



By the Numbers: Powder Coating with Tight Tolerances

By Troy Newport

The home page of Kentwood Powder Coat's website states boldly, "The Most Challenging Projects in Powder Coat" with expertise in challenging substrates, ultra tight tolerances, and large, heavy, awkward parts. After speaking with Quality Manager, Certified Six Sigma Black Belt, and Quality Process Analyst Samuel Lindemulder, it's a reasonable statement.

If you aren't familiar with the process of becoming a Six Sigma Black Belt, it's for those with an eye for detail and innate collaborative spirit. According to the American Society for Quality, "The role of the Black Belt is to manage DMAIC (define, measure, analyze, improve, and control) projects and processes at an organizational level. The Black Belt should be skilled in project management, leadership, analytical thinking, adult learning styles, and organizational change management."

Similar to martial arts, as individuals work their way through the Six Sigma program, they earn colored belts that represent their Six Sigma acumen. As they progress with real world experience and exams, they learn how to manage larger projects and acquire more advanced analytical skills. Ultimately the goal of the program is to develop outstanding leaders who utilize the skills they learn to manage Six Sigma projects full time.



The American Society for Quality provides professional training programs for individuals to earn quality certifications to enhance their understanding of quality processes.

The Parts Chose Us

Kentwood Powder Coat is a family-owned business that opened its doors in 1988. Samuel says from the time they first began powder coating, they have remained customer-focused, using continual investments in people, training, technology—and his cup of tea, process improvement—to provide optimal solutions for finishing challenges. Because of their meticulous approach to the finishing process, by 1996 they had doubled the size of their facility.

As Kentwood's reputation flourished, they grew until they became one of the largest facilities in their region. When Samuel joined Kentwood in 2021 as quality manager, he already had nine years' experience in quality management under his belt, working in pharmaceutical manufacturing



Kentwood Powder Coat attributes much of their ability to process low tolerance parts to automation and technologies that help create highly repeatable processes.

and liquid coating manufacturing. His focus from the beginning, he says, was to improve on their ISO 9001-based quality system. "I believe in the power of effective, data-driven decisions to control and enhance outcomes for a company," Samuel asserts.

Today Kentwood runs two high-volume, high-tech production lines that have processed parts for familiar brands like Caterpillar, Harley-Davidson, and Whirlpool. When asked if they purposely chose to specialize in low tolerance parts, Samuel says the company simply focused on their strong commitment to quality and customer, so parts with small dry film thickness (DFT) tolerances naturally arrived at their facility. "It was more like the parts chose us!"

Equipped for Quality

To consistently deliver a Class A powder coated finish, Samuel says understanding your equipment capabilities (and limitations) are just as crucial as maintaining excellent relationships with your suppliers. "Our two Gema automatic paint booths allow us to have detailed control over the powder application process. Working with their team has given us the ability to greatly refine our processes for maximum control and repeatability," Samuel explains. He continues, "In addition, we've had a relationship with Elcometer for over two decades now. Their equipment has allowed us to accurately inspect our parts and make adjustments with great detail and precision. Without the data we collect with instruments, we would be unable to effectively serve our customers to the level we have."

Kentwood coats a number of parts for the automotive industry, including mirror mounts, gas shields, and other interior and exterior components. According to Samuel, an example of one of the parts they powder coat with extremely specific tolerances is a ball mount for a car's rearview mirror. While we typically think of a coating's purpose as beautifying and protecting a product, in this particular instance, the dried film thickness of the ball mount heavily affects the function of the part. Too much powder, and the mirror torque is too high, preventing ease of movement. Too little powder, and the mirror will slop around and won't have the ability to stay in place. So, in this case, coating thickness is critical to the proper function of a safety device we interact with almost every day.

The Power of Data

While Samuel's focus was to improve processes when he first arrived at Kentwood in 2021, he soon found himself helping to solve a specific coating challenge. They were having trouble meeting thickness requirements on an interior component, so a troubleshooting process had to be devised. They first standardized the racking arrangement, fitting 104 pieces in 8 columns and 13 rows. The automatic booth they used for testing contains eight oscillating reciprocators per side. They now had to run through various tests controlling for the timing and oscillatory actions and documenting DFT results after each test. "Having highly programmable equipment gives us an enormous level of control during testing, and confidence in our results," Samuel explains. "We can control everything that happens in the booth, output from the guns, distance to the parts, oscillation patterns; things you can't always control with complete confidence

with a manual gun.” The Kentwood team repeated their testing for several weeks, making informed changes to the coating process and evaluating results with milage readings until they found their sweet spot. Samuel says they repeated this testing until the part met the criteria they were looking for, and then monitored performance over multiple weeks to ensure the process itself was stable, and not showing location-driven deficiencies in the application. “The settings we ended up with were easily saved in the devices, which allowed for maximum repeatability once dialed in. This process resolved our issue on an unprecedented scale. Without the ability to measure DFT accurately, and make precise changes to our equipment settings, our ability to service this customer would not have been possible.”

When asked for advice for other powder coaters that want to finish low tolerance parts, Samuel has some detailed suggestions.



Maximizing rack density and ensuring your parts are presented properly to the powder guns is a critical first step in developing repeatable processes.

Thorough Design Planning: Invest sufficient time and effort in design planning before initiating production. Address potential issues upfront, as complexities intensify once the part is in production with a committed design.

Creativity in Solutions: Embrace creativity in problem-solving. A prime example is Kentwood’s collaboration with Elcometer to design a specialized jig mount for obtaining precise DFT measurements on curved metal components. Engage in collaborative efforts to find innovative solutions; involving customers and partners can yield substantial dividends.

Data-Driven Decision-Making: Implement a robust data collection system and let data guide decisions. Scrutinize processes intelligently, recognizing that even seemingly minor changes can have significant impacts. Regularly communicate with customers about potential issues affecting them, ensuring transparency and alignment in the pursuit of continuous improvement.

It doesn’t take a black belt to make a commitment to quality, but running a profitable powder coating business does require that quality commitment. Perhaps implementing reliable, repeatable processes and collecting valuable data along the way will help parts find your shop too.

Troy Newport is publisher of Powder Coated Tough.

