

A manufacturer jumps off the fence to bring a powder line in house

To make its aluminum extrusion fencing weather the elements, a fencemaker chooses powder as the finish. To gain control of the finishing process and offer quick turnaround time to its customers, the company installs its own powder coating system.

To trace the outline of a man that arose from the land and defined himself by working on it, it's not such a far stretch to see how Loren "Digger" Graber evolved from a fifth-generation farmer into a fencemaker. In the rural reaches of Bremen, Ind., his life's work moved as necessity dictated. Farming presents a difficult occupation. Remaining viable is the constant struggle. Nature and economic forces made Graber turn a side job into a new business and ultimately his first livelihood into a hobby.

To make ends meet, Graber began in 1983 bending polyvinyl chloride (PVC) racetrack posts for cart and horse racing tracks and horse farms. That's where a new business venture trotted onto the field—vinyl fencing as a replacement to wood fencing. Graber saw the market potential for high-end vinyl fencing. He went to fence companies and told them he could meet their needs for vinyl fencing. Competition was scarce, allowing Graber to plot out a profitable manufacturing business. The company, Digger Specialties, now has four locations and sells to 35 states east of the Rockies.

But competition grew steadily over the years, and the vinyl fencing market matured. As big-box stores entered the ring, Digger Specialties' aggressive



The booth proves versatile in handling the company's part mix, efficiently processing parts of different sizes hung next to each other on the line. Unneeded guns will not fire. The booth also operates quietly, making the plant floor a more pleasant working area.

growth plan became more difficult to maintain. Graber once again had to extend his reach and diversify his business. To find out where to go, he assessed his present location and spoke with his customers. They complained of freight damage and order inaccuracies involved with aluminum fencing they were buying elsewhere. "They loved our company," Graber said. "It just made sense. We have the customer base. It was the lowest hanging fruit."

In adopting fencing made from aluminum extrusions, the company also needed to find a finishing method for its fledgling product line. Powder proved indispensable. The competition was switching to powder. Graber liked powder because it proved more environmentally friendly than liquid coatings and it produced a better finish on its fencing. "When we introduced the

"I knew what I didn't want," said the company's owner and president. "Previously, we had lost two or three customers because of the quality of the coating. They said 'once you get your own powder coating line and it's in your control, we trust you and we'll come back.' We needed a line in our building."

aluminum extrusion fencing, powder was always the choice because of the performance properties," said Larry Burkholder, powder coating technical services. "We knew powder was our choice right from the start."

Getting hung up

But saying you like powder, and spraying it on a part so that your customer keeps bringing repeat business

are two different things. Initially, powder coating proved challenging for Digger Specialties. Graber started with a limited knowledge of the process. As a result, this led him to enter into a venture with an Indiana-based powder coater; however, the coater's equipment proved unsatisfactory. First, the system was slow, operating at a line speed of 1 foot per minute. And second, the washer had pretreatment stages right next to each other with the nozzles spraying into the preceding and following stages.

Eventually, Graber turned to a custom coater. Although coating quality improved with this arrangement, the finisher didn't achieve the performance properties necessary for Graber to feel confident in backing the fencing with a lifetime warranty. Moreover, turnaround times lagged with the extra shipping of the product between the company's and the coater's plants, pushing shipments out as far as a week and a half. Instead of bemoaning these obstacles, Graber said he learned from these momentary setbacks. "I knew what I didn't want," he said. "Previously, we had lost two or three customers because of the quality of the coating. They said 'once you get your own powder coating line and it's in your control, we trust you and we'll come back.' We needed a line in our building."

Putting the pieces together

After dabbling with powder coating, Graber knew that he needed his own line. To accommodate it, he decided to add a second building to house the powder line and aluminum fencing assembly. He said he looked at equipment options and sought out an expert to implement the line. While attending Powder Coating 2004 in Charlotte, N.C., he found the booth



The entire powder coating system runs along a 410-foot-long closed loop. The design incorporates a split zone that can process a 7-foot-tall or a 10-foot-tall part window.

and application equipment. To fill in the rest of the line, he recruited Burkholder who had more than 15 years of experience working with custom coaters. “We wanted to come out of the chute running,” Graber said. “I didn’t want trial and error. I couldn’t afford that. Our business was too valuable. We had too good a customer base, and I didn’t want to mess that up.”

Burkholder created the performance specification, including 3,000 hours salt fog and 5 years of South Florida exposure, put the line out for quotation to various systems companies, and then oversaw the installation of the process. Burkholder, Graber, and a representative from the finishing system supplier designed the pretreatment system, dry-off oven, cure oven, system layout, and conveyor based on the coating specification. “This was the first time I got to design the equipment the way I wanted it designed,” he said. “Over the past 15 years, I’ve worked for three custom coaters with a total of 10 different lines. There’s a little bit of each of those lines in this system.”

