



GENERAL INTRO & PERFORMANCE NOTES

The MetalOx Cooling Tower Treatment System:

KDF has been used to treat cooling tower water for years. The reason why CuZn's MetalOx system is so unique is that our new-patented reticulated media delivery system allows for greater water treatment effectiveness. This is due in part to the increase in water contact time which results in complete, enhanced electrochemical reactions.

Additionally, the stabilized, porous structure of the MetalOx media allows for minimally invasive installation, requiring only that the Cube Unit be placed in a location within the sump where water is recirculated through the media.

The development of the MetalOx reticulated media delivery system eliminates the challenges previously faced when treating cooling towers with traditional granular KDF Media. When utilizing granular media, the installation of a separate piece of equipment in the recirculating loop to fluidize the media bed, along with regular maintenance for that equipment, is required.

While it has long been the consensus that KDF outperforms chemical treatment regiments, the challenges of utilizing the granular form of KDF have prevented many from making the switch.

Now with the introduction of CuZn's new MetalOx Cooling Tower Treatment System, the best cooling tower water treatment system can be implemented with minimal installation and maintenance!

Monitoring & Performance Notes:

When utilizing the CuZn MetalOx Cubes products, pH and TDS should be monitored on a weekly basis to determine the blowdown cycles guidelines of between 10 and 15 cycles. The MetalOx cubes last a minimum of (1) year.

The MetalOx system creates a highly reducing aqueous environment reducing scale from harmful calcite to non-fouling aragonite which allow much higher TDS operations and higher cycles of concentrations, saving substantial blowdown water and energy, with efficient coil heat transfer. The solubility of water is enhanced by the creation of aragonite CaCO_3 and calcium bicarbonate ($\text{Ca}(\text{HCO}_3)_2$) which are much more soluble in water than calcite CaCO_3 .

Corrosion is minimized because the MetalOx system acts as an oxygen scavenger depleting the water system of dissolved oxygen which is the main contributor to cooling tower corrosion. An instantaneous -300 mV ORP, indicating excess electrons, causes water to be reduced, producing H^+ and OH^- ions, thus using up H^+ that react with dissolved O_2 , producing water in the following equation: $O_2 + 4H^+ + 4e^- > 2H_2O$, and causing pH to stabilize at 8+.

In addition, calcium bicarbonate is formed ($Ca(HCO_3)_2$) rather than calcium carbonate ($CaCO_3$), using twice the dissolved oxygen. Also, dissolved oxygen is used in the formation of bacteria killing hydroxyl radicals and hydrogen peroxide. And since the filter prohibits bacteria, it eliminates hydrogen sulfide and hydrogen chloride from decomposing bacteria, which are corrosive.

Control & Prevention of Bacteria & Algae Growth:

The MetalOx system controls bacteria, algae, and mold, including legionella. Again, the highly the reducing environment of -300mV, create excess electrons in solution. The excess electrons in solution cause the formation of hydrogen peroxide in the following equation: $O_2 + 2H^+ + 2e^- > H_2O_2$ (Kills bacteria, reduces DO, oxidizes Fe^{+2} , increases pH); and the formation of highly reactive hydroxyl radicals ($\cdot OH$) by the following equation, : $H_2O_2 + e^- > 2\cdot OH$ (Hydroxyl Radicals- BioDetergent). The microorganisms are destroyed electrochemically, by the hydroxyl radicals, and by hydrogen peroxide.

The MetalOx cube containers are coated to withstand continual use in 9 pH seawater without corrosion. In addition, in the MetalOx system, Zn is oxidized which creates a galvanic effect protecting the cooling tower metals.



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