

EPP Improves Performance, Saves Energy and Water

Challenge

Each one of GE's businesses is committed to exhibiting the company's ecomagination vision—by adopting innovative solutions that benefit the productivity and financial performance of the business and the environment.

Roper Corporation, a wholly owned subsidiary of General Electric, produces cooking appliances. The company uses conversion coatings in the manufacture of many of its product parts. The parts are cleaned, rinsed and then chemically pretreated with a conversion coating that promotes paint adhesion and resistance to corrosion. Until recently, the facility used an iron phosphate conversion coating that required a bath of 125 to 140°F (52 to 60°C) and a post-treatment rinse stage.

GE found that a few small changes in the plant's conversion coating process yielded big savings in energy and water consumption, improved product quality, and vividly illustrated the power of the products in GE's ecomagination portfolio.

Solution

Roper Corp. asked its current supplier of iron phosphate conversion coatings to lower the energy consumption of the existing process without compromising product quality. The company also decided to test a new ecomagination-certified Permatreat Enhanced Performance Pretreatment (EPP) from GE Water & Process Technologies and compare its performance against the existing system. EPP offers an industry-unique method for metal surface preparation since the process operates at ambient temperature, eliminating the need for a boiler to heat the bath, and also requires no post-treatment rinse.

Roper Corp. could run the EPP process in the existing tanks, without major adjustments. Prior to implementing EPP at the facility, the company conducted extensive laboratory testing to evaluate the product's performance on all cooking range parts. After achieving favorable results, they implemented EPP at the facility in July 2006 for a six-month trial.



Corrosion performance was carefully monitored during the trial and the results clearly showed that EPP significantly outperformed the iron phosphate process. Roper Corp. compared the Neutral Salt Spray (NSS) performance from 12 months of iron phosphate data and six months of EPP data and found that EPP increased NSS performance by an average of 25% over iron phosphate.

Results

Since implementing the EPP process, the Roper Corp. plant has reduced phosphate levels in wastewater effluent by 45%. Regulatory trends suggest that phosphate limits will become more stringent in the future, and Roper's recent reduction means the company will meet or exceed regulatory changes for the foreseeable future.

EPP also enabled the plant to eliminate a boiler, resulting in annual energy savings of U.S. \$100,000, and reducing greenhouse gas emissions by 13.9 million ft³ (393,604 m³) per year. Since the final rinse step is also no longer required, the facility will lower its water demand by more than 360,000 gallons (1,363 m³) per year.

This simple change to a common manufacturing process can have significant environmental benefits. If only 25% of the world's manufacturing plants using iron phosphate conversion coatings switched to Permatreat EPP technology, they would collectively use 1.4 million fewer MWh of heating energy per year, or enough to heat 800,000 U.S. homes. They would also emit 250,000 fewer tons of CO₂ per year, or the amount emitted by 49,000 U.S. passenger cars.

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Find a contact near you by
visiting gewater.com or
e-mailing custhelp@ge.com.

Global Headquarters
Trevose, PA
+1-215-355-3300

Americas
Watertown, MA
+1-617-926-2500

Europe/Middle East/Africa
Heverlee, Belgium
+32-16-40-20-00

Asia/Pacific
Shanghai, China
+86 (0) 411-8366-6489

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