WATER TREATMENT NEWS

Keep Your Cooling System "On-Trac"

Volume 45
Winter 2012

Keeping your cooling tower system clean and free of scale and deposition is becoming an increasingly difficult challenge. The quality of many water supplies has deteriorated, and greater utilization of reuse and "gray" water for cooling system make-up has placed increased demands on cooling water scale and corrosion control programs.

The water treatment industry has responded to these demands by producing cooling water inhibitor formulations capable of providing complete scale and deposit control under the highly stressed conditions that lower quality make-up water supplies create. Water treaters in 2011 are armed with cooling water inhibitors featuring an array of advanced phosphonates and high-tech polymers, copolymers and terpolymers that can prevent scale formation under the most severe conditions.

That's the good news. The bad news is that the ability of these advanced cooling system scale and corrosion inhibitors to provide complete protection to system heat exchange and other surfaces is dependent on maintaining the cooling water inhibitor concentration within a narrow range. Too low an inhibitor residual for even a relatively short time can result in scale formation – in highly stressed conditions, scale can form in days or even hours if the inhibitor level in the cooling water is below minimum control parameters. On the other hand, maintaining a residual above the recommended range wastes money on inhibitor costs, and, under certain conditions, can also result in deposition on heat exchange surfaces.

Keeping inhibitor levels within the tight parameters necessary for optimum performance is difficult at best. Cooling systems can experience wide load fluctuations, resulting in commensurate changes in inhibitor demand. At the same time, these load changes impact blowdown requirements, which also affect the amount of inhibitor required to maintain a consistent residual in the cooling water.

The most commonly-used method for controlling cooling water inhibitor levels is by water meter/timer controlled feed. Using this method, cooling system make-up is routed through a contacting head water meter. After a pre-determined volume of water has passed through the meter, a contact is made, actuating a reset timer controlling the inhibitor pump. The pump injects inhibitor until the timer times out; the timer turns off the pump, then resets and waits for the next contact.

Water meter/timer-based inhibitor feed can provide adequate control over inhibitor levels, provided that most of the make-up is used to replace only evaporation and blowdown. In many systems, however, significant amounts of uncontrolled water losses such as leaks, windage and overflow occur. In these cases, inhibitor levels often vary significantly with water meter/timer control, resulting in rapid scale formation when the inhibitor level drops below the desired range, and waste of inhibitor when levels are too high. In either case, operational costs increase.

International Chemtex Corporation (Chemtex), a Lakeville, Minnesota provider of industrial water treatment chemicals, has addressed this problem with the development of On-Trac™, a line of cooling water scale and corrosion inhibitors that enables the system operator to precisely control product residuals within extremely tight parameters.

On-Trac™ inhibitors contain a specified level of a special fluorescent dye. The concentration of the On-Trac™ inhibitor can be measured with a high degree of accuracy through the use of an in-line fluorometer. Mounted in a by-pass on the cooling water system, the fluorometer sends a continuous beam of light through the cooling water flowing past an optical window on the fluorometer probe. The light beam excites the fluorescent dye mole-

This Newsletter courtesy of:

CHEMTEX
INTERNATIONAL CHEMTEX CORPORATION

8287—214th Street West ·Lakeville, MN 55044
952.469.4965

cules, which in turn emit light at a different wavelength. The fluorometer measures the intensity of the light from the dye molecules, and correlates it to the concentration of the On-Trac™ inhibitor in the cooling water.

A typical water meter/timer package controls cooling water inhibitor levels within plus or minus 10% of the desired concentration. Any amount above the target concentration is essentially waste, as no additional benefit is provided by higher inhibitor levels. Depending on make-up water chemistry and cooling water temperatures, scale can form on system heat exchange surfaces when inhibitor residuals are 10% below the target concentration, and corrosion rates would almost certainly be elevated.

Using On-Trac™ inhibitors controlled by an in-line fluorometer, product residuals are routinely maintained within plus or minus two to three percent of the target concentration, allowing the inhibitor to provide completely scale-free heat exchange surfaces and very low corrosion rates with no waste of inhibitor.

