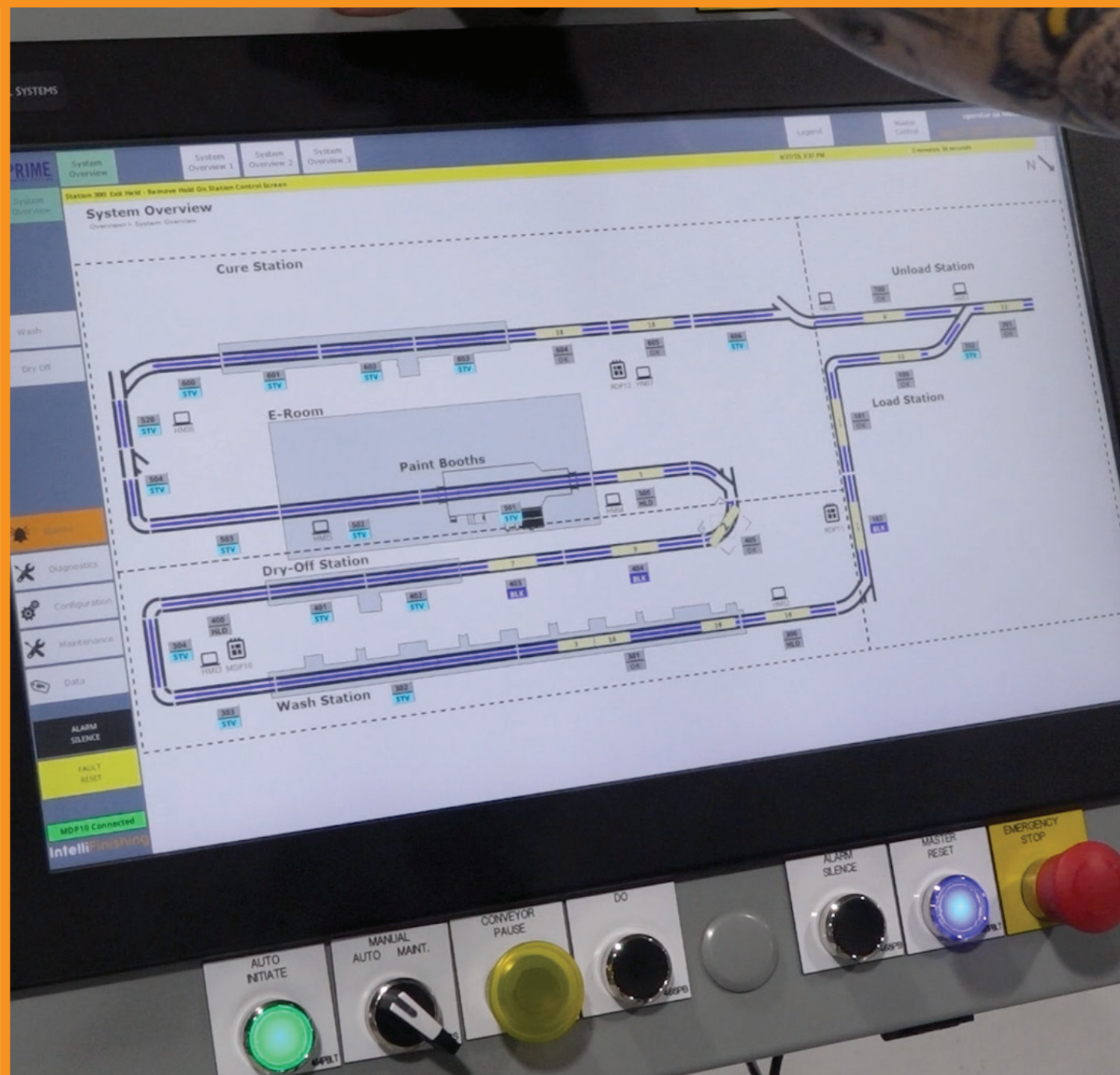


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Setting Up a Type 2 Chem
Film Line - 28

AUTOMATION

Digital Future for Metal
Finishing Shops - 32

POWDER

The Hidden Cost of Bad
Racking - 36

PLATING

Improving Alkaline Zi-Ni With
Membrane Anodes - 38

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CONTENTS

VOLUME 90 / NO. 12 / SEPTEMBER 2026

22 Protecting Our Infrastructure

The importance of protective coatings in the development of data centers goes beyond corrosion protection — it's about preserving every aspect of the infrastructure to ensure decades of service.



28 Setting Up a Type 2 Chem Film Line

What Manufacturers Should Know to Get it Right.

32 Success = Controlling Unpredictability

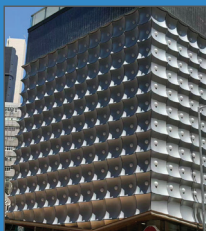
Why Metal Finishing Job Shops Struggle to Grow.



TECHNICAL EXPERTS

- 36 Bad Powder Coat Racks** / Rodger Talbert
Hidden Costs and Improving Your Strategy.
- 37 Energy Cost, Use Considerations** / Tommy Reno
Unlocking a More Efficient Cure Cycle.
- 38 Alkaline Zinc-Nickel Plating** / Markus Ahr
Compact Membrane Anodes Enhance Performance.
- 40 Advice on Better Racking** / Scott Francis
Boosting Finishing Line Efficiency.

INNOVATIONS



NEWS / COLUMNS

- 6 From the Editor** / Scott Francis
Are You a 2026 Top Shops Qualifier? Check the Updated List.
- 8 On the Line**
An Interview With Connor Callais, Hubbard-Hall.
- 10 Top Shops Insider**
Legacy, Quality and Relationships Power Success for MPP Group.
- 12 Finishing Industry News**
Laser Processes to Enable PFAS-Free Industrial Coatings.
- 42 Innovations**
Dürr CTS Electric RTO Systems Expand Air Pollution Control.
- 44 Never Finished** / Matthew Kirchner
Reflections From the Shop, 25 Years After 9/11.
- 45 Gardner Business Index** / Mike Shirk
Index Climbs on Production Gains as Margin Pressure Builds.
- 48 Photo Finish**
Sleek and Smooth Applicator for Any Surface.

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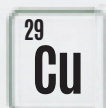


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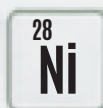
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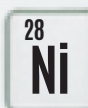
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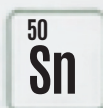
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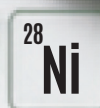
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Is Your Shop a 2026 Top Shops Qualifier? Check the Updated List

Additional shops have been confirmed as 2026 Top Shops qualifiers following a database correction. All honorees will be celebrated at the Top Shops Conference, Oct. 6-7 at the Huntington Convention Center in Cleveland, Ohio.



SCOTT FRANCIS / EDITOR-IN-CHIEF
sfrancis@gardner.media

► In our July issue, *Products Finishing* (PF) published the results of this year's Top Shops Benchmarking Survey, recognizing qualifying shops. In the weeks since, we discovered a database migration error that affected the benchmarking results for a number of participating shops in both the plating/anodizing and liquid/powder coating categories. As a direct result of that error, several shops that should have qualified for 2026 Top Shops recognition were not listed in the initial results.

We take full responsibility for this mistake. To every shop affected — and to the survey participants and readers who trust the Top Shops program to deliver accurate findings — we offer our sincere apologies.

We have since corrected the underlying data and confirmed several shops recognized as 2026 Top Shops qualifiers, in addition to those named in our July issue.

We will celebrate all qualifying Top Shops at this year's Top Shops Conference, Oct. 6-7, 2026, at the Huntington Convention Center in Cleveland, Ohio. Sessions run across both days with a mix of technical tracks and general business leadership content, plus plenty of networking opportunities.

This is the first year PF is joining the event alongside our sister publication, *Modern Machine Shop*, expanding Top Shops Conference to cover CNC machining and industrial coating and finishing. The two programs will run concurrently, with dedicated content for each industry alongside shared keynotes, general sessions and networking events, giving finishers and machining shops alike a chance to learn from one another and make new business connections.

Attendees can expect to network with industry peers and thought leaders, learn from expert-led presentations, and explore the exhibit hall to see the latest equipment and services from leading suppliers. Full agenda and registration details are available at topshopsevent.com. Congratulations to all qualifying Top Shops — we hope to see you in Cleveland. ■■■



2026 TOP SHOPS

The following list includes all participants that qualified as Top Shops in this year's benchmarking survey, including newly identified participating shops affected by the database migration error. (Shops listed in bold are additions to the original list.)

PLATING/ANODIZING

- **AaCron Anodizing** (Plymouth, Minn.)
- Aalberts Surface Technologies-Paulo (Murfreesboro, Tenn.)
- Ace Anodizing and Impregnating Inc. (Hillside, Ill.)
- Advanced Metal Finishing of VA Inc. (Blue Ridge, Va.)
- American Metal Coatings (Mentor, Ohio)
- **Diamond Metal Finishing** (Houston, Texas)
- Electro-Spec Inc. (Franklin, Ind.)
- Great Lakes Metal Finishing Inc. (Erie, Pa.)
- Green Bay Anodizing (Green Bay, Wis.)
- **Hohman Plating LLC** (Dayton, Ohio)
- **Jagemann Plating Co.** (Manitowac, Wis.)
- Lustrous Metal Coatings Inc. (Canton, Ohio)
- Marsh Plating Corp. (Ypsilanti, Mich.)
- Microfinish (Berkeley, Mo.)
- Miramar Metal Processing (San Diego, Calif.)
- MPP Group (Naples, Fla.)
- Plateco Inc. (Reedsburg, Wis.)
- **Professional Plating Inc.** (Brillion, Wis.)
- **Reid Metal Finishing** (Santa Ana, Calif.)
- **Reliable Plating & Polishing Co.** (Bridgeport, Conn.)

