

Contract Coater Carves Lucrative Niche

**Using its new
Autophoretic line,
Premier Coatings
opened up a new market
for itself ...**

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Editor



*Premier's new coating line was
producing and shipping products
its first day of operation.*



Premier Coating (Grand Rapids, MI) is a contract coater serving primarily automotive Tier I suppliers and the office furniture industry. The company, which offers Autophoretic coating, was founded in early 2001, which, by widespread consensus, has been the lowest, slowest business year in a decade for Tier I automotive suppliers and their suppliers.

The idea, according to owner John Hill, was to ramp-up slowly, gradually qualify and build a customer base. This would allow the company to get in position for the next up-cycle, when, hopefully, a second shift could be added. However, it didn't work out exactly as he had envisioned.

On "start-up" day, Premier ran—and shipped—actual product. The second shift, which was planned for the second year, was added in the second month. Ninety days after start-up, the company employed 16 full-time, turned product around in 3 days, and comfortably accommodated customer JIT demands.

The company is on-schedule to achieve QS9000 certification before its first anniversary in March 2002.

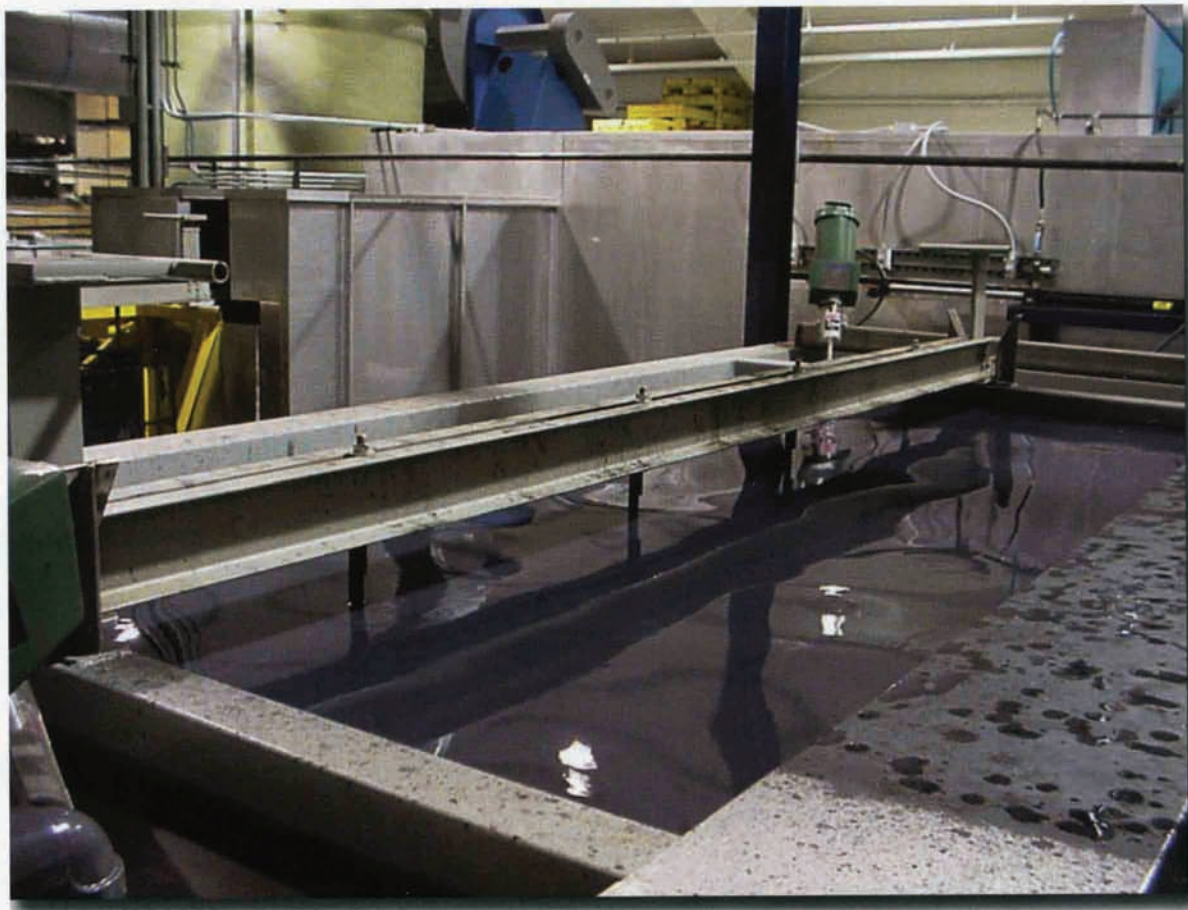
Owning and operating a contract coating company had long been a goal of Mr. Hill's. In 2000, Andy Ribbens, a friend and customer who owned a successful black oxide and vibratory deburring shop, suggested that they, together consider an Autophoretic operation. The technology was in-demand and evolving. The one Autophoretic coater in the region was abandoning the process to focus on electrocoating. A local stamper had said he'd provide steady business if Andy knew a good source. And the building across the parking lot, an 18,000-sq-ft former casting plant with high ceilings, had a "for sale" sign on it.

