

Cooling Water System - Treatment, Engineering Design, and Operation.

Evaporative Cooling is the most energy efficient and therefore the prevailing form of Cooling.

For every 1% of cooling water evaporated, the remaining cooling water is cooled 10°F down to the wet bulb temperature. The heat removed from the water is rejected into the air.

In the evaporation of cooling water, Acidic carbon dioxide gas (CO₂) is released into the air, raising the cooling waters' pH, converting relatively soluble calcium bi-carbonate into Calcium Carbonate scale:



The 1950s method to eliminate scale, was to add concentrated sulfuric (battery) acid to lower the cooling tower water pH, and keep the hardness as Calcium Bi-Carbonate (relatively soluble). Acid addition causes excessive system corrosion, and is a safety hazard.

We prefer a softened water make-up which is much safer and eliminates corrosion from acid addition. With corrosion protection designed for soft water, metallurgical protection is complete.

One old technology, Lignin (extracted from trees as a by-product of paper making), is cheaper to formulate with, but is marginal at preventing scale. Lignin is a dark black liqueur extract, not in solution, and is easily visually identified by its' dark blackish murky appearance.

Much better / more effective protection is provided by the more modern synthetic polymeric dispersants and sequestrants, developed beginning in the 60s, 70s 80s, and 90s, which produce superior system cleanliness with optimum heat transfer.