Steelcase Adds Powder Coating

Commitment to environmental improvement prompted Steelcase's switch to powder coatings . . .

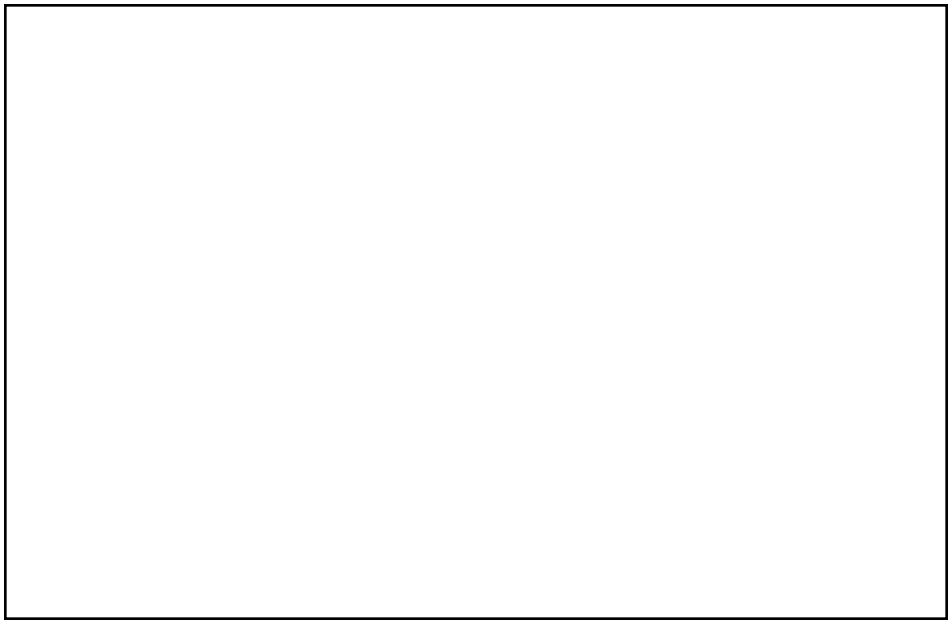
By Beverly A. Graves
Editor

THE SYSTEMS I powder coating line includes six roll-on booths to accommodate color changes.

Does an attractive working environment foster production? Steelcase Inc., Grand Rapids, Michigan, thinks so. That is why this 83-year-old company is dedicated to making office furniture not only attractive, but durable, functional and environmentally compatible.

"As a high-performance company, we are committed to continuous environmental improvements," stated Steve Martin, manager of finishing technology. One major transition was from liquid coating to powder. However, Steelcase did not convert all its liquid finishing to powder.

Steelcase began investigating powder coatings and systems in 1992 as part of its long-term strategy for compliance with Clean Air Act requirements. In order for the powder coating system to be cost efficient, a



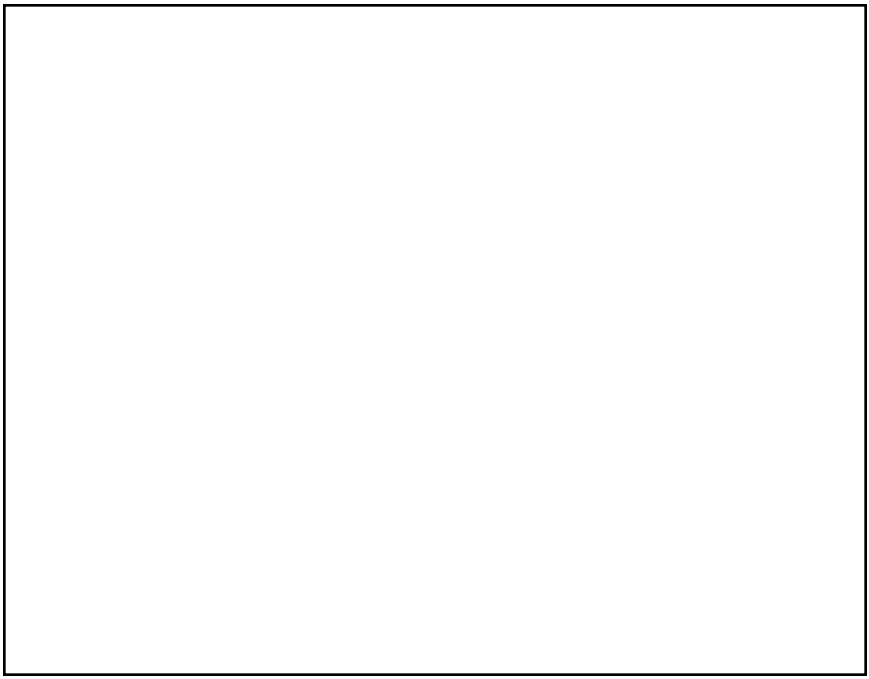
EACH SPRAY BOOTH reclaims and recycles oversprayed powder coatings.

durable coating would have to be applied at 1.5 mils on casegood and systems products. Casegood products include file drawers and bins, which receive much wear.