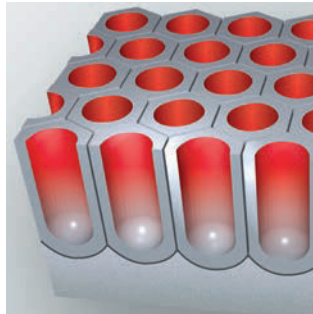
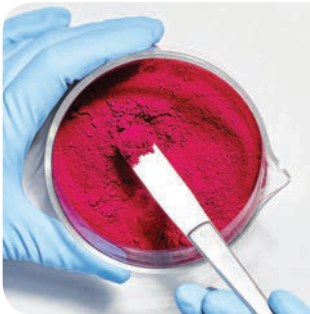
- **Silver Fox Completion Services** (Alberta, Canada)
- **Silvex Inc.** (Westbrook, Maine)
- **Surface Technology Inc.** (Ewing, N.J.)
- **Temecula Quality Plating Inc.** (Temecula, Calif.)
- **The Electrolizing Corporation of Ohio** (Cleveland, Ohio)
- **U.S. Chrome Corp. of New York** (Batavia, N.Y.)
- **Veterans Metal** (Largo, Fla.)

LIQUID/POWDER COATING

- All-Color Powder Coating Inc. (Oregon, Wis.)
- Autotech Production Services LLC (San Luis, Ariz.)
- **Diamond Metal Finishing** (Houston, Texas)
- Freedom Finishing LLC (Benton Harbor, Mich.)
- Georgia Powder Coating (Gainesville, Ga.)
- JIT Powder Coating Co. (Farmington, Minn.)
- Micron Metal Finishing (Bridgeview, Ill.)
- **Performance Powder Coating** (Longwood, Fla.)
- Prime Powder Coating (Memphis, Tenn.)
- Surgical Coatings LLC (Littleton, Colo.)
- **Veterans Metal** (Largo, Fla.)



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An Interview With ... **CONNOR CALLAIS**, Hubbard Hall

In the latest installment of *Products Finishing's* (PF) On the Line, we caught up with Connor Callais, product manager at Hubbard-Hall (Waterbury, Connecticut), to talk about the fundamentals that finishers most often get wrong in parts cleaning and pretreatment, best practices for bath chemistry maintenance and regulatory trends shaping the industry. Callais, a member of PF's 40 Under 40 Class of 2023 and a regular contributor to the Ask the Expert column, draws on his years as a technical application specialist working hands-on with customer lines to explain where finishing operations tend to go wrong — and how closer monitoring and earlier conversations with suppliers can prevent it.



Scan the QR code to listen to the complete interview.

► **Products Finishing (PF):** You're now a product manager, but you've also worked as a technical application specialist, hands-on with customer process lines. What does that work look like day to day?

Connor Callais (CC): As an application specialist, the job is to support our sales team, our operations and, most importantly, our customers in the field — helping them understand how our products work, how to control and maintain them, and how to get the best results for their application. The questions can be as simple as “How do I check the pH of my solution?” or as involved as full troubleshooting. A lot of companies have been running the same products for years, and the people operating those processes today may not know much about them. Whenever there's a gap in understanding of what products a customer is using — or should be using — that's where we come in.

PF: What are some of the things you consistently see people get wrong?

CC: A technical data sheet for a product like a cleaner is written pretty broadly, because the manufacturer doesn't necessarily know the specific application it'll end up in. So a lot of problems come down to people not running a product at the right concentration, time or temperature — or not using the right product to begin with.

PF: Is there any conventional wisdom in surface prep or pretreatment that's shifted in recent years?

CC: I'd say people are generally more aware and knowledgeable about the products they're using, even if they don't fully understand every hazard tied to a given chemistry. Over the past decade, we've seen a shift away from certain processes — methylene chloride used to be very common, and so was chrome. As regulations have tightened and people better understand the impact of these chemistries, there's more appetite for finding alternatives, even if that means some trade-off in performance.

PF: What regulatory trends are coming up most often in conversations with customers?

CC: Probably the most timely one is supply chain traceability. To make our products, we buy individual chemistries from distributors, who often buy from other distributors, so the supply chain in front of us is already complex. Increasingly, our customers, and their customers, need to qualify the original source of those raw materials, which isn't always easy for us to see clearly. We're seeing this especially with automotive and other large end users who want assurance that raw materials aren't sourced from certain countries. A lot of metal-containing compounds have historically come out of China, and finding domestic or other qualified international sources can be challenging — and it adds cost. On the local side, it's hard for us to stay current on every state or municipal regulation, but we see it most often in wastewater treatment, where different municipalities have different rules on what they'll allow into the treatment stream.

PF: Is there a piece of advice you'd give shops about when to call their chemistry supplier?

CC: We see the biggest disconnect with newer applications, or the first time we're working with a customer. Often, people switching suppliers just want an exact match to what they were already using, and it's easier for us to say “yes” and hand them a comparable product. But slowing down that conversation and understanding the bigger picture of what they're actually trying to achieve — even if it takes longer upfront — usually lets us suggest a better process, sometimes one that uses half the chemistry they're currently using. The times it comes back to bite us are when a small detail gets overlooked early on that ends up changing the whole picture of what we're actually working with. ■■■

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Legacy, Quality & Relationships Power Top Shop Success for MPP Group



With a nearly 90-year legacy, this family-owned zinc plater and architectural anodizer achieved a first place ranking in *Products Finishing's* 2026 Top Shops Plating & Anodizing category.

BY SCOTT FRANCIS EDITOR-IN-CHIEF

► For 2026, *Products Finishing's* Top Shops Benchmarking Program produced a rare tie for first place in the Plating & Anodizing category, with MPP Group (Corsicana, Texas and Du Quoin, Illinois) sharing top honors alongside Advanced Metal Finishing of Va. Inc. For MPP Group, a family-owned finisher that runs an architectural anodizing plant in Corsicana, Texas, and a zinc plating operation in Du Quoin, Illinois, the recognition caps a multiyear run as a Top Shops qualifier — and comes on the heels of some significant consolidation.

MPP Group's roots go back to 1937, when the company was founded by a cousin of CEO Ed Bozarth's mother. The business has stayed close to family ever since; Bozarth's uncle and father acquired the business from the cousin in 1956, his father assumed sole ownership in 1961 and Bozarth himself took over in 1988.

For decades, MPP grew by adding locations. The company operated a single facility in the Kansas City, Missouri, area until 1981, when it acquired a plant in Kansas. It added a Texas operation in 1991 and a Phoenix, Arizona, facility in

1995, then built its Illinois plant from the ground up in 1999 — a move that led to shuttering its original Kansas facility.

More recently, purposely or through unfortunate events, the company has consolidated several of its locations, enabling it to focus its efforts. A fire destroyed the company's Arizona facility in 2023, and rather than rebuild, MPP chose to absorb that work into its Texas plant. And in summer 2025, the company closed its original Missouri location, folding production into its Texas facility. Today, MPP Group operates just two facilities — Texas and Illinois — running roughly 145,000 square feet of combined production space.

Two plants, two distinct specialties

Rather than duplicating capabilities across sites, MPP Group has built each of its remaining facilities around a single core process. The Corsicana, Texas, plant focuses exclusively on architectural aluminum anodizing and can process parts up to roughly 30 feet long and 5 feet deep. The Du Quoin, Illinois, facility handles zinc plating only, running a 10-foot and 20-foot line to accommodate parts of varying sizes.

The Texas facility's anodizing line runs the full color spectrum, from clear anodize to black, including dark bronze, light bronze and champagne finishes. Its core market is architectural, says national sales manager Brian Stack — doors, windows, sunshades and railing systems — though the plant also serves a variety of retail and consumer applications such as door thresholds and industrial airflow components.

In Illinois, the plant runs alkaline and acid zinc plating processes and serves the electrical and plumbing markets, primarily supplying components for infrastructure and building construction.

Both plants layer additional services on top of their core finishing processes, including special packaging, in-house warehousing, direct shipping to end customers and cut-to-length services for extruded parts. On the certification side, the Texas facility follows AAMA architectural finishing standards, while the Illinois plant works to ASTM B633 for its electrodeposited zinc coatings. MPP prides itself on working closely with customers to meet specifications, even when it means helping customers work through outdated specs that need updating on their end before a job can move forward.

MPP Group's Du Quoin, Illinois, facility focuses on alkaline and acid zinc plating processes for the electrical and plumbing markets. *Source (All Images) | MPP Group*



A relationship-driven philosophy

MPP Group's customer strategy centers on a straightforward promise: quality, delivered on time. To make that possible, the company controls much of its own trucking and logistics operations, putting customers on a recurring pickup rotation rather than shipping on an ad hoc basis.

"Our number one philosophy is quality on time," Stack says. "Our ability to store some inventory is really helpful, because then we can control a little bit more of their inventory in-house, which also cuts down logistics and gives us a steady workflow."

That inventory buffer lets MPP smooth out demand spikes for its customers without disrupting its own production schedule. While the company operates as a job shop and takes on plenty of quick-turn work, Stack estimates that roughly 70% of MPP's business comes from longstanding customer relationships built over years or decades. "If you're getting a quality product on time, you're going to stay with us for a long time, because there's no reason to look anywhere else," he says. "Those are the relationships we take pride in."

Investing in people

Like most finishers, MPP Group operates with fewer people than it would like. The company employs roughly 88 workers across its two facilities, with Bozarth putting the ideal headcount closer to 110. Each facility runs with a workforce of around 50 employees, and the 25-year-old Illinois plant in particular has built up a core of long-tenured employees, with a number of workers having been there for 10-20-plus years.

To keep that tenure strong and attract new talent, MPP has steered away from temporary staffing and instead invested in culture and benefits.

Training runs on three tracks. Managers rotate through quarterly HR- and people-management coursework, team



MPP Group's Corsicana, Texas, plant is dedicated to architectural aluminum anodizing.

leads complete a lighter version of the same training online and new hires go through a mentorship program, shadowing an experienced employee for their first three weeks on the floor, a program the company is currently working to formalize further.

A culture of continuous improvement

MPP Group has been a paperless operation for several years already and aims to push its digital transformation even further. Bozarth says the ultimate goal is to tie MPP's internal systems together more tightly and extend order visibility outward and downward — giving both production employees and customers the ability to track a part's status through processing. MPP also uses AI-assisted tools, including Microsoft Copilot and Anthropic's Claude, to help track information day to day.