The graph shows a comparison of inhibitor concentrations in a cooling water system using water meter/timer control and on the same system using an On-Trac™ inhibitor controlled by an in-line fluorometer. On-Trac™ virtually eliminates inhibitor waste, saving chemical costs, while at the same time providing complete scale and corrosion control, optimizing system efficiency and extending equipment life.

John Hofstad, Chemtex Operations Manager, says that results using On-Trac™ are impressive. "We've seen significantly tighter inhibitor residual control, and outstanding scale and corrosion inhibition using On-Trac™," notes Hofstad. "And our customers are happy with the lower operational costs this technology provides. Their systems are clean, and in many cases inhibitor usage has been reduced."

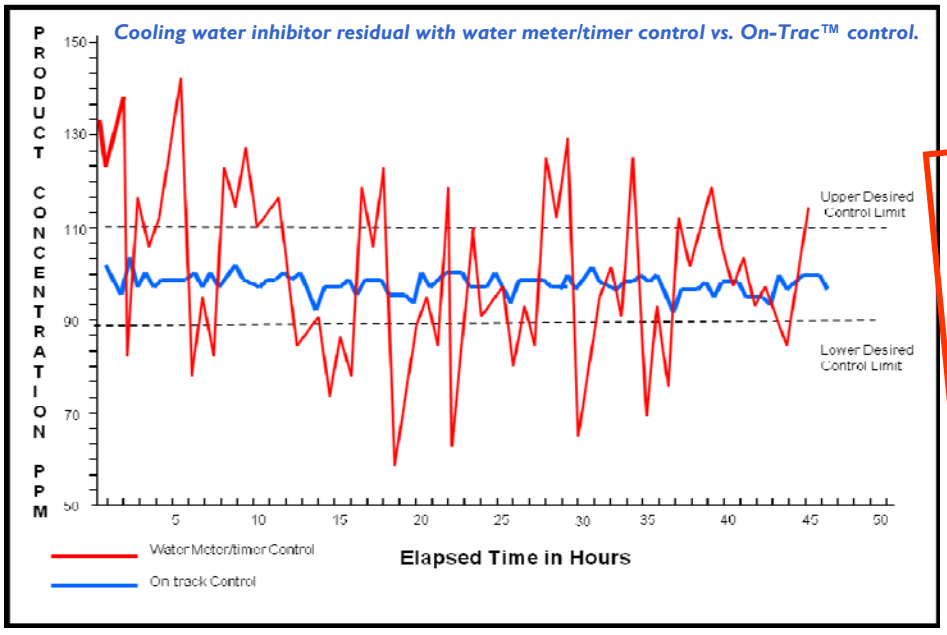
The fluorescent dye in On-Trac™ inhibitors also makes operator testing for product residual quick and easy. Operators test the cooling water for On-Trac™ product concentration using a hand-held fluorometer.

"Even the water test for On-Trac product residual saves time versus traditional inhibitor residual tests," says Hofstad. "Instead of the five or ten minutes required to test traditional inhibitor levels, the On-Trac™ test takes about 30 seconds. It's like testing conductivity or pH using a hand-held meter."

Hofstad says that a boiler version of On-Trac™ is also available.

"Using On-Trac™ for boilers, the boiler water sludge conditioner product residual is controlled in the same way as the On-Trac™ cooling water inhibitor. We don't have as much experience with On-Trac™ for boilers, but we expect to see the same degree of control in boiler water applications as we have with On-Trac™ for cooling," Hofstad observes.

Building owners and operators face an increasing challenge in maintaining their facility's cooling system clean and operating efficiently, and in many cases staff reductions cut the time they have available to monitor and control system operation, making the challenge even more formidable. On-Trac™ may help them meet this challenge.



Is your cooling system off track? Ask your Chemtex representative to show you how On-Trac™ may help!