BCP™ 1015 In Injection Molding Facility

Sludge (Bio-organic deposit) Control

Case Study

Problem – Failure Rate

A Midwest plastic injection molding company had been treating their cooling tower water with good success over several years. Recently, the plant purchased a new packaged chiller to produce low temperature chill water for a specific mold application and used the existing cooling tower water to cool the condenser section.

After only a few weeks, the chiller efficiency dropped to the point that it could not maintain chill water temperature, and would fail due to high head pressure, attributed to surface fouling. The existing water treatment program failed to keep the surfaces clean of fouling. Chiller failure continued. The chiller issues caused significant production problems, including increased parts failure rate, product delays, and maintenance costs. In addition, chiller surfaces were significantly fouled as shown, and thus, production rate was further impacted.

Image 1: Bio-organic deposition

Cause of Problem - Biofouling

It was determined that the cause of fouling was related to a microbial produced coating (biofilm) on the heat exchange surfaces. Biofilm is created by bacteria so they can attach to surfaces, and reproduce more efficiently than if freely floating (planktonic). This “slime” (biofilm) prevents or limits biocides' ability to kill the bacteria. A microscopic layer of slime reduces heat transfer rates which results in loss of process temperature control. By the time such layers are visible, the problem is very severe.

Although studies on the bulk water showed very few microorganisms present, it was clear that significant slime remained on the heat transfer surfaces. The current biocide program was effective in the bulk water, **but was not effective in controlling surface fouling.**

Solution - A successful Biofilm Control Program (BCP™ 1015 plus biocide)

Immediately after cleaning the condenser, BCP™ 1015 (trademark of AMSA, Inc.), an effective penetrating agent, dispersant, and corrosion inhibitor, was used at dosage levels of 12 ppm (active) once per week. One hour after the addition of BCP™ 1015, the biocide was added (few ppm active).

Shortly after the addition of BCP™ 1015, a brownish foamy slurry developed. Slurry formation is related to the cleaning action and is proportional to the amount of deposits removed. Once the surface is clean, slurry formation stops.

BCP™ 1015, used on a consistent basis (maintenance mode vs cleanout mode), cleans surfaces and reduces the amount of biocide needed.

Image 2: BCP™ 1015-treated chiller surfaces free from bio-organic deposition

Results

• Prior to the BCP™ 1015 program, the chiller could stay on line no more than about 7 weeks before shutdown and cleaning.

• ***Using BCP™ 1015, there has been no downtime due to condenser fouling.*** After several months, inspection showed the surface to be absolutely clean with no indication of organic deposits.

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