That same yearning for constant improvement is why MPP Group participates in benchmarking programs such as *PF*'s Top Shops. "I've always been of a philosophy that benchmarking is a good thing," Bozarth says. "Just to see where we are and where we can improve." The value, he says, is in having an informed reference point in comparison to peers in the industry. Stack agrees, noting that finishing remains a small, tightly connected industry.

That instinct to stay engaged with the broader industry extends beyond the benchmarking survey. Bozarth is a past NASF board member, a past president of his local AESF chapter and a former member of AESF's light metal finishing committee.

While MPP Group isn't currently chasing a specific new service or market expansion, the company evaluates new capabilities when customers request them, which happens a handful of times a year. Next year, MPP will celebrate 90 years — a milestone that Bozarth is quite proud of. "But the bigger picture," he says, "is that we still have some meaningful room for growth through quality, capacity and customer-driven demand." ■■■

MPP: Quick facts

LOCATION: Corsicana, Texas; Du Quoin, Illinois

INCEPTION YEAR: 1937

COMBINED FACILITY SIZE: 145,000 square feet

NUMBER OF EMPLOYEES: 88

FINISHING CAPABILITIES: Aluminum anodizing and zinc plating

ANODIZING CAPACITY: 10' × 30'

ZINC LINES: Two lines — 10' and 20'

ANODIZING FINISHES: Clear, black, dark bronze, light bronze, champagne

ZINC PROCESSES: Alkaline zinc, acid zinc

CUSTOMER BASE: Architectural, electrical, plumbing, industrial, consumer

Fraunhofer ILT Develops Laser Processes to Enable PFAS-Free Industrial Coatings

Fraunhofer ILT and partners are advancing laser-based manufacturing through the RePEEK, EPOS, LEMBAS and pureWaterSeal projects to apply PFAS-free functional coatings to metal components, plain bearings and elastomer rollers without causing thermal damage.

► Fraunhofer Institute for Laser Technology (Fraunhofer ILT, Aachen, Germany) is developing laser-based manufacturing processes for applying PFAS-free functional coatings to metal components, plain bearings and elastomer rollers. The RePEEK, EPOS, LEMBAS and pureWaterSeal projects demonstrate that replacing “forever chemicals” requires more than suitable substitute materials. Equally important are the manufacturing processes used to apply them.

PFAS are said to be virtually unbeatable in terms of functionality, being very resistant to chemicals and heat. Yet replacing them, explains Fraunhofer ILT, is far from straightforward. PFAS reduce friction, protect components against wear and corrosion, prevent material buildup and maintain emergency-running properties when lubricating films fail. For these reasons, any alternative requires not only a new material but also a reliable way of applying that material to a wide variety of components.

Through the four projects, Fraunhofer ILT is developing laser-based processes for applying PFAS-free, high-performance coatings on large metal components, plain bearings, seals and sensitive elastomer rollers. Depending on the application, the laser can deposit coating materials, melt them locally or selectively structure the surface. Because it delivers energy precisely where it is needed, and only for a short time, the laser enables engineers to process PFAS-free substitute materials that would otherwise require energy-intensive furnace treatments or temperatures that could damage the underlying component.

PEEK coatings using a hybrid process

In the RePEEK project, the surface engineering team is investigating how PEEK-based coatings can be applied to metal components used in heavily loaded moving systems. They are focusing on applications in mechanical engineering, including large plain bearings, seals, pistons and solenoid valves.

Large plain bearings used in wind turbines provide a particularly clear example of the challenge. A shaft rotates within a coated bearing shell, which is currently protected, in most cases, by PTFE-based coating systems. As its name suggests, RePEEK replaces PTFE with polyetheretherketone (PEEK).

“PEEK is often applied to large components either as a film or as a powder that is subsequently bonded by heat,” explains Dr. Samuel Moritz Fink, head of the Thin Film Processing Group at Fraunhofer ILT. “That approach can work well for small components. With metal parts weighing several tons, however, it becomes far more complicated. The entire component has to be heated in a furnace to a high temperature and then cooled down slowly.” The process consumes large amounts of energy, takes considerable time and heats far more material than is actually required for the coating itself.

ILT researchers first use a laser-based deposition process to create a metallic surface layer. This deliberately rough surface provides mechanical anchoring for the polymer. They then apply PEEK powder within the same process environment and melt it locally with the laser. The polymer becomes anchored in the rough surface, creating a composite coating consisting of a metallic functional layer and a PEEK-based topcoat. The team has developed a specially designed nozzle for the PEEK powder and has already filed a patent application for the process.

Multilayer PEEK coatings for large plain bearings

Building on the RePEEK project, Delil Idris Demir at Fraunhofer ILT is investigating how PEEK-based coatings can be deposited reliably onto large plain-bearing components in multiple layers via the EPOS project. Applying the coating step by step makes it possible to build up greater coating thicknesses without having to heat components weighing several tons entirely in a furnace.



ACS Coating Systems (Wilhelmshaven, Germany) contributes its extensive experience in PEEK coatings, particularly for plain-bearing applications. Managing director Dr. Christoph Stecher is supporting the project by providing his expertise in coating design, industrial-scale application and the transition to full-scale manufacturing.

Polymer Service GmbH Merseburg (PSM, Merseburg, Germany), led by Dr. Katrin Reincke, tests and evaluates the resulting coating systems. PSM's work focuses on the crystallinity, microstructure and thermal condition of the PEEK layer, as well as its mechanical and thermomechanical properties. This data will help optimize the laser process and the multilayer coating strategy so that the coating bonds uniformly to the substrate and withstands the long-term mechanical stresses encountered in plain bearings.

Nonstick coatings for sensitive elastomer rollers

The LEMBAS project focuses on elastomer rollers used in film manufacturing, the packaging industry, paper production and medical technology. In these applications, even small particles released from the roller surface can quickly become a problem.

"Silicone coatings are still widely used for these applications," explains Adam El-Sarout, also a member of the Thin Film Processing Group at Fraunhofer ILT. "While they provide the required nonstick properties, they do not always offer the durability demanded by today's high-speed manufacturing processes." Together with coating specialist Rhenotherm (Kempen, Germany), the LEMBAS team is developing laser-based manufacturing processes that use high-performance polymers such as PEEK, polyamide and polypropylene. Compared with silicone, these materials offer greater resistance to wear, improved chemical stability and a longer service life — all without the use of PFAS.

"The real challenge is the processing window," explains El-Sarout. "High-performance polymers require high melting temperatures, but elastomers such as EPDM can tolerate only limited heat. Heating an entire rubber roller in a furnace would damage the substrate." The laser addresses precisely this problem by generating high temperatures only where they are

needed and only for a very short time within the coating material. The functional layer melts, while the elastomer component beneath it remains largely protected from thermal damage.

To promote long-term adhesion, researchers are developing not only the nonstick coating itself but also an intermediate layer that protects the elastomer and strengthens the bond to the functional topcoat. They are also tailoring the optical and rheological properties of the materials to the laser process while investigating suitable coating and laser pretreatment methods.

"A replacement material must do more than provide the required functionality," says Dr. Christian Vedder, head of the Surface Technology and Ablation Department at Fraunhofer ILT. "It also has to be compatible with the component, the substrate's temperature limits and the manufacturing process."

PFAS-free seals for water-based lubricants

In the pureWaterSeal project, researchers at Fraunhofer ILT and Fraunhofer Mechanics of Materials IWM (Baden-Württemberg) are developing sustainable seals that eliminate the need for PFAS and operate with water-based lubricants. The project addresses two environmental challenges at the same time: PFAS persist in the environment indefinitely, while oil-based lubricants contaminate soil and water.

Researchers at Fraunhofer IWM have developed diamond-like carbon (DLC) coatings specifically for PFAS-free polymer components. The Fraunhofer ILT team then used a laser to structure the coating, locally relieving internal stresses and mechanical loads without compromising the stability of the coating as a whole. At the same time, the combination of the coating and laser structuring reduces friction, improves wear resistance and extends the service life of the seals.

First prototypes are already operating in pumps used at geothermal power plants. Together with industrial partners, researchers are now adapting the seals for additional applications, including passenger vehicles, ship propellers, wind turbines and agricultural machinery. At the same time, the team is preparing to scale up the technology for larger systems and industrial production. ■■

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ON THE MOVE

The ChemQuest Group (Cincinnati, Ohio) has named **Robert (Robb)**



Robert Lovegrove

Lovegrove as its third CEO in the company's 50-year history. Daniel Murad remains actively involved in the firm as chairman. Lovegrove brings a wide spectrum of experiences

and a diverse background in corporate strategy, M&A, strategic marketing and global people leadership, in addition to a holistic perspective and ability to use deep insights.

"Over the course of his career, Robb has built deep knowledge and expertise across the breadth of specialty chemicals and formulated products," says Murad.

MicroCare LLC (New Britain, Connecticut) has hired **Kevin**



Kevin Castonguay

Castonguay to serve as senior director of marketing. A 25-plus-year marketing executive, Castonguay brings experience in leading global strategies to accelerate revenue growth, expanding market share and building high-performing brands.

Castonguay will put his background in demand generation, go-to-market strategy, brand management, digital transformation and more to use at MicroCare to increase brand awareness and drive preference among current and new customers.

Gema USA Inc. (Indianapolis, Indiana), a Graco Inc. company, announces the addition of **Ryan Dudney**



Ryan Dudney

as territory manager for the South Central U.S. With a proven track record in the finishing industry and technical sales, Dudney brings strong leadership, market development expertise and a deep commitment to customer success.

Prior to Gema, he held key leadership roles at Allied Powder Coating. His deep roots in the Texas powder coating market and broad business development experience will be valuable assets to Gema and the customers he serves throughout the South Central region.

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Valterra Platinum, Umicore MDS Launch R&D Collaboration for Next-Gen PGM Electroplating

Valterra Platinum (Johannesburg, South Africa) and Umicore's Metal Deposition Solutions (Umicore MDS, Schwäbisch Gmünd, Germany) business unit have commenced a new collaboration to accelerate the development and commercialization of platinum group metal (PGM)-based electroplating technologies aimed at high-value industrial applications. The partnership reflects a shared commitment to create new, sustainable sources of demand for PGMs as the automotive landscape continues

to evolve. It builds upon many years of industrial collaboration and expanding engagement with fabricators by Valterra Platinum.

