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TECHNICAL PUBLICATION

INFORMATION & STRATEGY FOR THE
FACILITY MANAGER

Cooling Water Treatment

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Proper water treatment is essential in preventing problems in your cooling water systems - to avoid disruption of service, to avoid energy waste, and to avoid liabilities. Below is a short summary of the problems commonly found in cooling water systems.

Deposition

Raw water contains minerals. As water evaporates in a cooling tower, it leaves the minerals behind. Over time, the minerals supersaturate and precipitate on heat transfer surfaces.

At best, this reduces your heat transfer efficiency and increases your energy costs. A mere eggshell thickness can increase your electricity cost by 15%.

Severe deposition can lead to high head pressure, unscheduled system shutdowns, and disruption to your service.

Proper water treatment modifies the crystal structures of the minerals, and/or disperses the precipitate to minimize its adhesion on heat transfer surfaces.

Microorganism

A cooling tower is like an air scrubber, scrubbing all air-borne particles including microorganisms.

Cooling water provides all the necessary ingredients, i.e., water, air, and nutrients, to support microorganisms growth. Over time, the microorganisms grow and cause various problems depending on the species.

- Slime producing bacteria can accelerate fouling and mineral deposition, increasing head pressure, and potential system shutdown.
- Acid producing bacteria can cause pitting which can eat holes through your pipes.
- Fungi destroy wooden cooling towers.

- Pathogenic bacteria, i.e., legionella, can cause serious-to-fatal health hazards and liability.
- Algae can grow due to sunlight and the various nutrients in the cooling water, i.e., nitrogen and phosphorous. Aside from being unsightly, it provides nutrients for further bacterial growth, and can dislodge to plug the cooling system.

Proper water treatment keeps the growth of microorganism under control.

Corrosion

Raw water contains dissolved gasses, among which is oxygen. Left untreated, dissolved oxygen causes corrosion on metal surfaces.

Corrosion shortens equipment life, resulting in unscheduled shutdowns, and disruption to your operation. In addition, corrosion produces iron oxide and iron chips that leads to erosion, iron deposition, plugging of strainers and pipes, high head pressure, etc.

Proper water treatment protects the metal surfaces against corrosion.

Air-Borne Particles

A cooling tower scrubs air-borne particles, increasing suspended solids which can foul the cooling system, increasing head pressure and operating cost.

Severe fouling will lead to unscheduled shutdowns and disruption to your operation.

Proper water treatment is essential in keeping these particles under control.