

Cooling Tower Case Study

August 18, 2016



LEED Gold Headquarters Building
Houston, Texas
1,000 Ton Cooling Tower

Key Success Factors

- Prevent scale and biofoul accumulation in tower and chiller
- Reduce water consumption
- Optimize chemical program effectiveness
- Extend service life of infrastructure, fill and piping
- Reduce energy costs
- Reduce maintenance expenses

Results

- All key success factors were met during the 90-day demonstration
- Cycles of Concentration doubled without scale accumulation while chemical use was reduced by 75%, resulting in over 50% water savings
- Projected payback period aligns with the customer's expectations

Electronic Water Conditioning Allows for Substantial Savings in Commercial Building



A Fortune 100 headquarters, located in Houston, TX was certified LEED Gold in 2008. While continued efforts have been made each year to improve energy and water efficiencies, the company still identified the need for its cooling system to improve water conservation, as well as energy savings and chemicals reduction. *HydroFLOW* electronic water conditioning was the recommended solution for achieving these additional savings. HydroTech Solutions, the *HydroFLOW* distributor in Texas and Oklahoma, provided a 90-day demonstration, beginning April 26, 2016.

About the Cooling Tower

The headquarters campus features two buildings, each with a 1,000 ton cooling tower situated on the rooftop. The cooling towers exhibited scale buildup on infrastructure, fill, and piping. The chiller units are opened for cleaning and inspection annually, with scale accumulation at entry sections and rifling that required cleaning. Three cycles of concentration were allowed with conductivity set-point of 1,500 μS for blowdown. Despite a diligent chemicals management program for the control of scale, bacteria and corrosion; the cooling towers continued to exhibit accumulated scale and biofoul.

The *HydroFLOW* Demonstration

HydroTech Solutions provided the 90-day demonstration of *HydroFLOW* electronic water conditioning as a means of reducing scale and biofoul accumulation, optimizing the chemical program, decreasing the cost of makeup water and lessening the expense of blowdown disposal. An additional added value was to extend the service life of the cooling tower and chiller.

A 12" Custom *HydroFLOW* unit was installed inside the building, on the return line from the chiller. No pipes were drilled or cut, and the circulation of the cooling tower water was not interrupted during the installation. As a part of the baseline data gathering process, HydroTech personnel cleaned scale, to bare metal, on several surface areas. The purpose was to prove *HydroFLOW* prevents new scale from forming. Additional baseline data which was collected included make-up water volume, sanitary sewer disposal volume, total bacteria in the water, chemical costs and maintenance related expenses.

The purpose of collecting the baseline data came to demonstrate the cost savings associated with *HydroFLOW* electronic water conditioning.

Testing Procedure

Chemicals were gradually reduced over a span on 4 weeks. Once it was confirmed scale and biofoul control can be achieved with a combination of *HydroFLOW* and minimal chemical usage, cycles of concentration were increased.

Pictures of Chiller Tubes



Pictures of Fill Media



Before

After



90 days into the demonstration, deposits inside the tubes and on the fill media did not increase after chemicals were reduced and the water concentration cycles were increased. Hard scale deposits began to soften and could be removed easily.

“HydroFLOW significantly improved the operation of our cooling system, in terms of cost and maintenance. This technology pays for itself with the monthly savings it attains.”

Headquarters Facilities Manager

Results

HydroFLOW successfully met the key success factor and also restored equipment condition by removing existing deposits. This allowed efficient operation for extended periods with less maintenance.

Sustained Cost Savings

The company’s goal of maintaining the cooling system within industry standards while reducing chemical and blowdown water usage was achieved. The monthly fee of leasing the electronic water conditioning equipment is covered by the cost savings.

HydroFLOW Benefits Included:

- **Makeup water savings of approximately 250,000 gallons per month**
- **Blowdown reduced by approximately 50%, saving significant water disposal**
- **Reduction of chemical use by 80%**
- **Prevention of scale formation throughout the cooling system**
- **Improved filtration capabilities of existing side stream filter**
- **Chiller tubes were free of scale deposits**
- **Cycles of concentration were doubled**
- **Water cost savings of \$2,500 per month**



About HydroFLOW

HydroFLOW devices, which are powered by Hydropath technology, apply a frequency that travels throughout the water system and causes dissolved minerals to cluster in the water thus preventing hard scale from forming on pipes and equipment. The ± 150 kHz frequency also disrupts biofilm and bacteria, which minimizes biological loading in a recirculating water system, such as a cooling tower.

HydroFLOW is installed on the outside of a pipe of any material (plastic, metal, etc.) without cutting or modifications.

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