

# Reaching AAMA Standards With Superdurables

**Business on the powder side of Spectrum Metal Finishing's coating line has been growing over the years. In 1993 when the shop first opened, the finisher of architectural products made from high quality aluminum used only liquid paint. Now, powder accounts for 40 percent of its finishing work. Find out how powder is helping Spectrum meet AAMA standards while still keeping green.**

By Paul Mills

**E**veryone at Spectrum Metal Finishing takes a lot of pride that the powder coated extrusions, ceiling panels, and smoke baffles in the new One World Trade Center tower in downtown New York City were powder coated in their Youngstown, Ohio, facility. "As an elite applicator for partners like PPG, Akzo Nobel, Valspar, Tiger Drylac and Sherwin Williams, we offer facilities and capabilities not found at any other company. We've shipped products to job sites throughout the United States, Canada, the Pacific Rim and the Caribbean," says Neil Chrisman III, the company's founder and president. "We finish architectural products made of high quality aluminum—that's our niche. We don't want to be all things to all people, but we want to be very good at the thing we do." Indeed, Spectrum has supplied high quality finished products to a wide range of high profile buildings from the casinos of Atlantic

City to art museums in Japan.

Because he operates both a fully automated liquid spray paint line as well as a fully automated powder coating line in his 70,000 square foot facility, Chrisman is a good judge of the benefits of powder coating. "When I started the business in 1993, we didn't have a powder line," says Chrisman. "Powder just couldn't compete with liquid coatings on aluminum for these kinds of large-scale building projects. But now, 40 percent of our business involves powder coating—and the share continues to grow." Chrisman attributes the growth in the powder coating industry to changes both inside and outside of the powder coating business.

"Powder coatings have vastly improved in both appearance and performance. Just look at powder's ability to meet the toughest AAMA (American Architectural Manufacturer's Association) specifications and you see how far powder has come," Chrisman

notes. To meet the older AAMA 2603 specs, you only needed to provide one year of Florida exposure, and there was no specification for things like gloss retention. But now powder coatings can meet AAMA 2605 with 10-year Florida exposure standards. "Until there was a change to basic resin chemistry of powder, the only option was liquid paint. But the new Kynar-based powders can achieve these same standards as liquid paints, and that has spurred the growth in our powder business," he says.

Neil Chrisman IV, Chrisman's son and the business development manager for Spectrum, adds, "Along with performance, the standards for appearance have also risen dramatically. The powders we have now offer architects superdurable powders with amazing pearlescent metallic colors and high-end micas with a much broader gloss range."

"While higher performance and better looking powders have come from



Photo courtesy Spectrum

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technology within the powder coating industry,” says Chrisman (III), “a third force that’s driving our powder business is a growing concern for environmental compliance. Powder has always been a ‘green’ technology, but now architects are being paid to design buildings that are LEED certified.”

LEED, or Leadership in Energy and Environmental Design, is a rating system for the design and construction of green buildings that was developed by the U.S. Green Building Council. Many federal, state, and local governments offer various initiatives and strong financial incentives like tax exemptions for LEED certified projects. To obtain LEED certification, buildings are awarded points based on the environmental impact of all kinds of things. “Powder coating has a soft environmental footprint, and that gets LEED points. Therefore, architects are specifying more and more powder coatings on their drawings,” says Chrisman (III).

One example of a LEED-certified building is the Tower at PNC Plaza (pictured on the cover and on page 19),

located in downtown Pittsburgh. The 33-story building, which will be the new corporate headquarters for the PNC Financial Services Group, is being marketed as one the greenest skyscrapers in the world and is a certified LEED Platinum building. Spectrum has provided the high performance architectural powder coating for the interior and exterior of the building’s façade—specifically, the aluminum extrusions and intricate panel work.

According to Chrisman (IV), the high-performance architectural coating specified for the tower is a PPG Coraflon Gray Mica Powder. “We have been working alongside our strategic partners—Permasteelisa North America, SAPA Extrusions North America, Omni Fab, Inc. and PPG Industries—to provide the best possible building solutions available to the architectural marketplace. The Tower at PNC Plaza is a true testament to the commitment to ‘green,’ environmentally friendly architecture, and it will assuredly be a focal point of the Pittsburgh skyline for decades to come,” he says.

### **Prep, Coat, Cure**

“The key to powder performance on aluminum is proper pretreatment,” says Don Houck, the Spectrum powder coating plant manager. “Our seeming obsession with good pretreatment is because it’s critical to meeting the AAMA standards.” The Spectrum pretreatment system features a state of the art 5-stage chrome phosphate immersion system with a chrome phosphate conversion stage acting as stage 3. The parts are first cleaned in a heated phosphoric acid immersion wash. This wash is followed by a clean water rinse. In the critical third stage, parts are treated with a chrome phosphate conversion dip. “You could never achieve the industry specification without chrome,” says Chrisman (III). “I couldn’t sleep at night knowing I put powder on a 30-story building with no chrome pretreatment.” The chromed parts are then rinsed with clean water and then a final reverse osmosis (R.O.) water rinse before they are dried off in a dry-off oven. Spectrum works closely with their pretreatment chemical sup-



Photo credit Paul Mills

*Spectrum’s pretreatment system features a five-stage chrome phosphate immersion system. The parts are first cleaned in a heated phosphoric acid immersion wash (pictured). This wash is followed by a clean water rinse. Parts are then treated with a chrome phosphate conversion dip.*

plier Republic Chemical, Summit, N.J., to optimize the pretreatment chemistry for the wide range of high-end aluminum substrates they process.

