

# Guardian Program Improves Process Control, Productivity and Corrosion Protection at Lower Cost

## Challenge

A powder coater with multiple three-stage washers was having a growing problem meeting its customers' increasingly demanding neutral salt spray (NSS) performance requirements, although it diligently followed its chemical supplier's technical recommendations. It appeared that equipment modifications would be necessary to improve the performance of the three-stage washers.

The powder coater had been dumping its Line 1 rinse section on a daily basis while adding seven different chemicals to the other stages of the washer. Line speeds were drastically reduced to increase dwell times for problem parts. Line 2 was operating at a pH of 3.7 to 4.2 in order to increase cleaning ability and to obtain a better etch on aluminum parts.

The goals of the program were to:

- Increase NSS results to above 240 hours
- Decrease operator handling of chemicals
- Reduce the number of chemicals used
- Minimize line temperatures to conserve natural gas
- Maintain a more neutral pH to extend equipment life

## Solution

Powder coater personnel attended a GE Water & Process Technologies phosphating seminar, and gained confidence in the expertise of its metals process specialists by working with the local representative. Together, they conducted an extensive engineering line survey and reviewed several case

histories. GE used a "Total Systems Approach" in dealing with the customer's performance, quality and cost concerns.

A comparison was run in the powder coater's plant using CRS oiled panels. A GE portable washer was brought in and matched against one of the three-stage washers. NSS testing showed that the customer's pretreatment program fell short of the required NSS hours. The portable washer with the Guardian Program exceeded 500 hours.

Based on this marked improvement, the customer implemented a Guardian Program using Permatreat\* 377M cleaner and iron phosphate conversion coating. Permatreat 377M combines a very robust surfactant package for cleaning with a "high end" phosphating chemistry. The result is a single treatment that gives a tightly adherent coating. The customer is also utilizing Permatreat 604A sealer to increase corrosion resistance. This chrome-free sealer requires no special waste disposal.

The GE chemical specialists and supportive technical service personnel cleaned parts and consistently obtained 40+ mg/sq ft of phosphate coating weights on Line 1 and 60 mg/sq ft on Line 2. GE also regularly tested coating weights and NSS hours during the key start-up phases. The results showed the customer was able to obtain over 1,000 NSS hours using only two chemicals: a cleaner/coater and a sealer.

An additional controller was added to the sealer stage. The customer's first line was already using a pH controller on the cleaner/coater stage. The cleaner/coater stage and sealer stage on Line 2 were automated with AccuTrak\* pH control equipment. With the addition of this equipment, operator



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involvement in process monitoring and control was dramatically reduced. Operator testing could now be performed twice per shift instead of every 30 minutes, while obtaining a more consistent bath chemistry and producing a better quality product. Automation also allowed the customer to eliminate the manual addition of chemicals and reduced the number of chemicals used from seven to two.

Both lines had been running their cleaner/coater baths at excessive temperatures (135 to 160°F {57 to 71°C}) in order to clean parts properly. With the GE pretreatment program, the baths can now be run at a temperature of 120°F (49°C) for almost all parts. Parts that are difficult to clean because of excessive oil and grease occasionally require an increase in temperature to 135 to 140°F (57 to 60°C). Lowering the bath temperatures saves money in energy costs by reducing the use of natural gas by the washers.

The GE program also permits both lines to be operated at a pH of 4.8 to 5.2 on all parts. This is 1.0 pH unit higher than Line 2 was running previously. By operating at a higher pH for everyday production, the customer lowers the corrosivity of the bath and extends the life of the steel washer and recirculating equipment.

## Results

The successful alliance between the powder coater and GE resulted in wide-ranging benefits that increased performance, productivity and product quality while reducing operating costs. Customer confidence in the reliability of the pretreatment program was strengthened.

Immediate improvements were realized in the bath chemistry. Line 1 increased stage one bath life by 50% and extended sealer stage bath life by 200%. Line 2 increased stage one bath life by 50%, while generating less than half as much sludge as before. This sludge also was much easier to clean.

Equally dramatic changes occurred with the improvement in neutral salt spray hours to a level exceeding the powder coater's requirements, making the customer more competitive in marketing corrosion resistant parts.

Other important benefits included:

- Decreased operator involvement and overtime hours

- Elimination of acrid chrome vapors from the work environment
- Improved process control
- Consistent product quality
- Reduction of energy costs

## A Changed Opinion

Before the GE involvement, the customer had assumed that cleaner chemicals were pretty much the same. "I was pleasantly surprised to see the rapid and significant improvement in salt spray results with the Guardian Program," said the owner. "Substrate preparation is the life blood of our business and is critical to long-term performance. In addition to short-term cost savings, we were able to pursue new avenues of business previously lost because of the salt spray shortcomings. The cost savings were a bonus. The quality improvements were critical to maintaining a competitive position.

"The customer service provided by GE personnel was totally professional and above and beyond the call of duty. GE spent enough time here at all times of the day and night during the phase-in period to qualify for a time card. They were very knowledgeable and dedicated to problem solving."