

SofTek and Phosphonate-Polymer Product Corrosion Rate Comparison Low Hardness, Alkalinity, and Dissolved Solids Makeup Water

CHR 1111

Background

ProChemTech has provided the water management program for a large sintered metal parts plant located in Western Pennsylvania since 1988. As the plant was supplied with a high quality city water makeup supply, low hardness (TH < 20 mg/l), alkalinity (TA < 25 mg/l), and dissolved solids (TDS < 80 mg/l); the water management program has utilized our polysilicate based corrosion and deposition inhibitor products, SofTek, through the various product improvements to 2011. In March, 2011, due to promised lower program costs, plant management decided to change to another water management program based on a phosphonate-polymer based corrosion and deposition inhibitor as is commonly used for hard, alkaline makeup waters. As sintered metal part plants are equipped with steel jacketed furnaces operated at high water temperatures and low flow rates, they are especially susceptible to ferrous metal corrosion and deposition problems. The plant engineering and maintenance departments were not pleased with this cost cutting action and authorized ProChemTech to continue the long running corrosion monitoring program on a plant cooling tower system.

Corrosion Monitoring Results

The following table compares 90 day length corrosion monitoring results by study completion date on the standard evaporative cooling tower system monitored.

Coupon Material	Phosphonate Polymer ProChemTech SofTek Program				
	09/01/11	03/04/11	12/01/10	09/01/10	06/01/10
steel - mil/yr	4.91	0.47	0.57	0.47	0.57
steel - mil/y	4.20	0.47	0.38	0.39	0.47
copper - mil/yr	0.09	0.08	0.08	0.08	0.00
brass - mil/yr	0.10	0.09	0.09	0.09	0.03

These results clearly show that the new phosphonate-polymer program has an average steel corrosion rate approximately 9.7 times as high as the ProChemTech SofTek program. Even if the new program is substantially less costly than the SofTek program, the high corrosion rate will result in premature failure of steel furnace cooling jackets and cooling water piping as well as increasing the amount of iron corrosion products depositing in, and plugging, furnace cooling jackets and piping. Due to use of the phosphonate-polymer program, plant operating costs will be substantially higher from premature equipment failure and additional maintenance costs than any cost savings realized on the water management program.

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SofTek chemistry is patented: US patent #7,595,000