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The Cooling Tower Pre-clean: Why It Is Important!

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Following is a summary of the pre-cleaning and passivation (pre-filming) processes and why they are important.

Prior to start-up of a new cooling tower, it is strongly recommended that the equipment be pre-treated in order to maximize the useful life of the system. Pre-treatment should include:

Cleaning to remove dirt, debris, and residual manufacturing materials and/or scrap
Passivation/pre-filming to create a barrier against corrosion

Pre-cleaning

Pre-cleaning is necessary to ensure that the pre-film and/or corrosion inhibitors will adhere sufficiently to the equipment. If the system is not pre-cleaned, there likely will be an increase in the amount of corrosion during initial start-up. This, in turn, will result in higher energy costs due to reduced heat transfer. Over time, there will be higher maintenance costs and ultimate equipment failure.

The best time to for a pre-clean is just prior to the scheduled start-up. This pre-clean should then be followed immediately by pre-filming in the form of passivation. The pre-cleaning phase typically will require 10 to 24 hours. Pre-cleaning is complete after a heavy blow-down of the system to remove all the cleaning chemicals and foreign material.

Pre-cleaning for most cooling towers will consist of a recirculating flow of detergent, surfactant, and anti-foam through the heat exchange components. An effective pre-clean should remove any hydrophobic materials left behind from manufacturing as well as light amounts of rust. During pre-cleaning, it is important to ensure that the pH is kept between 5.5 and 7.0. For quicker results, elevated water temperatures (> 150 F) likely will produce faster and more effective removal of contaminates.

Passivation

Immediately following pre-cleaning, passivation (aka pre-filming) should begin. Passivation is a common form of pre-filming that provides a barrier to corrosion. The key to successful and enduring Pre-film is ensuring the "film" is created evenly and at the appropriate rate. If too slow, corrosion might begin before the layer is complete; if too fast, weak spots in the film could occur.

Pre-filming does not eliminate the need for ongoing water treatment, but it does provide a strong foundation from which to build a regular water treatment program. Ongoing treatment in conjunction with a well-applied pre-film, the cooling tower will require less energy to operate, much less maintenance to keep it running, and enjoy a longer and more useful life.

Things to Remember

Significant changes in environment (e.g., severe pH depression) can destroy the pre-film, and corrosion products can accumulate before the film is reestablished through normal treatment. When this occurs, a pre-filming program may be necessary for rapid repassivation of the system. Pre-filming for cooling towers is recommended following any deep chemical cleaning or after significant changes in the environment, such as a sharp drop in pH.

Another method of pre-filming is to increase inhibitor levels for 6 to 24 hours. Although this is somewhat easier, it is less efficient and is generally used only when the continuous inhibitor program is phosphate based.

In general, pre-treatment and passivation, followed by ongoing treatment programs, will minimize corrosion over the life of any heat transfer system. Less corrosion translates to lower operating costs due to the improved heat transfer, longer service life, and reduced maintenance requirements.

Clear Water Technologies offers pre-cleaning and passivation/pre-filming chemicals and services for new and existing cooling towers. To learn more about how to prolong your investment and maybe even save some money, contact a Clear Water Technologies expert at info@ClearWaterTech.com or call 1.844.429.8324.

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