Under the agreement, Valterra Platinum will invest up to £2.5 million over an initial three-year period and will work alongside Umicore MDS to advance technologies from laboratory research toward commercial readiness. Umicore MDS will contribute equivalent value through R&D services, drawing on its expertise in materials chemistry, surface technologies and industrial scale-up.

The initial R&D program will concentrate on high-speed platinum electroplating, particularly in the electronics segment — such as connector applications. This application represents a sizeable market in which platinum could provide a competitive, cost-effective and durable alternative to gold, which has current industrial demand of more than 300 tonnes per year. Additional projects and strategic partners may be introduced over time.

"This partnership allows us to focus on the targeted development of innovative solutions that will result in platinum coatings that match the performance of other precious metal finishes while offering significantly improved economic efficiency," Michael Herkommer, vice president of Umicore MDS, says.



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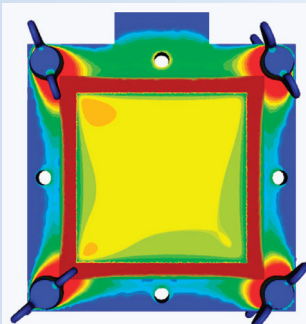
NASF Technical Papers

Edited by Dr. James Lindsay, NASF Technical Editor

Electrodeposition in Porous Fiber Cloth Structures: From Poor Coverage to Optimized Process

Romain Baudson, Bart Van den Bossche, Koen Delaere, Aliona Nicolenco, Uxua Huizi, Francisco Alcaide, Parisa Molaeipourashka, Mesfin Haile Mamme and Annick Hubin;

Elsyca NV, Leuven, Belgium; CIDETEC, Basque Research and Technology Alliance (BRTA), Spain; and Sustainable Materials Engineering (SUME) Research Group, Vrije Universiteit Brussel (VUB), Belgium.



Applying electrodeposition to provide porous structures such as foams, fiber cloths or

packed fiber beds with a metallic coating remains a challenging process. This is because the throwing power of these processes into the porous structure is generally very poor.

In this paper from SUR/FIN 2026, both simulations and experiments for a nickel-tungsten deposition process demonstrate that deposit thickness decreases very rapidly when progressing further into a carbon fiber cloth structure, while tungsten content in the deposit strongly varies. Experimental results were obtained from cloth samples processed in a

lab-scale plating cell, with cross-sectional FE-SEM and EDX applied to investigate the deposition thickness profile over the fibers. Simulated results were obtained from an FEM-based Multi-Ion Transport and Reaction (MITRe) model with validated kinetic electrode reaction parameters. It was found that carefully defined forced electrolyte flow systems and pulse current programs can largely enhance throwing power.

The full presentation can be accessed and printed at short.pfonline.com/NASF26-Sept1.

NASF/AESF Foundation Research Project #124: Innovative Coatings for Hybrid Manufacturing of (Micro)Technical and Tooling Systems – 7th Quarterly Report (February-April 2026)

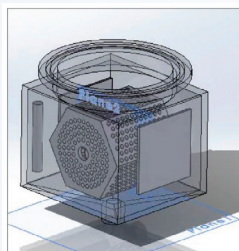
Professor Jean-Yves Hihn, Université Marie et Louis Pasteur, CNRS, Institute UTINAM UMR 6213 F-25000, Besançon, France

This NASF Foundation research grant is part of Project RIFHySTO, standing for “Innovative Coatings for Hybrid Manufacturing of (Micro)Technical and Tooling Systems.” This report covers the seventh quarter of project work.

In the first project phase, a redesign of the pilot cell was undertaken with CAD software. The pilot cell would serve as a demonstrator for parts plating in ionic liquids. The second phase of study on electrodeposition of titanium from ionic liquids involved extensive tests to find conditions for the electrodeposition of titanium to overcome resistance to the last

reduction step. Work here concentrated on the study of simultaneous aluminum-titanium plating using additives.

The full report can be accessed and printed at short.pfonline.com/NASF26-Sept2.



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Visual Shop, Bluestreak Join Forces With Steelhead Technologies

Steelhead Technologies (Calumet, Michigan) announces the acquisitions of Visual Shop (Crystal Lake, Illinois) and Bluestreak (Delafield, Wisconsin), two longstanding providers of job shop management and quality management system (QMS) software. Customers of all three companies now have access to an all-in-one system built on a digital production floor, with automation and AI built in to power margin and growth.

For years, Steelhead, Visual Shop and Bluestreak have earned the trust of metal finishers and heat treaters across North America by delivering systems designed with the specific complexities job shops face in mind. Now, through this acquisition, customers are getting the best of each system: the digital production floor, the industry knowledge and the people who understand their business.

“Metal finishing job shops have been under decades of competitive pressure from offshoring, workforce challenges and volatility in costs. With demographic changes and AI completely

changing the operational landscape, the challenges remain as tall as ever,” says Jeff Halonen, CEO/co-founder,

Steelhead Technologies. “At the same time, top government officials and contractors are urgently bringing back work by reshoring and scaling production. Job shops must leverage technology to rapidly increase capacity and capability while not adding head count to solve every challenge.”

Steelhead is accelerating its investment in metal finishing to position job shops for the next generation of manufacturing. The team is continuing to invest heavily in the industry, including its investment in FedRAMP to meet the security and documentation standards CMMC compliance requires, and dedicating engineering, support and product resources specifically to fine-tune workflows. Customers will benefit from access to the people who know metal finishing and heat treating best, drawing on the longstanding experience at Visual Shop and Bluestreak.

Steelhead is also partnering with metal heat treating company ThermTech (New Berlin, Wisconsin) in which the latter will implement its AI-powered heat treating platform. “Over the last 23 years, we’ve leveraged and co-developed the Bluestreak QMS, and that investment in capability has been central to how we serve our customers,” says Mary Springer, executive VP, ThermTech. “Moving to Steelhead is the next chapter of that same philosophy, a platform that unites MES, QMS, ERP, financials and customer service in a single system. Our engineering team will work closely with Steelhead to shape highly specialized heat treating capabilities.”



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CCAI/IFCA Finishing Education Foundation Awards \$20,500 in Student Scholarships for 2026

The CCAI/IFCA (Lakewood Ranch, Florida) Finishing Education Foundation has announced its 2026 Matt Heuertz Scholarship Program recipients, among which a total of \$20,500 is being bestowed. In addition to the cash awards, each recipient will receive a one-year student membership in CCAI/IFCA, making available to them the association's resources and its regional chapters across the country.

Since 1992, the Matt Heuertz Scholarship Program has provided financial awards to students enrolled in programs that could lead to a career in industrial finishing and coating. Applications from qualified students are reviewed by the Finishing Education Foundation Board of Directors, who then determine the winners.

"We are especially excited that this year's recipients represent a wide range of educational pathways, reflecting the many opportunities available to those pursuing careers in the finishing industry,"

says executive director Sheila LaMothe. "It's particularly rewarding to see the highest scholarship award presented to a community



college student, underscoring the vital role these institutions play in developing our future workforce."

This year's recipients include:

- Ebenezer Chan, University of Texas
- Zacharia Davis, University of Cincinnati
- Mya DeAngelis, Wentworth Institute of Technology
- Gannon Evers, Arizona State University
- Sakshayam Ghirmire, University of Southern Mississippi
- Megan Kokesh, University of Wisconsin-Stout
- Matthew Kulangara, Texas A&M University
- Arnav Parmar, North Carolina State University
- Mark Soucek, University of Cincinnati
- Benjamin Thomas, University of Texas

The Jim Gallagher Award, given to the highest scoring applicant, went to Jacob Keunzi, of Chemeketa Community College. "A man like Jim is who I strive to be, giving and working hard to bless others and strengthen the future of the manufacturing and finishing industry," Keunzi says.

The Bob Warren Award, which is underwritten by CCAI/IFCA corporate member Sames, went to Nelson Gomez, of Rasmussen University. "I currently work as lead operator in the paint department at a manufacturing facility, and receiving an award connected to someone as respected and dedicated to the finishing industry as Bob Warren means a great deal," Gomez says.

Scholarship applications are accepted each year beginning in January.



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AkzoNobel Completes Key Phase of €22M Aerospace Coatings Expansion

AkzoNobel Aerospace Coatings (Waukegan, Illinois) has completed a major phase of its €22 million investment at its Pamiers production site in France, a development project designed to expand capacity, strengthen technical capabilities and support the site's environmental objectives.

The investment supports AkzoNobel's long-term focus on operational excellence, while enhancing local support for customers across the growing aerospace coatings sector. The upgraded site will increase AkzoNobel's European production capacity, improve workflow efficiency and support the continued development of next-generation coating technologies.

A key part of the project is the construction of a new warehouse facility, adding more than 2,000 square meters of storage space for raw materials and finished products. Advanced temperature-controlled storage cells have been installed to

help ensure optimal product preservation and more efficient stock management.

AkzoNobel has also built a new 638-square-meter waste management facility equipped with next-gen sprinkler systems featuring zoned automatic detection and controlled intervention technology for enhanced operational safety.

Alongside the site expansion, AkzoNobel has modernized its quality control and production services to strengthen product quality and operational performance. Upgrades to the Quality Control department include four new application cabins and a dedicated cabin for chromate products with specialized insulation and secure airlock access. Eight more new laboratory benches with integrated extraction hoods have also been implemented — increasing quality control capacity by 166%.

Production capabilities at the site have also been enhanced through the installation of precision weighing systems, additional paint tank and a new automatic beads mill dedicated to non-chromate coatings. A redesigned workspace layout and optimized work organization have further optimized production flow, operational flexibility and manufacturing efficiency.

The overall development project remains on track, with final construction and equipment installation expected to be completed by the end of 2026. An official inauguration event is planned for 2027.



