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Technical Articles & Hot Topics

What is Scale and Fouling?

Technical Article CWT-20



System characteristics, such as water velocity, residence time, water temperature, and system metallurgy will affect the type and amount of scale that is created in that system. In general, as temperatures increase and water flow velocities decrease, the level of scale will likely increase.

Typically, the most cost effective solution to control scale is to implement a chemical treatment program using Scale Inhibitors (phosphate or phosphonate) in conjunction with a dispersant. Successful programs will include monitoring and regular testing of the water quality to validate the effectiveness of the chemicals being used and to ensure that the chemical pumps and conductivity monitors are working properly.

Fouling is caused by insoluble particulates that are suspended in recirculating water. These particulates can accumulate to form deposits on the various surfaces in a system. The same system characteristics that affect scale will also determine the rate and level of fouling that occurs for the various types of particulates; however, the most important factor affecting rate and level of fouling is the size of the particle.

For cooling towers, the majority of contamination is in the form of either clay, silt, or iron oxide that enters the system as airborne contamination or as the result of leaks or corrosion. For boilers and closed loops, leaks and corrosion are the primary sources of particulate contamination that leads to fouling. Aluminum and iron hydroxides may also find their way into a system as byproducts from pretreatment stages.

Clear Water Technologies, LLC, is a Southern California-based industrial water treatment company. For more information, visit www.ClearWaterTech.com.

Prevention Solutions for Scale and Fouling

Filtration to remove particulates is a cost effective way to reduce fouling and should be integrated into any water system. Filters should be regularly inspected and replaced to ensure maximum effectiveness.

Dispersants should be added as part of a water treatment program in order to reduce the chance that particles will attach to the various surfaces in a system. Dispersants will cause particles to be more hydrophilic and therefore less likely to adhere to each other or equipment surfaces.

Surfactants should also be incorporated into a water treatment program to prevent fouling that might be caused by hydrocarbons that are insoluble in water. The surfactant will cause the hydrocarbons to emulsify so that they do not coalesce.

In general, the best defense against scale and fouling is a well-planned, well-executed water treatment program that is administered by a qualified water treatment specialist.