

# How to Stay Ahead Of Corrosion

**T**here is a new generation of vapor-phase corrosion inhibitors available with preservatives to prevent biological growth.

Operators of cooling towers face a never-ending challenge to maintain optimum operation. Operating efficiency is adversely impacted when deposits form on the tower fill. These deposits take the form of scale, corrosion, biological growth and sludge. Operating efficiency also is impacted by degradation of the structure itself. Corrosion is one of the key players in the degradation of steel and concrete structures.

Mitigation of corrosion and mitigation of biological growth are accomplished by changing the material used to construct the cooling tower structure and fill, and by treatment of the water with various chemicals to impede corrosion and biological growth. New fiberglass materials and plastics, while being highly resistant to corrosion and bacterial growth, are quite expensive and as a result many galvanized towers are in operation. Concrete towers are also becoming more prevalent, especially at large power plants.

Operators of both the galvanized and concrete towers face unique challenges for optimizing efficiency while meeting more stringent environmental requirements.

The products are segregated by tower design, i.e. closed-loop, open-loop and concrete natural draft. This new line of products is an effective replacement for nitrite- or chromate-based formulations. They combine contact and volatile (vapor phase) corrosion inhibitors with anti-scalant in a non-toxic formulation with no nitrites, phosphates, chromates or heavy metals. Due to their environmentally friendly nature, these new products minimize the disposal issue, especially for large quantities of water.

The following are some of the many uses and environmentally friendly features of this product line:

- Effective in fresh water, salt water, brine and glycol coolant systems.
- Does not contain nitrites or free amines.
- Vapor-phase action provides protection to non-wetted areas.
- Readily water-soluble.
- Multi-metal protection including galvanized steel, copper, aluminum and ferrous metals.
- Effective in low dosages.
- Solubility is not affected by pH range or salt concentration levels.
- Biodegradable.

Concrete towers present more of a challenge in that one of the major issues is failure of the concrete structure due to corrosion of the embedded metal supports. Migrating corrosion inhibitors (MCIs) have been developed to address the issue. These products can be added to the concrete mix during the construction phase, which provides corrosion protection to the embedded metals.

For existing structures, there is a surface-applied MCI product that is painted onto the structure. The MCI migrates into the concrete attaching to the surface of the embedded reinforcement. Testing to various ASTM standards has shown that MCI doubles the time before onset of corrosive attack and reduces the corrosion rate up to 80 percent. Furthermore the testing has demonstrated the migration rate of MCI into existing concrete surfaces to be 3 to 4 inches in 28 days

## IN BRIEF

### Increasing Tower Efficiency

Cooling tower users, always looking for ways to prevent corrosion and extend the life of their units, are increasingly turning to vapor-phase corrosion inhibitors (VPCIs). Less corrosion also means a more efficient tower with less maintenance downtime.

The advantages of VPCIs are many, including the features listed below.

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- Solubility is not affected by pH range or salt concentration levels.
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The untreated panel on the left shows extensive corrosion from damaging deposits. The panel on the right, which was treated with a vapor-phase corrosion inhibitor (VPCI), is corrosion-free. VPCIs can greatly extend the life of cooling towers.