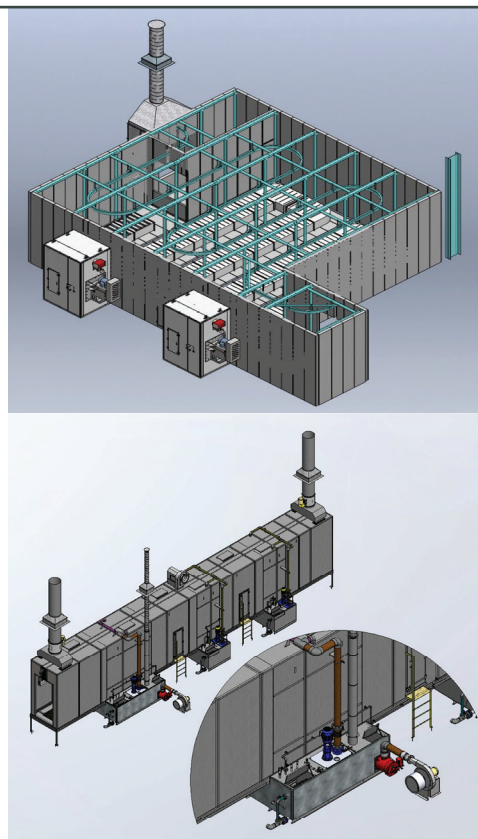
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Lon Thrasher Receives 2026 NASF Award of Merit

Lon Thrasher, president and general manager of Palm Commodities International Inc. (LaVergne, Tennessee) and vice president of NASF, was honored with the NASF Award of Merit at SUR/FIN 2026.



In a statement released in the wake of the award, Palm Commodities International, a subsidiary of Umicore USA and supplier of metals, chemicals, equipment and materials for the surface finishing and

electroplating industries, says, "Lon has dedicated countless years to advancing the surface finishing industry through leadership, innovation and service. This prestigious award recognizes his significant contributions to the industry and his unwavering commitment to supporting the success of customers, suppliers and industry professionals alike. Lon's passion for the industry, combined with his leadership at both Palm Commodities and NASF, continues to make a lasting impact on the future of surface finishing."

SUR/FIN 2026 was held June 2-4 at the Donald E. Stephens Convention Center in Rosemont, Illinois. The 2027 iteration of the conference and trade show will take place at the Long Beach Convention Center, on June 8-10, 2027.

Hoffmann Acquires Naples Powder Coating, Merges Operations With Sunmaster

Hoffmann Family of Companies (HF Companies, Winnetka, Illinois), a family-owned firm, has announced the acquisition of Naples Powder Coating (Florida), Collier County's largest production powder coating facility, and its integration into Sunmaster of Naples, HF Companies' Naples-based manufacturer of custom awnings, ornamental metal products and storm protection systems since 1969.

Naples Powder Coating serves customers across marine, automotive, architectural and residential markets — from T-tops and rod holders to gates, railings and patio furniture. Led by husband-wife duo Audrey and Kyle Hogg, the company is known for its state-of-the-art Nordson equipment and for being home to what is reported to be Collier County's largest curing oven. It also recently added in-house sand blasting on raw materials, a natural upstream complement to its powder coating work.

"There's a real void in the market for a reliable, high-end powder coating partner, and pairing that capability with a brand of Sunmaster's quality is exactly how we plan to fill it," says David Hoffman, chairman and founder of HF Companies.

Naples Powder Coating's capabilities are highly complementary to Sunmaster's existing metal fabrication business, which produces awnings, custom railings, staircases, gates, fences, pergolas and the Titan Screen line of motorized retractable screens. Hoffmann Commercial Real Estate has also acquired the entire building housing the powder coating operation — of which Naples Powder Coating currently occupies only one-third — signaling a commitment to expanding coating capacity and delivering a complete, full-service offering to existing customers and new ones alike.

"Bringing finishing under our umbrella means faster turn-around and tighter quality control for every piece of metal that leaves our shop — and for outside customers, too," adds John Wilkinson, CEO of Sunmaster. "Our plans include updating outdated equipment and reviewing all procedures to ensure they're in line with our standard of quality. As an end user for over 50 years, we know what our customers expect, and making that our number one priority is exactly how we'll approach this new addition to the Hoffmann portfolio."

HF Companies' Naples portfolio spans more than 30 local companies, from Sunmaster to Naples Princess to The Augusta Clothing Company, Jerri Hoffmann's new fashion boutique.





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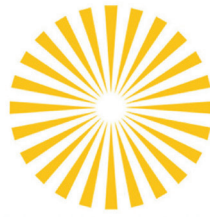
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Protecting Our Infrastructure

The importance of protective coatings in the development of data centers goes beyond corrosion protection — it's about preserving every aspect of the infrastructure to ensure decades of service.

BY KEVIN BILLER CONTRIBUTING WRITER



► AI, cloud computing and digital transformation are fueling one of the largest construction booms in modern history. McKinsey & Co. estimates that more than \$1.7 trillion will be invested in data center construction by 2030. That's an incredible opportunity, but it's also creating unprecedented challenges for owners, contractors and material suppliers.

The discussion around data centers has expanded well beyond building facilities faster. Operators today must reduce energy consumption, improve water efficiency, manage supply chain uncertainty and deliver facilities that will operate reliably for decades. Every material specified — from structural steel to cooling systems — must contribute to that objective. Protective coatings are no exception.

Protective coatings have always been about preserving assets. They enable components to be protected before they arrive on-site. They support fire safety, improve durability under demanding operating conditions and help facilities withstand moisture, chemicals, abrasion and temperature fluctuations. Properly selected coating systems also contribute to sustainability initiatives by extending service life, reducing maintenance, minimizing material replacement and supporting compliance with increasingly demanding environmental regulations.

Data centers, however, demand much more than corrosion resistance alone.

Understanding the major components of a data center

When most people think about a data center, they picture rows of server racks filled with blinking lights. Those servers are certainly the heart of the operation, but they're only one piece of a much larger and more sophisticated system. Every data center relies on a network of supporting infrastructure that keeps the equipment operating continuously, often 24 hours a day, seven days a week.

The IT equipment includes servers that perform the computing, storage systems that securely hold enormous amounts of data, and networking hardware, including switches, routers, firewalls and load balancers. In turn, these components allow information to move quickly and securely throughout the facility and around the world.

Reliable power is essential. Data centers depend on utility power backed by uninterruptible power supplies (UPS), power distribution units (PDUs) and emergency generators to ensure that even a brief interruption doesn't result in downtime. Many of these components are housed in steel enclosures and cabinets that require durable finishes capable of protecting against corrosion while providing an attractive, long-lasting appearance. Powder coatings have become the finish of choice for many of these applications because of their durability, efficiency and environmental advantages.

Managing heat is another constant challenge. Servers generate tremendous amounts of heat, making cooling systems every bit as critical as the computing equipment itself.



Racks of equipment such as these, located in a warehouse in a remote location in Stutsman County, North Dakota, require consistent, large-scale temperature control — and coatings that can tolerate such an environment.

Computer room air conditioners (CRAC), computer room air handlers (CRAH), traditional HVAC systems, containment systems and, increasingly, liquid cooling technologies all work together to maintain precise operating temperatures. The cabinets, ductwork, cooling equipment and support structures that make up these systems also benefit from high-performance coating systems that are able to withstand demanding operating environments.

Finally, redundancy is built into virtually every critical system. Whether it's power, cooling or networking, most facilities are designed with backup capacity, so operations continue even if a component fails or requires maintenance, because in the world of data centers, uninterrupted operation is an expectation.

Why powder coatings matter in data centers

Powder coating has become the preferred finish for many data center components because it provides a combination

of durability, corrosion protection, appearance and environmental performance that is difficult for conventional liquid coatings to match. Whether components are exposed to outdoor weather, high humidity or changing environmental conditions, a properly selected and applied powder coating provides a durable barrier against corrosion, which is especially important for exterior equipment, structural members, security fencing, cooling equipment and backup power systems that are expected to provide decades of reliable service.

Throughout the life of a data center, equipment is installed, upgraded and serviced regularly. Cabinets, racks, doors and enclosures are frequently moved, opened or handled, creating countless opportunities for abrasion and impact. Powder coatings offer excellent resistance to chipping, scratching and wear, ensuring these components maintain their appearance and protective performance over time.

Appearance may seem secondary in a mission-critical facility, but it is important. A clean, uniform, high-quality finish reflects the attention to detail and quality expected throughout the entire operation. Powder coatings retain their color and finish for many years with very little maintenance.

Powder coatings make the most difference on fabricated steel elements such as server racks, cabinets and IT cages,

which must protect the internal computing equipment but also withstand continual hands-on maintenance. For similar reasons, electrical enclosures, switchgear, power distribution equipment and UPS cabinets also benefit from such coatings, in addition to corrosion resistance and optimal appearance requirements.

Outside the building, powder coatings are also widely used on generator enclosures, cooling equipment, HVAC systems, battery storage enclosures and other environmental control equipment. These components operate in every extremity of weather, and long-term durability and corrosion protection are essential. To that same end, powder coatings are also employed for security fencing, access gates, bollards and protective barriers.

Less noticeable — but no less important — are cable trays, wire management systems, equipment supports and structural framework. These components may not be seen once a facility is operating, but they are expected to provide reliable service throughout the life of the data center.

Finally, powder coatings are increasingly specified for architectural and structural steel, including stairways, handrails, catwalks, mezzanines, equipment platforms and other fabricated metalwork.

The common thread running through all these applications is reliability. Data centers are built with the expectation that they will operate continuously for decades with minimal interruption. Powder coatings help support that goal by protecting the steel components that make up much of the facility's infrastructure. While they may not be the most visible part of a data center, they are an important contributor to its long-term performance, durability and overall value.

Duplex coating systems

One of the most effective ways to protect any component in a demanding environment is to combine two proven technologies: hot-dip galvanizing and powder coating. This combination, commonly referred to as a duplex coating system, has been used successfully for many years in applications where long-term corrosion protection is essential.

Each coating contributes something different. The galvanized coating provides sacrificial corrosion protection by shielding the steel from the environment, even if the surface is scratched or damaged. The powder coating serves as a durable barrier that further limits exposure to moisture and corrosive elements while providing the color, gloss and overall appearance expected in today's facilities.

