A Better Way to Prevent Biofilm And Control Legionella

According to the US Centers for Disease Control (CDC), an increasing number of people in the US are getting the serious lung infection known as Legionnaire’s disease. Annually, about 5,000 people are diagnosed with Legionnaires’ disease and at least 20 outbreaks are reported. Among the persistent barriers to controlling these outbreaks identified by the CDC is biofilm. To resolve this problem, technologies are available to prevent the formation of the slime that harbors these deadly bacteria.

Cooling towers on buildings and other facilities are possible sites for Legionella development. When counts grow to high levels, outbreaks like the recent high profile cases in New York City can cause deaths. The CDC found that devices like cooling towers that can spread contaminated water droplets should have a water management program. A CDC “tool kit” for developing a good management program can be found at www.cdc.gov/legionella/WMPtoolkit.

Biofilm – The Culprit

Biofilm presents a significant challenge to maintaining a “clean” system in several ways. Biofilm is created when bacteria attach to a surface and synthesize an exopolymer which provides a matrix that supports and promotes further rapid growth. Thick layers can develop in as little as a few days. Mature biofilm colonies can then be difficult to remove and unresponsive to chemical treatment.

Biofilm acts to protect Legionella from heat and limit the penetration of disinfectants to control its growth. Biofilm also provides food and shelter supporting growth for as long as decades on any moist surface. Other contributors to rapid Legionella growth include scale and sediment that weaken disinfectants strength and create expanded surfaces for Legionella and other microbes to thrive. Biofilm can also compromise the effectiveness of chemicals commonly used to provide corrosion protection.

Prevention - The Answer

Programs that prevent the build-up of biofilm offer an important alternative to reactive treatment with biocides alone. One effective option is the biofilm-preventing chemical technology, Mexel 432/0. This emulsion forms a molecular layer of filming amines on the wetted interior surfaces of the cooling system to repel biofilm, scaling, and mud deposition, and protect against corrosion. It is the only filming amine approved by EPA for use as a biocide in cooling towers and once-through cooling systems. requiring only small
amounts dosed daily. The daily dosing requires only small amounts of product, but is effective in a wide range of bulk water conditions including pH, temperature, and hardness.

Laboratory testing of Mexel 432/0 demonstrated dramatic reduction in *Legionella pneumophila* serogroup 1, with immediate destruction of the bacteria within 30 minutes. Field experience over many years has also confirmed it as highly effective on biofilm and planktonic bacteria.

**Comprehensive Management Programs**

Other cooling tower system design and operating conditions can further encourage *Legionella*. These include systems where: water temperature is between 77°F–108°F (*Legionella* can still grow outside this range); water pressure changes cause biofilm to dislodge, colonizing downstream devices; pH is outside the effective range of 6.5 to 8.5 typical of most disinfectants; and/or inadequate disinfectant concentrations fail to kill or inactivate *Legionella*.

Effective control of biofilm is essential to prevent many potential outbreaks of microbial pathogens and other dangerous fouling conditions in cooling towers. Carefully designed and monitored chemical and maintenance programs are also required along with careful tracking of organisms that become resistant to conventional treatment. These comprehensive programs can effectively protect against unnecessary outbreaks of *Legionella*.

Additional resources:

[Bacterial Resistance to Antimicrobials in a Cooling Water System — Part 1](#)
By Chris L. Wiatr, Buckman Laboratories, *The Analyst, AWT, Volume 23 Number 2, Spring 2016*


“In Vitro Biocidal Effectiveness of Mexel 432/0 Against *Legionella pneumophila*, serogroup 1.” Performed by Special Pathogens Laboratory, The Legionella Experts®, 12/7/2015.

For more information, go to [www.mexelusa.com](http://www.mexelusa.com).