

Protozoa

– In search of protozoa –

Introduction

Protozoa & legionella are reported to be linked. Legionella can be harbored within the body of a protozoa. Protozoa are large one cell organisms, which are easily seen under a microscope and are generally associated with a mature biological population. Protozoa consume bacteria and require a sizeable bacterial population in order to thrive. The existence of large populations of protozoa in a cooling system is not good.

Biocide programs should be designed to control the majority of bacteria found in any cooling system, as the primary threat to a cooling system is biological growth. In fact, over 90% of piping failures in cooling systems are contributed to biologically induced under-deposit corrosion conditions. The biocide program should be designed to control bulk water counts, biofilm, and under-deposit type bacteria.

Do not be fooled by decent bulk water counts. Testing is performed on cooling water to reveal “indications” of what may be occurring in the system. These indications are not empirical information as to the condition of the system in its entirety.

The testing of the water for key parameters (along with regular equipment inspections) is the correct way to address your cooling system needs. The tower sump, coupon racks, spool pieces, equipment strainers, and filtration media should all be checked regularly.

Case Study

This case study focuses on a large commercial office building in New York City with a tenant cooling system servicing a vast number of package units.

Backstory: A chief engineer noticed black deposit in the cooling tower, became concerned, and notified the property manager. The property manager asked his water consultant to come and immediately investigate the situation.

This system was on a standard Homeyer Consulting specified dual-alternating biocide program consisting of a halogen and non-oxidizing biocide with biocide additions of at least three feeds per week. The system was also outfitted with 0.5 micron and sand filtration. Months prior, the total biological counts (run twice weekly by building staff) had been close to zero, or zero, each and every time.

Over the years, this building has had problems with low-flow horizontal branch piping. Most of the horizontals had been replaced with copper, and all package units had been outfitted with three-way valves to ensure flow in the piping.

The Issue: The problem was that the package unit coils themselves (even with three-ways) can go stagnant for extended periods of time in the winter months. This water then becomes a breeding ground for bacteria. As warmer weather approaches, the tenants begin using cooling from the package units, which had been idle, releasing the organic matter to the rest of the system. This organic matter was first seen in the cooling tower and then was collected from one of the package unit strainers.

Results: The analysis of the strainer deposit found both large populations of bacteria and large numbers of various protozoa.

The Answer: The solution to this problem was the immediate sterilization (under the auspices of the treatment supplier) of the entire system in an attempt to kill off the protozoa and burn up the newly released organic material that was now in the system strainers. We feared that if an early season biological contamination was allowed to bloom, that the system may be plagued for months to come. The human health risk was taken very seriously and immediate action was ordered. Large numbers of protozoa are not a good indication for any system.

In the future, efforts will be made to open up the package units in the winter months during biocide additions.