

GenGard* Technology

For Open Recirculating Cooling Systems

- Maintains System Cleanliness
- Only Halogen Stable Technology in the World
- Uncompromised performance under stressed conditions

Description and Use

GenGard* is the most advanced and effective water treatment technology for open recirculating cooling systems. GenGard treatment programs can be applied across the entire pH spectrum from neutral to alkaline and ensure uncompromising results even under the most stressful conditions. The programs incorporate the most advanced deposit and corrosion additives available. The patented GenGard technology includes a new Stress Tolerant Polymer (STP), alkylepoxycarboxylate (AEC) and halogen resistant azole (HRA) in combination with phosphate-based steel corrosion inhibitors.

All GenGard treatment components are stable and retain their effectiveness in the presence of chlorine and other halogens. Halogen stability allows Legionella compliance when chlorine or bromine residuals are continuously applied at effective levels (0.5-1.0 ppm free Cl₂) for general microbiological control and during periodic system disinfections (> 5 ppm free Cl₂). Unlike conventional treatments, GenGard provides the freedom to effectively respond to microbial upsets without a loss of deposition or corrosion control.

The stress tolerant polymer (STP) is the culmination of more than 30 years of polymer research at GE Water & Process Technologies.

a product of
ecomagination™

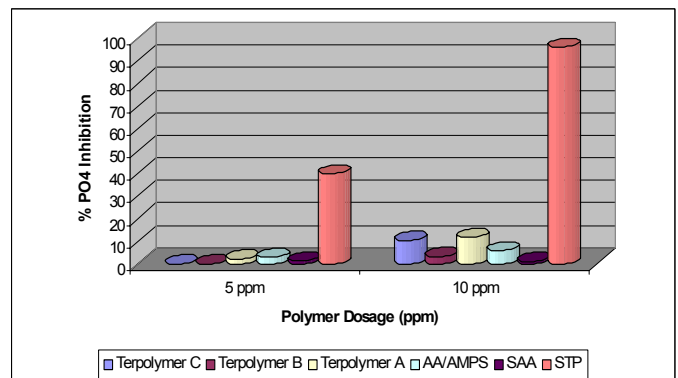


Figure 1: Calcium phosphate inhibition at 400 ppm calcium hardness, pH 8.2, 10 ppm PO₄, 160°F (70°C)

STP is designed to maintain phosphate-based and zinc-based corrosion inhibitors soluble. (Figure 1) The STP performance far exceeds that of conventional polymeric dispersants, providing exceptional corrosion protection while preventing deposition even in the most demanding applications. The STP performance is not adversely affected by aluminum carryover from influent clarifiers, high temperatures encountered with low flow heat transfer equipment or soluble iron generated from corrosion or entering with the makeup water.

AEC is the only effective non-phosphorus calcium carbonate scale inhibitor for open recirculating system operation above 2.5 LSI (Langelier Saturation Index). Breaking the calcium carbonate supersaturation barrier of organic-phosphate scale inhibitors (phosphonates), AEC provides excellent deposition control under severe conditions where others fail. AEC's superior calcium tolerance and hydrolytic stability permit high cycle operation even under the most stressed conditions.

GenGard products include HRA, a modified azole that provides unequalled copper alloy corrosion protection. HRA is halogen stable and capable of

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maintaining effective corrosion inhibition even in the presence of chlorine and bromine-based biocides. Conventional azole inhibitors, such as tolyl-triazole and benzotriazole, are readily halogenated in the cooling water, preventing the establishment and repair of a protective film on the metal surface. HRA maintains its activity both in the water and on the metal surface, ensuring continuous protection for copper alloys. HRA also reduces copper levels in the cooling water, minimizing copper discharge and effectively controlling destructive galvanic pitting on steel surfaces.

Typical Applications

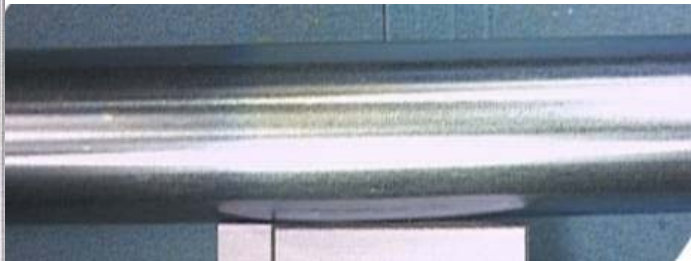
The GenGard GN7000 series of products are designed for cooling systems operating in the near-neutral pH 6.8 - 7.8 range. They utilize high levels of inorganic phosphate to promote the formation of a thin, protective iron oxide film on steel surfaces. This protective oxide film is extremely tenacious and does not interfere with heat transfer. STP provides the necessary calcium phosphate control to maintain system cleanliness and uninterrupted operation. (See Figure 2.)

The GenGard GN8000 series of products are designed for waters in the less corrosive alkaline range above pH 7.8. GN8000 products utilize AEC as the basic component to allow operation at highly alkaline conditions without concern for scale formation.

For More Information

For more information on the GenGard Technology, please contact a GE Water & Process Technologies account representative or visit us on the web at www.ge.com/water.

2 ppm STP/HRA
 LCS <0.5 mpy
 ADM <0.2 mpy



8 ppm AA/AMPS /BZT
 LCS - 1.4 mpy
 ADM - 0.6 mpy

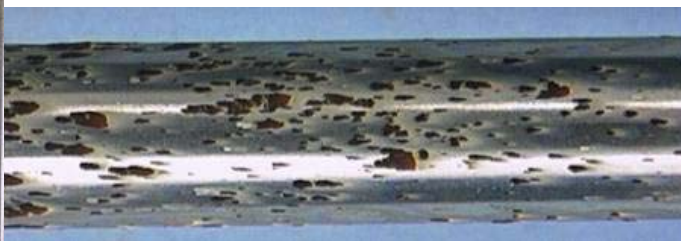


Figure 2: Comparison of Halogen Stable vs. Conventional Treatment, neutral pH, phosphate program, continuous chlorination (0.5 - 1.0 ppm free Cl₂)