First the company tested a number of powder coatings and eventually selected coatings from Enviro Powder in Grand Rapids, Michigan, and Evtech in Charlotte, North Carolina. Once powder coatings were chosen, Steelcase worked with equipment suppliers to determine if the coating could be applied to its specifications. Several equipment suppliers were evaluated in field tests.

Steelcase installed its first Nordson powder coating system in its Panel Plant. The second system went into the Chair II Plant. The third, and most involved, system was installed in the fall of 1994 at the Systems I plant where casegood products are made. A fourth system is now coming on-line in the company's File Plant.

Each plant is self-contained. All manufacturing, cleaning, pretreatment and finishing are done at a single facility. The original pretreatment line at the Systems I plant is still used for parts going to the liquid and powder coating lines. Pretreatment is a seven-stage iron-phosphate spray system. The first stage is Bonderite 3212 and cleaner 3140 from Parker Amchem followed by two heated and filtered tap-water rinses. The fourth stage is the same as stage one. Stage one cleans the gross contaminants, while stage four provides more thor-



STEELCASE SYSTEM 1 powder coating line

ough cleaning and iron phosphate deposition.

The Bonderite 3212 is a low-temperature iron-phosphate conversion coating for steel. It produces a non-metallic, iron phosphate coating that inhibits corrosion and increases the adhesion and durability of the paint finishes.

Stage five is a heated tap-water rinse. Stage six is 95A Parcolene non-chrome sealer. Stage seven is a recirculated RO rinse with a fresh RO counterflowing rinse for polishing. Parcolene 95A chromium-free post treatment increases the corrosion resistance of the painted metal surface.

The pretreated products then travel through a heated dry-off oven and into the specially built powder coating room. Steelcase did not add to the original facility to house the powder coating system. Instead, it built the room within the building. The room is maintained at 70 to 74F and 50 pct humidity.

The six booths in the powder coating room use one conveyor line. Each booth is dedicated to a color. Booths are rolled on and off line as needed. As a booth is rolled on line, the lights above the booth are programmed to turn on. When the booth is rolled off line, the lights go off after 30 seconds. Then the lights above the off-line booth go on so that it can be cleaned.

Gene Jager, finishing engineer,

explained that this helps the company save money. It may not seem like a big deal, but it is indicative of the company's attention to detail and pursuit of cost-reduction opportunities.

A central vacuum system is used to clean the booth components daily. More intensive vacuuming and cleaning are done on each booth weekly.

There are two line speeds. Complex parts having Faraday cage areas are run at 22 fpm; flat panels are run at 25 fpm. A bank of 11 reciprocating guns is positioned on both sides of each booth. One side also has seven stationary guns that are used only to powder coat drawer interiors. Hand guns are used for touchup.

Another necessary procedure is the air-drying system for compressed air going to the powder system. The air is maintained at 38F pressure dew point or 80 psi. To do this, Steelcase uses a refrigerated air-drying system.

Backpulsing the filter is done only as needed. When a certain static pressure is reached, the filters are pulsed. This saves money because compressed air is used only as needed. "Compressed air is expensive to generate," noted Mr. Jager.

Powder is fed into the hoppers from 1,200-lb boxes. The oversprayed powder is reclaimed and blended with virgin powder in a 30 pct reclaim to 70 pct virgin ratio. Each booth has two hoppers to accommodate the large number of applicators. One sieve is used for each booth to filter the powder.

Parts go from the powder coating room to the gas-fired convection ovens where they are cured for 20 min at 350F.

The biggest reject is light paint. For this, parts are simply run through the powder coating booths a second time. Steelcase has a 98 pct acceptance rate on its parts. "We used to have only a 95 pct acceptance rate until Nordson developed a current limiter for the electrostatic handguns," said Mr. Jager.

The current limiter allows users to set the gun current at a level that will provide optimal powder charge and field strength for each application. Current control ensures that the number of ions generated in the charge zone is sufficient to charge the powder effectively, but not high enough to create excessive free-ion current on the already deposited powder layer.

The decision to go to powder coating was environmentally driven, but Steelcase was not willing to sacrifice quality. Its extensive research paid off. The powder coating system at the System I facility helped Steelcase maintain quality and improve the environment. **PF**

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