



GEMI[®]

Collecting the Drops:

**A Water
Sustainability
Planner**

Case Example

Ashland Water Technologies, Drew Industrial, Division of Ashland Inc.: Using Chemical-Free Microbiological Control at an Engine Manufacturing Plant

Achieving microbiological control in the process cooling system had always been a challenge for a major engine manufacturing plant in the Midwestern U.S. Ashland Water Technologies Drew Industrial's non-chemical SONOXIDE[®] ultrasonic system helped the client improve microbiological control over their conventional chemical biocide treatment program.

The engine manufacturing plant had in place a semi-closed, recirculating cooling system, used to remove heat from engines during the engine testing stage of the manufacturing process. Cooling water is circulated through a Dyno cooler where heat is removed from engines being tested. Cooling water is then passed through an open 10,000 gallon tank and then through a heat exchanger prior to being recirculated back through the process. This facility was in need of an improved microbiological treatment program. Total bacterial counts averaged 10^5 colony forming units per milliliter (CFU/mL) with activity often exceeding 10^6 CFU/mL. Biofilm contamination was evident especially in low flow areas. Mild steel corrosion rates increased to 5 mpy and were attributed to microbiologically induced corrosion (MIC). Biological control was further stressed by occasional process contamination adding to the organic loading. As a result, this critical process system would need to implement a costly shutdown each quarter for cleaning and disinfection.

The treatment program included dual alternating non-oxidizing microbiocides plus a biodispersant. Due to both process and metallurgy, microbiocide selection for this system is limited and restricts the application of oxidizing microbiocides and other chemical alternatives. As a result, this plant was continually challenged with maintaining a costly treatment program that provided marginal performance. This facility was interested in a non-chemical alternative for microbiological control.

Solution

The SONOXIDE ultrasonic system was recommended as an ideal treatment alternative for this challenging application. SONOXIDE treatment is a non-chemical means of controlling microbiological activity in recirculating cooling water. The patented technology utilizes low-power, high-frequency ultrasound to reduce total bacterial counts as well as control biofilm throughout the entire system. The SONOXIDE system was easily installed to a bypass from the 10,000 gallon recirculating tank. Upon start-up, all chemical microbiocide and dispersant chemicals were eliminated. System performance was routinely monitored using microbiological assay slides.

Results

SONOXIDE ultrasonic treatment provides improved performance over the chemical treatment program:

- Total bacterial counts now maintained at $\leq 10^2$ CFU/mL.
- No evidence of biofilm.
- Corrosion rates reduced from 5 mpy to less than one mpy due to elimination of biofilm and MIC impact.
- System cleanings and disinfections now reduced from quarterly to once per year.

Ashland Inc.: Using Chemical-Free Microbiological Control at an Engine Manufacturing Plant (Cont.)

Advantages

- Excellent control of microbiological activity reduced to and sustained at $\leq 10^2$ CFU/mL.
- Exceptional system cleanliness maintained through the elimination of biofilm.
- Minimize the impact of MIC (microbiologically induced corrosion) thereby extending equipment life.
- Elimination of all equipment, maintenance and labor costs associated with biocide feed and monitoring equipment.
- Process cost savings and throughput improvements achieved due to the significant reduction in system cleanings and shutdowns.
- Elimination of environmental, health and safety issues associated with chemical microbiocides.
- Establishment of a company-wide Best Practice standard for microbiological control that is safe, effective and compliant.