

Powder Coating Teams with Magnesium For Growth in High-Tech Consumer Products

As more electronics equipment manufacturers move beyond plastic to magnesium to make cell phones and laptop computers lighter and more durable, powder coating provides the high-end finish that consumers have come to expect, while contributing to the external durability of the product.

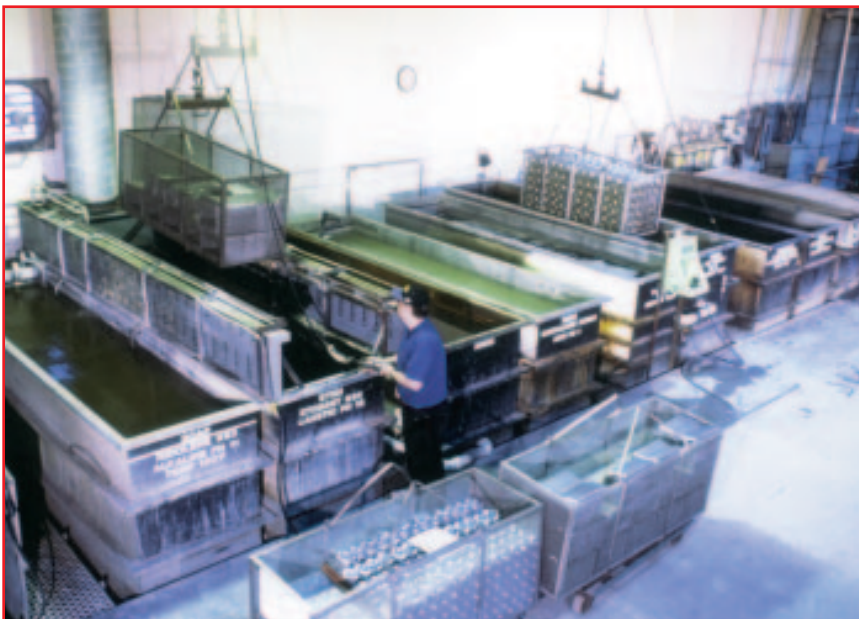
For Applied Coating Technology, Inc. (ACT), a custom coating jobshop in Minneapolis, MN, the new high-tech role for powder coating offers the potential for new product lines.

Lightweight Substrate Is Good for Business

"Magnesium has been a big area of growth for us," said Mike Meagher, ACT's vice president of manufactur-



About 60 percent of the painting work processed at Applied Coating Technology is powder coating. These parts are being finished for use in laptop computers. (Photo courtesy of Henkel Surface Technologies.)



Proper cleaning and pretreatment are essential for a successful finish with powder coating. This hoist line at Applied Coating Technology, Inc. is custom-designed to process lightweight magnesium parts so that the powder will stick to the substrate. (Photo courtesy of Henkel Surface Technologies.)

ing and engineering. Since ACT took its first magnesium job three years ago, coating laptop computers, the orders have continued to come in for different product applications. Bar code scanners for use in parcel delivery have already moved from plastic to magnesium. Cell phone manufacturers are also finding that magnesium offers a lighter phone with a more stable frame.

Seattle-based Itonics, Inc. was ACT's first partner in magnesium three years ago. The company manufactures laptop computers for clients who use them in service on the road, including Sears' service technicians and AT&T's diagnostic teams. "Itonics makes a water-tight laptop that technicians can throw on the front seat of a van, and they often fall off the seat onto the floor," said

Meagher. The laptop, fitted with a rubber armor boot to absorb the daily impact of life on the road, relies on powder coating for abrasion resistance as it jolts and bounces during the ride from job to job.

The magnesium is a critical component for the sturdy laptops, making them lightweight and durable.

Surface Preparation Is Critical for Success

ACT faced a few significant hurdles in the preparation of the magnesium surface prior to powder coating. They knew from previous experience that a process that only cleans the surface would result in powder adhesion problems with the magnesium substrate. Industry standards from the treatment of magnesium prior to painting called for an alkaline chromate process. That process, however, proved to be less than desirable, because of waste treatment and disposal concerns. An alternative chromate process also proved ineffective, because it left too many byproducts, or "smut" on the metal, resulting in a number of issues, from appearance problems to poor performance of the powder topcoat.

"Magnesium presents a lot of problems in getting cleaned and prepped," Meagher said. One of those problems is de-gassing the porous magnesium to prevent the coating from trapping pockets of air and driving them out during the curing process, creating disruptions in the finish. "You can't just clean the magnesium. It doesn't lend itself to traditional prepping," said Meagher.

ACT called in its pretreatment supplier to solve the problem and devise a process that provided the quality, performance and environmental impact that ACT and their customer required. They developed a novel pretreatment process for magnesium that did not produce the "smut" on the surface of the magnesium and included the following sequence:

- Alkaline Cleaning
- Water Rinsing
- Organo-metallic Composite Coating
- Water Rinsing.

The selection of a specially formulated conversion coating was the key. The produce was designed to use as a reactive (rinsable) coating for reactive substrates. "The critical step was eliminating the smut and getting the powder coating to stick to the

substrate," said Meagher. "With those problems solved, powder coatings fit another unique application."

Keeping up with technology is nothing new for ACT, which began powder coating in 1976 for Litton's microwave ovens. "Over the years, we've increased the amount of powder work we do, and now about 60 percent of our painting is with powder," said Meagher. "It's become a requested finish for quality, durability and environmental reasons." *P&SF*