Going through the line

The line has a work window 1½ feet wide, 10 feet tall, and 24 feet long. This enables the company to manufacture and powder coat a 10-foot-tall driveway gate. Currently, most of parts processed fit inside a 7-foot-tall work window. But the company doesn’t want to outsource coating the 10-foot-tall gates. To accommodate this diverse part mix, the system splits equipment into two zones—one to finish the 7-foot-tall parts and one to finish the 10-foot-tall parts. Part height determines how the nozzles in the washer spray. Workers flip one switch so that pumps feed the bottom 7 feet of nozzles. By flicking another switch the remaining 3 feet get activated. The other equipment, including the air knife and IR panels, are also set up to process these two different part heights. The booth also has a 7 foot-tall work setting and a 10-foot tall work setting. The powder guns are on gun movers that can set the spacing at various heights. The

booth’s electronic eyes also match those heights and control which guns fire and which ones don’t.

Because the line handles a lot of long parts, the pretreatment system was placed in a 2-foot-deep pit. As a result, the entire line has only an 18-inch incline. This design feature reduces the chance of parts falling off. It also enables easier hooking capabilities because workers can lay parts on a hook rather than hooking them in a hole.

From the loading area, parts enter a five-stage washer, consisting of an acidic cleaner, city water rinse, reverse osmosis (RO) water rinse, RO halo, and

Turnaround time dropped from 5 days to 1 day with in-house powder coating. “We love to give that turnaround time,” said the company’s owner and president. “A few customers demand it—and others we like to spoil.”

a dried-in-place sealer with RO water.

In terms of wastewater, the company, classified as a categorical user, is dumping 4 to 5 gallons per minute from overflow of stages two and three and the waste stream from the RO system. Temperature of the combined waste stream and pH levels are checked every 2 hours. The company also performs tests on stage one and stage four, submitting the results to the city before dumping them. “That’s been the biggest surprise,” Burkholder said. “All that’s involved with the wastewater permitting.”



Digger Specialties makes and powder coats its Courtyard™ line of aluminum extrusion fencing.

Next, parts pass through an air knife and proceed into the dry-off oven. Parts then enter the powder coating booth, which includes automatic guns and two manual stations for inspection and touch-up work. Graber said the booth has proved to be versatile in handling the company’s part mix, and the system efficiently processes parts of different sizes. For example, 26-inch-long fence pickets will follow a group of 72-inch-long fence pickets. Unneeded guns won’t fire, which conserves powder use.

The automatic guns apply custom-blended superdurable polyesters based on triglycidyl isocyanurate (TGIC). The company offers five colors: black (applied to 80 percent of the work), bronze, white, beige, and green. A dedicated filter reclaims the black. The other four colors are sprayed to waste. Switching colors involves a simple 15-minute color change, although switching to black takes more time because workers don’t want to contaminate the filter system. The company is also considering buying another module for bronze because of the amount it sprays.

In addition to efficiently finishing the parts, the booth makes the powder line a more pleasant working environment. It operates very quietly. “I can be working with a coworker right next to the unit and talk in a normal tone,” Burkholder said. “It is so quiet that I can hear the sound of my washer doing its job over the top of the booth—and it’s a good 60 feet away. We are in

a manufacturing environment, and it's just nice having a quiet booth."

After being coated, parts enter the convection cure oven, which includes an internal IR booster section. The 1-minute IR boost is significant. The entire powder coating system runs along a 410-foot-long closed loop. Because space is limited, the IR booster allowed the convection oven length to be shortened by 25 feet. After the finish is cured, fence components can be assembled, packaged, and shipped immediately to the company's three other distribution centers.

Posting rewards and laying claims

By installing its own powder line, Graber said he was able to gain total control of his process and product quality. This has allowed him to back his product with a lifetime guarantee and to meet the American Architectural Manufacturers Association (AAMA) 2604 specification.

In addition, turnaround time dropped from 5 days, at best, with the custom coater, to 1 day. "We love to give that turnaround time," Graber said. "A few customers demand it—and others we like to spoil." PC

Editor's note

For further reading on the topics discussed in this article, see *Powder Coating* magazine's Web site at [www.pcoating.com]. Click on Article Index and search by subject category.

Booth and application equipment: *Deimco, Tama, Iowa. 641/484-8806. www.deimco.com*

Turnkey system: *Midwest Finishing Systems, Mishawaka, Ind. 574/257-0099. www.midwestfinishing.com*

Pretreatment chemicals: *Chemetall Oakite, Berkeley Heights, N.J. 908/464-6900. www.oakite.com*

Air knife: *Air Force 1, Waterloo, Ontario. 519/746-5035. www.af1.com*