

## Case Study

# Cooling tower

### Background

A major IT office complex in Chennai, housing software publishing and consultancy companies, has been operational since 2001. A cooling tower of 100 m<sup>3</sup>/h capacity was installed to cool the spaces in the IT complex. There were, however, complaints about comfort in some of the offices. The management team thus needed to review their facility's infrastructure. Their goal was to make the operations energy efficient, and optimise their existing equipment to reach the desired performance, but without investment in additional capacity.

### Challenges

An operational review of various facilities revealed a couple of different challenges. A major concern was comfort, as there were reports of inconsistent cooling from the users. However, the overall capacity was sufficient.

It was also observed that despite having a chemical treatment system for the cooling water, which enabled recycling of cooling tower water, the consumption of fresh water in the cooling towers was still quite high at 72.6 m<sup>3</sup>/day, incurring Rs. 2904/- towards fresh water every day. This was caused mainly because of the manual blowdown.

Thus, to summarise, while the cooling infrastructure was found to be more than adequate for the park, it was not providing sufficient cooling. Additionally, the cost of makeup water in the cooling tower was high even with a chemical treatment system in place.

### Solution

The IT park management approached A.T.E. to help them resolve the issue with the cooling towers. A.T.E. studied the system in detail and recommended the Walchem controller system to automate the dosing and blowdown processes.

Walchem controller not only monitors vital system parameters such as pH, ORP, residual product, and conductivity online, but it also ensures automatic dosing to help precisely maintain these critical parameters. With precise dosing and automatic blowdown, the cycle of concentration (COC) improved and was maintained at 6 (optimum level). Due to this, the blowdown was reduced by 39.7%, which in turn reduced freshwater consumption tremendously.

The optimum COC level and accurate dosing of chemicals helped to reduce condenser approach temperature of the chiller by freeing the chiller tubes of foulants, scale and corrosion.

### Results

1. The freshwater usage during blowdown reduced from 18.1 to 10.9 m<sup>3</sup> per day, saving almost 7.2 m<sup>3</sup> of water per day or 2628 kl of water annually, leading to a savings of ~₹1,05,120 (cost of water ~₹40/m<sup>3</sup>) annually.
2. The condenser approach temperature was decreased from an average of 5°C to 2°C, resulting in improved cooling in all the offices.
3. The power consumption of the chiller decreased by 6.32% from 8967 kW to 8400 kW per day. This reduction of 567 kW per day or 206,955 kW annually, amounts to a saving of ~₹1,966,072 (\* cost per kW ₹ 9.50)
4. Chemical consumption decreased by 20%
5. Increased ease of operation with automatic chemical dosing and monitoring system.

The management of the IT park was extremely pleased with the excellent results achieved with the installation of the Walchem cooling tower controller.

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