Autophoretic coatings are supplied exclusively by Henkel Surface Technologies. First developed in 1973, Autophoretic chemistries work by liberating iron from the steel substrate in a process of oxidation-reduction. They are single-

coat, functional finishes, applied without pretreatment. Created as an alternative to electrocoat, "A-coat" is most commonly used for underhood and underbody vehicle components, as well as office furniture and appliances. It is currently available in several Class A and B formulas, depending on the gloss, heat resistance, salt spray performance and, topcoat ability required, particularly for aftermarket parts.

Autophoretic chemistries are polyvinylidene chloride based, and very "green" in that they are heavy-metal and VOC-free and have virtually no environmental impact. Mr. Hill contacted Henkel and began conversations with George Derderian, senior design engineer and project manager specializing in Autophoretic technology.

Because it is a patented process, parameters for the application and cure of Autophoretic coatings are well established. The challenge was to identify an equipment supplier that could design and build a system to accommodate the



Autophoretic coatings are built up 1/2 to 1 mil thick on parts.

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strict demands of the chemistry, the spacial limitations of the facility and the probable needs of the coater and its future customers.

Mr. Hill qualified four potential vendors, narrowing the field to two based on technical issues and "comfort level." Ultimately, Walgren Company was awarded the project. Walgren had engineered and manufactured a flexible (more than 50 different cycles) zinc plating line for another company that had a 95% uptime record during an 8-year period. The company also had more than two decades experience in the design and manufacture of complex electroplating and anodizing lines. Equally important, they offered total system responsibility, including design, fabrication, installation and field support.

System design began with decisions about part sizes and fixturing. Versatility would be key, since configurations would change throughout the day, along with the parts mix. Early discussions

regarding the coating of airbag canisters, console components and brackets suggested four planes of work that included a rack package of 2x4x10 ft and high-density, universal fixturing that could be tailored to the load as needed. Two permanent carriers would attach to work bars.

Because Autophoretic coating does not involve electrical current or line-of-site considerations part density for these systems can be the highest that is mechanically possible. All that's needed is for the part to contact the solution and not another part. The challenge comes when the rack is moved. Smooth hoist movement is critical until parts cure.

The facility couldn't accommodate the lineal square footage required to build the system in the traditional straight line, so an "H" configuration, with a side-entry, off-line oven was specified. Hydraulic indexing was recommended for use in the 12-stage oven to minimize motion. Two dedicated shuttles would

move parts while they were inside the oven. Elsewhere on the line, two programmable 1,500 lb hoists would do the work. Specifying the oven off-line saved the cost of a third hoist.