For data centers, this approach is particularly attractive for exterior applications exposed to the elements, including security fencing, structural steel, equipment supports, cooling infrastructure and generator enclosures.

Duplex coating systems have been used successfully for many years in applications where long-term corrosion protection is essential.

Duplex systems are especially well suited for facilities located in coastal regions where salinity is high, areas with high humidity, industrial locations where airborne contaminants are present or anywhere steel is subjected to aggressive weather conditions.

Performance drives specifications

Winning business in the data center market is about much more than supplying powder coating. OEMs evaluate suppliers on their ability to deliver consistent quality, provide technical support across multiple manufacturing locations, maintain reliable supply chains and offer products that perform over decades of service.

For interior applications — such as server racks, electrical enclosures, switchgear and network cabinets — epoxy-

polyester hybrid powders remain one of the most widely specified technologies. They provide an excellent combination of appearance, scratch resistance, chemical resistance and overall durability in controlled indoor environments.

Exterior applications present a different challenge. Generator enclosures, battery energy storage systems and exposed structural components

require powder coatings capable of withstanding sunlight, moisture, temperature fluctuations and corrosion. In these applications, super-durable polyester systems have become the preferred choice because they provide optimal weatherability and long-term color retention.

Water management and fire protection

As large-scale infrastructural footprints, data centers depend on increasingly sophisticated cooling systems to manage the enormous heat they generate. As operators work to improve water usage effectiveness (WUE) — which calculates the ratio of the water consumed by a facility for cooling, humidification, etc., to the total energy consumed by its IT equipment — cooling water systems, storage tanks, containment structures and wastewater infrastructure become even more critical.

These environments expose concrete and steel to continuous moisture, aggressive chemicals, abrasion and thermal cycling. Selecting the proper coating system is essential for protecting these assets.

Immersion-grade epoxy coatings, elastomeric linings and other high-performance protective systems help maintain the integrity of tanks, piping, tunnels and secondary containment structures. Failure of these systems can lead to unplanned downtime, costly repairs, environmental concerns and regulatory compliance issues.

The growing use of multistory data centers, particularly in urban markets where available land is limited, has also led to a redoubled need for robust fire protection measures



Powder coatings affect nearly every inch of a data center's entire footprint. Consider the Skybox Power Campus, shown here under construction in Hutto, Texas, which will be a 4 million-square-foot facility providing 600 megawatts of power when completed.

— notably because in centers of this kind, personnel commonly occupy spaces adjacent to server operations.

Intumescent fire-protective coatings are increasingly specified to provide multi-hour fire resistance for structural steel. During a fire, these coatings expand to form an insulating char that slows heat transfer, allowing the steel structure to maintain its strength longer. Those additional minutes make a major difference for safe evacuation, emergency response and protecting valuable equipment.

Many European facilities have required higher fire-resistance ratings for years. As global data center operators apply common design standards across multiple regions, similar performance expectations are becoming more common throughout North America.

Looking ahead

The explosive growth of AI and hyperscale data centers is changing the expectations placed on virtually every component that goes into these facilities. Powder coatings are no exception.

For years, coatings used on server racks, electrical enclosures, cooling equipment and support structures were expected to do two things well — protect metal from corrosion and provide a durable, attractive finish. Those requirements haven't changed, but they are no longer the whole story.

Today, powder coatings are becoming part of the overall engineering solution. OEMs are asking suppliers to help improve manufacturing efficiency, support sustainability goals, extend equipment life and, in some applications, even contribute to thermal and electrical performance.

Heat management. As rack densities grow, operating temperatures will increase. While powder coatings were not intended initially to dissipate heat, they must continue to perform after years of thermal cycling without losing adhesion, gloss, color stability or mechanical integrity. That means resin technology will continue to evolve to provide

better long-term durability under increasingly demanding service conditions.

Data centers are built with the expectation that they will operate continuously for decades with minimal interruption.

Cooling systems.

Liquid-cooled systems that use chilled water, glycol solutions, dielectric fluids and even

immersion cooling expose coated components to environments that were uncommon only a few years ago. Future powder coatings will need greater resistance to moisture, chemicals and continuous exposure to cooling fluids while continuing to protect welded assemblies, fittings and fabricated steel from corrosion. In many outdoor or high-moisture applications, duplex coating systems that combine galvanizing with powder coating will become even more valuable.

Sustainability. While powder coatings already offer significant environmental advantages because they contain little or no volatile organic compounds (VOCs) and achieve high material utilization, swiftly evolving emissions reduction



standards will also demand a reduction in the energy required to manufacture coated products. Low-temperature cure powders are a good example. By lowering cure temperatures, manufacturers can reduce oven energy consumption, increase production throughput and coat thinner materials with less risk of distortion. It's one of the fastest-growing areas of development because it benefits both the environment and the manufacturer's bottom line.

The industry is also turning toward PFAS-free technologies, renewable raw materials, lower embodied carbon, Environmental Product Declarations and life cycle assessments. As data center owners pursue aggressive environmental goals, coating systems that can document their sustainability performance will become increasingly valuable.

Electrical performance. While powder coatings do offer excellent electrical insulation, certain applications within data centers may benefit from coatings engineered with controlled electrical properties that help dissipate static electricity or work in conjunction with grounding systems. While these technologies are still emerging, they illustrate how coatings are becoming increasingly functional rather than simply decorative.

Multifunctional coatings. Researchers are evaluating additives such as ceramic materials, graphite, graphene, boron nitride and aluminum nitride to determine whether powder coatings can assist with heat management in specialized applications. Other research is focused on self-healing technologies that can reduce corrosion after minor surface damage and smart coatings capable of detecting moisture,

corrosion, overheating or mechanical damage before failures occur. Moreover, as many data center components are prefabricated and assembled on-site, densely salinated air during ocean transport, desert temperatures, tropical humidity or industrial pollution are all risk factors in transit. As a result, coating specifications are increasingly demanding higher corrosion resistance, improved edge protection, better UV durability and greater resistance to abrasion during shipping and installation.

As demand for data centers continues to accelerate, designers and manufacturers are placing greater emphasis on materials that offer long service life, lower maintenance costs and sustainable manufacturing practices. Powder coating checks all those boxes. Future coatings won't simply resist corrosion and look good — they'll help manufacturers build more efficiently, more sustainably and help critical infrastructure perform more reliably over decades of service. For an industry built around uptime and long-term reliability, that's an exciting future for powder coatings. ■■



ABOUT THE AUTHOR

KEVIN BILLER has been developing, commercializing and manufacturing powder coatings since 1978. He has held leadership positions at several industry companies, including as president and owner of IRIS Powder Coatings and VP/general manager of Jamestown Powder Coatings. In 2007, he established the Powder Coating Research Group (now part of the ChemQuest Group). He holds four U.S. patents in industrial coating technology and is the author of "Powder Coatings: Foundation for the Novice Formulator."



Going Beyond the Chemistry

This Type 2 chem film installation's drainage grid also serves as an area for manual monitoring of parts moving through the line.
Source (All Images) | Best Technology Inc.

What manufacturers should know before setting up a Type 2 chem film line — from having the right line design to the level of production control expected by its end-use application.

BY MARK BATTLES CONTRIBUTING WRITER

► For manufacturers processing aluminum components, chem film is often one of the most practical ways to improve corrosion resistance, support paint adhesion and preserve electrical conductivity without adding measurable thickness to the part. That combination is why chem film, also called chromate conversion coating or Alodine, continues to be used across aerospace, defense, electronics and other precision manufacturing environments.

But not every chem film line is the same. When the requirement is MIL-DTL-5541 Type 2, manufacturers need to think beyond the coating chemistry itself. The right line design must support the specification, the chemistry, the part size, the rinse requirements and the level of production control expected by the customer or end-use application.

What makes Type 2 chem film different?

Under MIL-DTL-5541, Type 2 chem film refers to hexavalent chromium-free conversion coatings. In many cases, this means the process uses trivalent chromium-based chemistry instead of traditional hexavalent chromium chemistry. This

is important because many manufacturers are looking for surface finishing processes that maintain performance while reducing environmental, health and regulatory concerns associated with hexavalent chromium. Type 2 chem film helps support that transition while still providing corrosion protection and surface performance for aluminum parts.

Because Type 2 chem film chemistries can vary by application and specification, the equipment should be designed around the approved process requirements. This includes the cleaning approach, rinse strategy, tank sequence, dwell time, chemistry compatibility and quality control expectations for the finished part.

Why manufacturers choose Type 2 chem film

Type 2 chem film can offer several practical advantages when compared with traditional hexavalent chromium processes.

One of the most important advantages is process simplicity. Depending on the chemistry and application, Type 2 systems can often use fewer process steps than Type 1 systems, which may reduce line complexity, floor space requirements and operating time. Some Type 2 chem film processes can also be applied at room temperature, which helps reduce the energy demand associated with heated tanks and minimize concerns related to evaporation.

These benefits matter because surface finishing is not just about coating performance. It is also about repeatability, operator safety, production flow and the ability to meet specification requirements without adding unnecessary process complexity.

BELOW: Best Technology builds chem film equipment for Type 1 and Type 2 processes, with system layouts designed around the application, part size, tank sequence, rinse strategy, controls and production requirements.

Typical Type 2 chem film

A Type 2 chem film line must be designed around the complete process, not just the coating tank. A typical Type 2 hex-free chem film process may include:

Acid clean: The parts are cleaned to remove dirt, oils and residues from machining, handling or packaging. Proper cleaning is critical because contamination can interfere with uniform coating formation.

Rinse: A rinse stage helps remove detergents and cleaning chemistry from the part surface. A cascade counterflow rinse may be used to improve rinse efficiency and reduce carry-over. A water-break-free test may also be used to confirm the surface is properly cleaned.

Type 2 chem film coating tank: The aluminum part is immersed in the hex-free conversion coating chemistry. The dwell time depends on the chemistry, coating requirements, application method and geometry of the part.

Rinse: A post-coating rinse removes excess chemistry and helps stabilize the finished surface.

