

# Improved Biofilm Control Helps Pharmaceutical Company Reduce Costs And Enhance Sustainability



- ✓ **Industry:** Pharmaceutical
- ✓ **Application:** Cooling Towers / Chilled Loops
- ✓ **Problem:** Pharmaceutical manufacturer experiencing biofouling buildup in cooling systems leading to increased operational costs.
- ✓ **Solution:** Improved water treatment program by installation of a filtration system and a targeted chemical treatment program including periodical cleaning for biofilm removal.
- ✓ **Result:** Improvements to the program resulted in €87,000 savings in addition to a 340 ton decrease in CO<sub>2</sub> emissions.

## Prior State

A pharmaceutical manufacturer operating in Ireland wanted to improve the water treatment program and operational efficiencies across multiple sites. An evaluation at one of the facilities showed poor microbial control, resulting in reduced heat transfer efficiencies, further compromised as cooling demand and production increased. The reduced efficiency of the heat transfer equipment resulted in higher energy costs and CO<sub>2</sub> emissions.

## Proposed State and Justification

Chem-Aqua proposed to incorporate industry expertise and innovative technologies in order to decrease energy consumption, reduce CO<sub>2</sub> emissions and improve the chemical treatment program and cooling efficacy.

System audits confirmed the presence of elevated levels of microbiological growth and determined that their presence was the key contributor to poor heat transfer due to biofouling deposits. Since biofilms are four times more insulating than inorganic scale deposits, a focus on microbiological control was needed to improve heat transfer surface cleanliness.

## Corrective Actions

As part of Chem-Aqua's Get Clean, Keep Clean™ 360° approach to bio-management, a combination of mechanical and chemical solutions were employed in order to tackle the biofouling problem. A side stream filtration system was installed to reduce the amount of suspended particles and microbes contributing to the surface biofouling. The chemical program was improved with a selection of biocides more suited to the system particulars. Nitrite based inhibitors previously used were replaced with a more compliant option that would not act as a potential food source for nitrifying or denitrifying bacteria. In addition, system cleaning was completed using bioXile®, a patented biofilm removal product that disrupts the structure of biofilm, allowing biocides to be more effective and insuring a deep cleaning of the systems.

## Results

The bespoke programme improved the cleanliness of heat transfer surfaces. Client chiller data showed a 30% and 7% increase in heat transfer efficiencies over a two year span on two of the chiller systems, translating to a €87,000 reduction in energy expense. The reduced energy consumption had the additional benefit of a 340 ton decrease in CO<sub>2</sub> emissions, a critical operating parameter for the facility.



**Energy Savings**  
 Chiller 1 ■ 30%  
 Chiller 2 ■ 7%



**Savings = €87,208**



**Sustainability**  
**>340 Tons CO<sub>2</sub>**  
**Emissions Saved**

## NCH House

Bilston, West Midlands  
 England  
 +44(0)1902 510342  
 www.ncheurope.com  
 CAtechmarketing@ncheurope.com



## Regional Headquarters

United States • Irving, Texas  
 Canada • Brampton, Ontario  
 Europe • Birmingham, UK  
 Latin America • Mexico City, Mexico  
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 Asia Pacific • Shanghai, China