Production was established at 15 loads per hour, with a maximum of 800 parts per rack. At this rate, Premier could run more than 4,500 brackets (or other parts up to 8 inches) every hour.

There are 3 fixed load/unload stations designed for greatest productivity and best-possible worker ergonomics. There is also off-line racking capability for situations where a load can't be racked/unracked within 4 minutes. All of the tanks are fitted with mixers and educators for agitation. Rim sprays prevent contamination between tanks.

The all-immersion Autophoretic process at Premier is 7 stages, plus cure. The first two steps are alkaline cleaning, designed to remove stamping oils and other light contaminants. They are each operated at 180F, 60 and 120 sec,



After coating, parts will enter a transfer area, where a trolley will move them into the oven.

respectively. This is followed by a 60 sec rinse and 60 sec DI rinse. The coating bath, which builds 1/2 to 1 mil, depending on customer specification, is 120 sec in the Autophoretic 866, a Class B coating delivering 1,000 hours of salt spray protection with application at 1 mil. It is operated at 70F, ± 2 .

A 60-sec rinse eliminates carryover of unreacted material. It is followed by 60 sec of reaction rinse and an ammonium bicarbonate solution with a pH of 7. The reaction rinse is what provides the final coating properties and starts the

New Development in Autophoretic

The newest development in Autophoretic technology is Henkel's Class A epoxy, the 900 Process. It provides corrosion protection nearly equal to the 800 products, plus a high-gloss finish. It is also highly effective as primer for a powder topcoat and is highly temperature-resistant. Used in this way, 1,200 hours of salt spray performance can be expected. Walgren's line was engineered specifically to accommodate 900 process technologies, which Premier plans to add in 2002.

dewatering process prior to the part entering the oven.

Parts next enter a transfer area, where a trolley moves the racks into the oven. The oven is installed parallel to the paint line and wet loads are shuttled in on one side. Racks are indexed inside the oven every 3-4 minutes for a maximum of 30 minutes in order to ensure homogeneous air temperature and air velocity and prevent hot spots. Variable speed controls on all fan motors can be adjusted to best suit individual load size and density. Cured loads shuttle back to a slot in line with the process tanks. When a shuttle activates, it signals the hoist that a finished load is ready to be transferred to the unload area.


An Allen Bradley PLC with PC front end provides logic control for the programmable hoist, as well as pumps, ovens and other mechanical systems. Four recipes can be used to vary hoist travel and the dwell in various stages. "If parts have simple shapes, for example, and arrive without surface oils, it's possible to reduce cleaner immersion times, for example," said Mr. Hill.

Control over cleaner and coating baths,

as well as chemical replenishment, is provided by a Henkel process controller, which operates autonomously and does not interfere with line control. The autonomy of the two control systems was considered by Walgren and Henkel as the most agile and efficient alternative. "Problems, if they occur," said Mr. Derderian, "are more confined—and more readily identified—a major concern given the high volumes Premier is already running."

The bracket that was Premier's first project has since become two different brackets. Each is coated to GM specifications, with a combined volume of 5 million pieces per year. "A huge independent seating company has also approached us to do its work," said Mr. Hill, "and we're working with office furniture components as well. Our ability to get 1,000 hours of salt spray with a finish that's chrome-free was a big part of earning this business."

Process reliability and environmental issues were primary to Mr. Hill's decision to install Autophoretic coating. The line is distinctive for the simplicity of waste treatment involved. Wastewater gets a slight pH-adjustment and goes right to city sewers, according to Mr. Hill. The only tanks requiring ventilation are the alkaline cleaners, since the coating tank is water-based and solvent-free. And what goes up the stack from the oven is strictly water vapor.

"This work is all about having a predictable process and equipment you can count on," said Mr. Hill. "Growth is great, and million-piece volumes are great. But our first priority is quality. We are determined that the 'perfect' part everyone wants is precisely what we deliver." 

For more information on
Autophoretic coating lines, contact:

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