Final rinse: A final rinse is commonly used to support consistent final quality and reduce contamination before drying or downstream processing.

Some Type 2 systems may follow an acid-clean route, while others may require an alkaline-clean route with additional deoxidizing and rinse stages. The correct tank sequence depends on the chemistry, aluminum alloy, part condition and customer specification.

Each step has to be controlled carefully. A weak cleaning step, poor rinse quality or inconsistent dwell time can affect the coating result even when the correct chemistry is being used.

Equipment considerations before building a line

Before setting up a Type 2 chem film line, manufacturers should evaluate several equipment-related factors. Tank material and construction are important because the system must be compatible with the chemistry being used. Tanks,





Compatibility with the chemistry being used and the shop's existing infrastructure is a core component of selecting a chem line for adoption and installation.

components will look very different from a line designed for large aerospace structures or high-volume production.

Rinse quality is also a major design consideration. Chem film lines depend on effective rinsing to prevent contamination, reduce drag-out and support consistent coating quality. In many cases, counterflow rinsing helps improve rinse efficiency while managing water use.

plumbing, pumps, ventilation and structural components should be selected based on the process environment.

Part size and load weight determine the required tank dimensions, basket design, hoist system and workflow layout. A line designed for small aluminum

Process control matters as production volume increases. Manual lines may be appropriate for lower-volume applications, but semi-automated or automated systems can improve repeatability by controlling immersion time, transfer timing, rinse sequencing and operator variation.

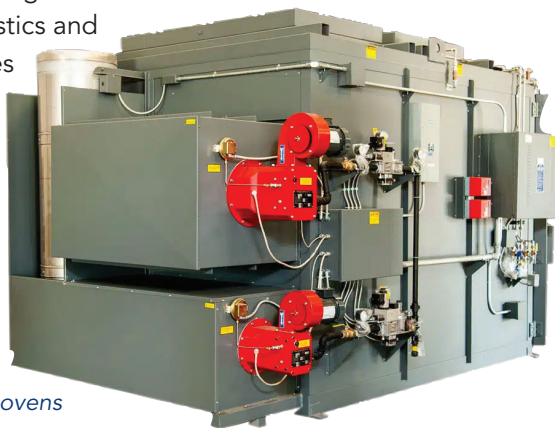
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Ventilation and safety features should also be considered early in the design. Even when using hex-free chemistry, the system still needs to be designed around safe handling, operator access and proper process containment.

When automation makes sense

Automation is not required for every Type 2 chem film line, but it may become valuable when consistency, throughput or documentation becomes more important.

For high-volume applications, automation can help reduce operator variability and improve process repeatability. A

When the requirement is MIL-DTL-5541 Type 2, manufacturers need to think beyond the coating chemistry itself.

controlled system will move parts through the line according to defined dwell times and process steps, helping manufacturers maintain tighter control over the finished coating. Integrated automation will benefit manufacturers that need higher throughput, more

repeatable processing or better control across multiple shifts. In regulated or specification-driven industries, this level of control will help reduce rework and improve confidence in the process.

Final considerations

A Type 2 chem film line is not just a set of tanks. It is a controlled surface finishing process that must match the chemistry, specification, part geometry, production volume and quality expectations of the application.

Before investing in a new line, manufacturers should define the required specification, confirm the chemistry, evaluate part size and throughput, and determine how much process control is needed. The best system is one that supports the coating requirement while making the process repeatable, safe and practical for day-to-day production.

As more manufacturers transition toward hex-free surface finishing, Type 2 chem film will continue to play an important role in aluminum corrosion protection. ■■■



ABOUT THE AUTHOR

MARK BATTLES is an application engineer at Best Technology Inc. with more than 25 years of cross-functional experience in the medical device and aerospace industries. During his more than eight years with Best Technology, he has helped manufacturers navigate complex surface treatment and production processes for demanding applications. His work includes developing a proprietary Type 3 titanium anodizing process and helping customers identify practical solutions for critical engineering and manufacturing challenges.

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Mastering the Chaos

Why metal finishing job shops struggle to grow, and what top performers do differently.

BY JEFF HALONEN CONTRIBUTING WRITER

► Running a metal finishing shop is hard but growing one can feel impossible. Why? What is unique about metal finishing job shops versus other types of manufacturing shops?

In a word, unpredictability.

Nearly half of all metal finishing shops experience 25% or greater monthly revenue volatility, while many also suffer staff turnover rates exceeding 50% each year. Alongside that rocky revenue road, an average of 70% of collected revenue for an average shop is collected late, and revenue distribution further points to a limitation related to customer base — two-thirds of revenue for most shops comes from their five largest customers, creating a potential tipping point due to a lack of diversity in the client list. Moreover, 80% of finishing customers send less than five orders per year. As a result, it can be stunningly easy to lose money on jobs or even across an entire month's work.

When you add in customer expedites, constant phone calls, variation in day-to-day part mix and price-sensitive customers, it becomes clear why running a finishing shop is one of the hardest jobs in the world. And despite facing many of the same challenges, shops across North America run the

LEFT: Adoption and integration of technology is one way metal finishing shops can be flexible and quick to respond to challenges and opportunities. *Source (All Images) | Steelhead Technologies Inc.*

means some shops experience nearly 100% turnover, while others might have to absorb as little as 10% or less. Response and turnaround time can also yo-yo — a three-day quote turnaround time can become 2 hours or less, while a two-day customer response time can drop to 5 minutes or less.

So, what separates the top performers? It is not that they are in a less-chaotic market environment. It is that they have their operations under control. The highest-performing shops win in three key ways:

- They react faster.
- They scale revenue without adding people.
- They make better decisions with better data.

Reacting faster

Metal finishing shops are reactive by nature. Unlike many manufacturers, they cannot plan weeks ahead with confidence. Priorities shift daily. Expedites happen constantly. Production schedules change by the hour.

The best shops have accepted this reality and built systems

gamut in terms of performance metrics. Net margins can be as low 0% or as much as 35%, while negative growth can exceed 50%. While as employee turnover averages 50% as previously stated, that

around speed. These shops create full operational visibility so every person in the business can quickly see what matters. From customer service to scheduling to operators on the floor, everyone knows where parts are, what stage they are in and what needs attention. This level of visibility enables shops to react quickly to schedule changes, expedite requests, equipment downtime and quality issues.

Visibility also allows them to identify unprofitable work faster. One plating shop in Tennessee discovered a part that required far more labor than quoted to meet customer quality expectations. Because they could see the labor impact clearly, they adjusted pricing threefold to make the job a profitable one. In a different instance, a shop in Minnesota found that batch sizes below 100 pieces dramatically increased cost per part. They responded by implementing minimum lot sizes to protect their margins. Then there's a Canadian shop that reduced customer response time from multiple hours to less than three minutes simply by improving visibility into job status across the line.

These are not just efficiency gains. They accelerated everything these shops do and allowed them to react to a changing landscape in real time.

Investment in digital management systems can give shops a boost in productivity while lowering downtime and potential error-related costs.





Scaling revenue without adding people

Shops that invest in digital systems and automation can do more with less. Instead of trying to solve every problem by just adding more people, they first focus on maximizing existing capacity and getting the most out of their workforce.

That usually starts by consolidating business and production workflows into a single system, eliminating duplicate data entry and reducing friction across quoting, scheduling, inventory, quality, shipping and invoicing.

When each order costs less in administrative costs, that cost reduction becomes an accelerant of scale, and growth happens organically with much less stress and more profit. A shop in Oregon jumped from \$5 million in annual sales to \$9 million while adding only five employees, which would have been impossible without integrated systems. Another shop in Tennessee increased revenue by 25-30% without hiring a single person. Meanwhile, a business in Ontario leveraged AI to reduce time spent on order entry by 80%. For these companies, technology investment led directly to growth.

Historically, metal finishing shop customers have been left in the dark, sending in their parts and then waiting with no real understanding of, or estimate of, turnover time. Meanwhile, these customers have their own customers to answer to, so they call the shop day after day for a status update, and for the most part, it leads to an outcome that is opaque and a frustrating customer experience that can

compromise job retention. Top shops increasingly use digital customer portals for order entry, job tracking, certifications and communication. This reduces time-consuming phone calls and manual follow-up while improving customer experience and building trust with customers.

Internally, growing shops strive to eliminate clerical work at every opportunity. Their philosophy is that if the end customer is not willing to pay for it (i.e., make that work a direct cost), it should be eliminated to the maximum extent possible. Generating certifications, updating job statuses and moving information between departments becomes automatic instead of manual.

One shop reported eliminating 95% of internal phone calls after integrating its operational data flow, giving employees back hours every day to focus on production, quality, hiring and customer relationships.

In a labor-constrained industry, this advantage compounds over time. Growth is no longer just about adding people. It is about increasing output per person.

Making better decisions with better data

Philosopher Sir Francis Bacon once said, “A prudent question is one half of wisdom.” This remark illustrates the importance

Making sure your workforce is dialed into a linked and streamlined digital system can bring numerous gains in throughput and quality control.

of not only having the right information at the right time but knowing what to focus on and how to use it. Speed and efficiency are imperative, but they are not enough. Because finishing shops must navigate a perpetually rapidly changing environment, they need to be decisive and nimble.

With a digital production floor and an all-in-one system in play, a shop can veritably swim in data — but that data is only useful if you're asking the right questions, doing the analysis and pointing the team at problems and opportunities to work on.

This is where AI is beginning to create real advantages. AI can help surface operational risks faster than humans can find them, whether it is margin erosion, customer concentration, quality issues, declining order volume or rework trends. The advantage is not that AI replaces leadership; it is that it accelerates analysis and points leadership directly at a problem or opportunity so that they can take action.

The opportunity is here

While growing a job shop may feel impossible, leading shops like D&K Powder (North Mankato, Minnesota) are proving it can be done. The company grew from \$4 million to \$16 million in four years while dramatically improving net margin, powered by margin data on every job, streamlined workflows and obsession over quality.

Shops that get ahead begin leveraging higher profits to invest back into the business, adding key talent, equipment,

trucks, technology and sales, which further drives improvement and growth.