Pretreated parts are loaded on a 650-foot powder coating line, designed by Tellkamp Systems, Inc., Sante Fe Springs, Calif. “Tellokamp has specialized in designing powder lines for aluminum extrusions and other architectural parts,” says Houck, “so this line was engineered for long and complicated extrusions with the flexibility to handle parts up to 33-feet long, 5-feet high, and 3-feet wide.”

The racetrack design of the paint line begins with the part loading station where pretreated parts up to 400 pounds per foot can be loaded on the line. Parts move through either of Spectrum’s two down-draft spray booths. Either booth can be moved on and off the line for cleaning during color changes. The two powder booths are equipped with opposing automatic spray stations. Each station uses an electronic reciprocator equipped with



Photo credit Paul Mills

*The ability to store powder recipes based on different part package sizes and configurations in the controllers helps Spectrum coat hundreds of different kinds of parts each shift with high efficiency.*

six Gema Optiflex automatic powder spray guns. Each gun is controlled by a control unit which can be programmed manually.

“Because many of the powders we spray have special effects and fine grinds that cannot easily be reclaimed and sprayed again, our first pass transfer efficiency is really important. The system is designed to achieve this through the efficiency at every step from the airflow in the booth, the movement, positioning and triggering of the right spray guns, to the control

that lets us dial in the right powder flow, the right electrostatics, and other variables that add up.”

Two opposing manual spray stations equipped with Gema Optiflex 2 manual spray guns allow operators to reinforce recessed areas or touch up a part on the rare occasion that it’s needed.

The two booth system allows Spectrum to make color changes without having to interrupt production as one booth is online the other can be cleaned explains Dan Campana, the Head Powder Coat Sprayer for the plant. Although the spray booths are designed with reclaim capability, the fine grind and rich metallic colors that Spectrum sprays for most projects usually dictates that they spray to waste. This means even more careful attention to measures that increase their first pass transfer efficiency. “With as many as six large projects running at any single time we need to be able to change colors and our spray setup quickly,” says Campana. “The ability to store powder recipes based on different part package sizes and configurations in the Optiflex controllers also helps us coat hundreds of different kinds of parts each shift with exceptionally high efficiency.”

After powder coating, the parts enter a 2-minute gas-catalytic infrared gel



Photo credit Paul Mills

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oven before transitioning into the 180-foot direct-fired gas convection cure oven. At a typical line speed of around 10 feet per minute, parts take about an hour to traverse the entire length of the line.

What also stands out at Spectrum Metal Finishing is the attention to measurement and quality assurance throughout the process. Beginning with careful inspection of incoming product, operators armed with a range of electronic instruments follow parts throughout the entire process. In the powder booth, for example, the powder film thickness is measured prior to being cured with a handheld non-contact thickness gauge. If a light or thin spot is detected, the powder can be blown off and re-coated without a lot of hassle or cost.

Coated parts are inspected not only for cure, adhesion, and coating thickness, but for color and gloss as well. “Some of our customers specify a tolerance of less than one delta-e in color variation from their standards” explains Jeff McCrory who is the Quality Assur-



Photo courtesy Spectrum

*The entire extrusion package for the exterior facade of the new science building at Columbia University in the Upper West Side/Harlem of NYC was powder coated at Spectrum. The new structure boasts a two-coat high metallic powder called “Columbia Sparkle,” made by Tiger Drylac.*



Photo credit Paul Mills



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Attention to measurement and quality assurance throughout the process is key to a quality product. Beginning with careful inspection of incoming product, operators armed with a range of electronic instruments, follow parts throughout the entire process. In the powder booth, for example, the powder film thickness is measured prior to being cured with a handheld non-contact thickness gauge (above, left). If a light or thin spot is detected, the powder can be blown off and re-coated without a lot of hassle or cost. Coated parts are then inspected post-cure using a dry-film thickness gauge (above, right).

ance Manager for the Powder business. “These parts are going up hundreds of feet on the façade of iconic skyscrapers and the last thing they want is to look up at a building and say – oh, that color doesn’t match. “

“When I left PPG as the Global Business Manager for Extrusion Coatings in 1993 to buy a small liquid coating shop in Youngstown, Ohio, I

listened to what the industry wanted,” says Chrisman. “They told me they needed somebody who could coat longer lengths and heavy shapes. Twenty-two years later we still listen closely to what the market wants, and we’ve succeeded by carving out a niche as the only ISO-certified powder coating operation that does what we do.”

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