlights
<ul style="list-style-type: none"> ☞ Can be implemented in all types of cooling tower fans ☞ Very simple measure and can be implemented with out external expertise

Summary

Automatic temperature control for the operation of cooling tower fan resulted in switching off cooling tower fan whenever heat load on the cooling tower is reduced.

Background

The unit has centralized cooling tower to meet the cooling water requirement. The major heat loads are a glass furnace and refrigeration condensers. The cooling tower has three cells and each cell is served by individual fan. All three fans were operated and no control systems were installed to the cooling tower for the auto operation of fans.

Detailed analysis and measurement carried out during full production of the plant.

The Design and operating details are:

Design cooling load of the cooling tower	: 4 lakh kcal/h
No of cells	: 3
Design heat load of each load	: 1.33 lakh kcal/h
Design range	: 5 °C
Measured range	: 5 °C
Measured approach	: 0.5-1.0 °C
Design cooling water flow rated	: 800 m ³ /h
Actual water flow rate (measured)	: 485 m ³ /h
Present heat load	: 2.43 lakh kcal/h
Power consumption by one fan	: 6 kW

It can be seen that the actual heat load is about 60% of the total heat load which can be met by two cells only

. Plant has taken immediate steps and incorporated the thermostat to one fan. It was observed post-implementation that the fan remained switched off continuously since the cooling tower cells were able to meet the demand.

Details of techno-economics:

Power consumption by fan	: 6 kW
Energy savings	: 6 kW
Annual Energy savings @ 8500 h	: 0.51 Lakh Kwh
Annual energy savings	: Rs. 1.53 Lakh
Investment	: Rs. 0.25 lakh
Payback period	: Two months

Principle

Though significant energy saving potential in cooling tower fans exist, a detailed systematic study is essential to identify the energy saving measure through measurement and analysis

Implementation issues

Operation of thermostat and auto controls require periodic testing to check the operation of controls