



Published in the April 1998 issue of Products Finishing Magazine

Converting to Powder Coating

Changing to a powder coating process while maintaining efficiency...

United Receptacle, Pottsville, Pennsylvania, a manufacturer of steel and aluminum waste receptacles, has always focused on the specific and stringent requirements of its customers. Its diverse product line is comprised of more than 1,000 units in an almost endless array of shapes, sizes, configurations and colors.

Until recently, United Receptacle's products were coated with a liquid paint applied using advanced electrostatic finishing technology. But, a preliminary investigation of powder coating technology indicated the opportunity to enhance product durability while maintaining the efficiency levels of the liquid coating.

"The idea of converting to powder coating posed a significant challenge for us," said Richard Weiss, president of United Receptacle. "We knew powder coating could improve product appearance, performance and service life. Yet the complexity of our operation, number of parts, configurations and colors, and the fact that we were already operating at peak efficiency, gave us cause to doubt any supplier could meet our staggering demands. However, we found a supplier that had the technology we needed."



Automatic powder spray booth

Setting goals. The bottom line for United Receptacle was the ability to achieve acceptable first-pass transfer efficiency. "For us to justify the conversion, powder coating would have to provide the film build and thickness control required to meet our durability and efficiency goals," said Mr. Weiss.

To demonstrate powder coating's feasibility, Nordson Corp., Amherst, Ohio, first assessed United Receptacle's immediate and

long-term needs. It then established the specifications for the system needed to meet production and performance requirements. The supplier then calculated the application cost for each product, including any waste for non-reclaimed portions of the operation. Tests were carried out at the supplier's customer demonstration laboratory.

"The tests confirmed that despite the complexity of our needs, we could get a better product with

powder coating, without increasing production costs," stated Mr. Weiss.

The testing for United Receptacle was customized to address several issues. It was necessary to insure that proper film build could be achieved and maintained for the entire line of products and for each color. The Versa-Screen® control system provided maximum film thickness control over every part configuration and color currently in production.

The real thing: part one. In June 1995, United Receptacle installed four Excel 2000® powder coating spray booths in a 6,000-sq-ft temperature-controlled cleanroom. For the three months that followed, United Receptacle continued its investigative process, conducting additional testing in a closed-loop operation while maintaining current production levels in the liquid coating operation until paint supplies were depleted.

Howard Nielson, manufacturing manager at United Receptacle deemed the testing a success. "It was a productive plan, since it gave us the chance to familiarize ourselves with powder coating in general, work out small problems in the initial start-up phase and establish our new line scheduling."

The system includes three automatic spray booths, integrated booth movers and powder spray guns. Two Versa-Screen work stations, with more than 100 customized menu recipes provide PLC operator interface between industrial controllers and the powder application equipment in the booths. The automatic spray booths are equipped with the supplier's air management systems to ensure consistent booth airflow and velocity, which results in better transfer efficiency. This translates to less overspray and more consistent coating uniformity.

The real thing: part two. United Receptacle began production with



EXCELLENT first pass transfer efficiency has reduced rejects by 20 percent.

the powder coating system during the fourth quarter 1995. The powder coating operation runs one shift, four days a week.

More than 100 shapes and sizes of receptacles and components are routinely scheduled for coating in the cleanroom. Predominant colors are white, gray, brown, red and green, although the powder system accommodates as many as 30 colors. One automatic booth is dedicated to the application of white powder, while the remaining automatic booths handle an average of six color changes every day.

It takes less than three minutes to move a booth on- or off-line. Complete color changes, cleaning the booths and switching modules, is accomplished in less than an hour with non-reclaimed colors. Automatic booths are actuated by push-button control.

For unusual custom colors and particularly short batches, United Receptacle applies coatings in the dedicated manual booth. Product is brought through on a conveyor, coated from any of four platforms,

and moved with minimal slow-down to standard line speed.

Film thickness is a critical requirement for United Receptacle. The high performance capabilities of the proprietary weatherable powder chemistry and system supplier's process control technology are credited with maintaining the desired film-thickness specifications. By automatically controlling gun triggering, adjusting gun voltage and current and maintaining optimal airflow settings, United Receptacle can easily adjust to the multiple color changes and part configurations of its product line and still consistently get excellent quality and efficiency.

Lilly Industries, North Kansas City, Missouri, who supplies virtually all of the powder coating for United Receptacle, played a key role throughout the powder conversion process. Its most important assignment was quality control of the powder, which was handled through a pre-certification program. Prior to shipping, the powder supplier pre-certifies all of United

Receptacle's colors according to color specification and general physical properties. This process eliminates the need for the customer to conduct on-site checking as a function of quality control.

A change of pace. According to Mr. Nielson, the conversion to powder has had a significant impact on productivity, scheduling flexibility and overall environmental conditions.

The powder system has increased productivity in terms of reduced rejects. "Excellent first-pass transfer efficiency has resulted in a 20 pct reduction of rejects over our previous liquid operation and will likely be even better as we gain experience with powder coating," stated Mr. Nielson.

Production scheduling has also changed since the powder system was installed. "Powder gives us greater flexibility to respond to our customer's needs and to plan production according to daily requirements," explained Mr. Nielson. "Previously, we manufactured product and put it through the paint shop in large batches that ran in multiple colors. Now, we run product in a variety of smaller batches through the powder coating room, allowing us to expedite customer requests.

"The new challenge for us is to efficiently schedule assembly, packing and inventory functions to accommodate specific product requirements as the receptacles exit the ovens and are cooled," Mr. Nielson continued.

The conversion to powder coating has also resulted in



POWDER COATING line can paint receptacles in a variety of colors.

reduced hazardous waste disposal, which translates into savings for the company and a friendlier environment for employees. "On its most basic level, powder coating has eliminated the need to dispose of waste solvents, spent paint filters and residue from paint cleanup," said Mr. Weiss. "But, the bigger picture is a cleaner environment that reduces costs, improves the morale and image of the company and meets the corporate goals of customers who specify products from companies with environmentally sound policies."

With its powder coating system up and running, United Receptacle has begun educating the marketplace about the benefits of

powder-coated receptacles.

"We are following the lead of the Powder Coating Institute (PCI) and promoting the durability and environmental advantages of powder coating," said Mr. Weiss.

"In fact, we have already produced an exclusive Uni-Koat™ finish for use on all of our literature, advertising and product packaging. The Uni-Koat™ mark on our powder-coated product cartons informs distributors and end users that we make high-quality receptacles using technology that is friendlier to the environment." **PF**

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