The U.S. is facing a surge in manufacturing driven by data centers, onshoring, aerospace and energy sector investment and much more. Meanwhile, McKinsey estimates that 71,000 manufacturing shops will shut down by 2035 due to a lack of succession planning, a portion of which will be metal finishing shops. Add to this the immense regulatory and permitting barriers to standing up a new metal finishing business, and the pressure on existing metal finishing job shops will continue to grow.

At the same time, the next generation of workers entering metal finishing expects modern tools in their work environment and has a low tolerance for burdensome systems. With population growth slowing, employees have more choices in where they work, and businesses will have to focus on becoming a great place to work.

For metal finishing shops that master the chaos and invest in growth, the next decade will be the greatest growth opportunity the industry has seen in generations. ■■

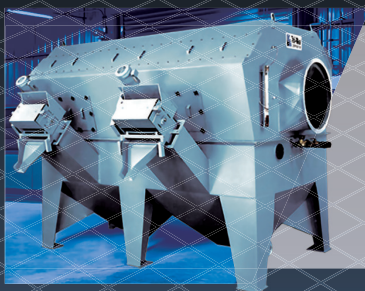


ABOUT THE AUTHOR

JEFF HALONEN is co-founder and CEO of Steelhead Technologies Inc. (Calumet, Michigan), an ERP technology partner serving metal finishing shops in the U.S., Canada, Mexico and Australia.

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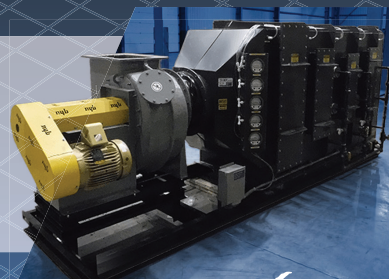


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The Hidden Cost of Bad Powder Coating Racks

Q: We have been powder coating now for a few years and we get reasonably good results, but I am sure we could do better. Our reject and rework is too high and we really need to get better throughput. We can do a good job some days and get out a lot of good parts, but we are not as consistent as we need to be.

One of my concerns is the way we rack our parts and take care of our hooks and racks. Some of our racks and hooks have a lot of powder buildup and rack maintenance can be held up due to production demands. Some of our racks are damaged during production and we use some hooks that do not hold as many parts as we could fit on the line if we had a better racking scheme. Is there any way to quantify the impact of racking on the powder coating process? Can you give us some guidance on rack design and line density?

A: This is an interesting question because racking is one the biggest and most obvious contributors to success or failure in a powder operation. It is very common to see large line gaps, bent and broken racks, twisted hooks, too much powder buildup on racks, racks that are only partially full, different hooks or racks being used for the same part or just bad rack designs. The cost of poor racking is ridiculously high.

First, you need to understand the principles of good racking. Good density is key. Parts should be grouped close enough together to reduce the space around them so the ratio of metal to air is high. Of course, there is a limit to how much space to allow between parts for good coating. There must be enough space around a part to make it easy to cover, allowing enough time for manual operators and avoiding light coating because the application process cannot handle the volume. But within reason, more is better.

Second, the parts should be positioned so that they can be easily accessed and easy to see. They should be held in a stable and consistent position. There should not be large gaps between racks as long as there is sufficient time to coat the parts based on the line speed and number of guns. Contacts must always be clean so that there is no way a part can be insulated from earth ground by coating buildup. Good racking is an important key to profitable coating.

The costs can be evaluated to determine the difference between a good racking arrangement and a poor racking arrangement. To determine the cost associated with racking, you need to evaluate what your throughput could be if you had proper racks and compare it to how you run it now.

You can build samples to test theories and compare the defect rates of one racking pattern to another. If you can quantify the current rack capacity and quality, you can

compare them to any other racking option. It is simple math to evaluate the number of parts per foot and the number of good parts versus bad. Many companies waste a lot of dollars by using sub-optimum racks because they do not want to invest in tooling, they do not want too many different rack



designs around or they simply do not even evaluate it at all. Evaluate the options — there is a good chance you can improve the throughput and reduce costs by using the right racking scheme.

Consider a rack that holds one part on a simple hook. You know you can hold two parts if you build a special tool. The tool cost will be \$600 for a full set of two-piece racks. If you divide your fixed cost by your production throughput, you can determine the savings. Then you can see how long it will take to recover the \$600 investment. If the part in question is high volume, your return on investment (ROI) will be fast. If you run it very infrequently, the ROI may be too slow. If you improve your first pass yield, the ROI could be very fast. Always evaluate options and choose the smartest racking method, even when it means investing in a new tool. With a good earth ground, good maintenance and proper density you can really improve your profitability. ■■



ABOUT THE AUTHOR

RODGER TALBERT has more than 30 years of experience in the powder coating industry.

The Most Efficient Cure Cycle is the One You Eliminate

Q: With costs rising, we're actively looking for ways to reduce energy use on the finishing line. Do you have any recommendations that could significantly reduce our energy consumption without sacrificing finish quality?

A: Energy consumption is one of the largest operating expenses for any industrial coating line. In a finishing facility specifically, oven curing takes the prize.

When energy costs rise, manufacturers often assume they'll need to spend money to save money. However, the biggest energy savings don't always come from equipment upgrades. They come from process improvements — and the benefits often extend well beyond the utility bill.

By optimizing the finishing process and eliminating unnecessary oven use, manufacturers can reduce energy costs and environmental impact while also driving increased capacity, productivity and profitability.

In other words, optimizing a traditional two-bake process is one option. But with the technology available today, the better question may be whether you need two bake cycles at all.

Every bake has a cost

Traditional thermoset powder coatings require two bake cycles: one after the primer is applied, then another after the topcoat is applied. Standard systems typically cure for roughly 10-20 minutes at object temperatures around 345°F. Then, those parts need time to cool to approximately 125°F before any material handling can occur.

It takes significant energy for the coatings to heat, melt, level and cross-link. But beyond energy, two bake cycles also require significant time. Depending on the line configuration, this process may also require additional conveyor length, floor space, material handling and labor.

But what if one oven cycle could do the job of two? Instead of optimizing cure schedules to save a little energy, what if you could remove an entire oven cycle and streamline the whole process? That is exactly what dust-on-dust powder coating technology is designed to do.

Optimize the process, not the cure

Transitioning from a traditional two-bake powder coating process to a single-cure dust-on-dust system has the potential to significantly reduce energy use and still deliver on additional operational benefits.

With a single-cure dust-on-dust process, the primer and topcoat are applied one after the other, with no bake in between. Both layers are then cured together in a single oven cycle. Instead of applying the primer, baking, cooling and

then repeating the process for the topcoat, both coatings are applied consecutively and cured at the same time.

If you're currently using a two-bake process, removing the second bake cycle can cut total thermal processing time and energy consumption roughly in half, which translates directly into lower gas or electric consumption per unit — without any change in the equipment itself. And after adopting a single-cure process, you can also optimize airflow, heat exchangers, oven insulation and compressed air systems for additional savings.

Efficiencies that go beyond your energy bill

Dust-on-dust coatings offer more than reduced energy costs and emissions. Fewer oven cycles mean less material handling, which in turn lowers the risk of damage or contamination and reduces rework. Work in process inventory is also



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reduced, freeing up valuable floor space. Total process time is shortened too, in many cases enabling manufacturers to increase throughput without any major capital investment.

Simply put, transitioning to a less energy-intensive, dust-on-dust powder coating system will improve ROI through production efficiencies, reduced rework and lower energy costs. At the same time, many manufacturers also gain a boost to coating performance, driving higher customer satisfaction and profitability overall. ■■



ABOUT THE AUTHOR

TOMMY RENO is the global product director of powder coatings for Sherwin-Williams.

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Improving Alkaline Zinc-Nickel Plating Performance With Membrane Anodes

Q: Alkaline zinc-nickel plating is widely used for corrosion protection, but it is also known for plating efficiency challenges. What are the main limitations of conventional systems and what can be done to mitigate those issues?

A. Alkaline zinc-nickel plating delivers optimal corrosion resistance, which is why it has become a standard application for automotive and industrial fasteners. Traditional alkaline zinc-nickel processes operate with strong complexing agents and organic additives to enable the simultaneous deposition of zinc and nickel.

The challenge is that, in a conventional setup, these additives are exposed directly to anodic oxidation. Over time, this leads to the formation of breakdown products such as carbonates and degraded organic compounds. As these byproducts accumulate, the electrolyte becomes denser and more viscous, which negatively affects conductivity, current distribution and overall plating efficiency.

This membrane allows ionic current transport but prevents organic additives and complexing agents from reaching the anode surface, where they would otherwise be oxidized. As a result, the reactions that generate breakdown products are effectively moved out of the main electrolyte.

By preventing the formation of carbonates and organic degradation products at the surface of the anode, the electrolyte remains in a near-new condition for a much longer period of time. This stability directly translates into higher and more consistent cathodic current efficiency, improved plating rates and predictable coating quality.

Overcoming traditional membrane anode limitations

Membrane anodes are not new. So, what makes the “compact” membrane anode different from earlier designs? Earlier membrane anode systems were effective, but they often required bulky membrane boxes — sometimes 120-150 millimeters wide. That footprint limited their use, especially on existing plating lines where space

between anode and workpiece is critical.

The CMA was developed specifically to overcome this limitation. Its membrane box is only about 65 millimeters thick, making it the thinnest membrane anode assembly currently available for alkaline zinc-nickel plating. This compact design allows the technology to be integrated into most existing rack and barrel lines without major mechanical modifications.

Despite its reduced size, the CMA maintains very good conductivity and supports high current densities, which means plating speed is not compromised. In fact, it is typically improved thanks to the higher effective current efficiency.

From a performance standpoint, the most immediate benefit to CMA is higher cathodic current efficiency. In barrel plating applications, efficiencies of 80-85% can be maintained consistently, even over long production runs. This is a significant improvement over conventional systems, where efficiency often declines as the bath ages.

Higher current efficiency allows parts to be plated faster at the same thickness or, alternatively, enables lower current and voltage settings for the same throughput. In many installations, this results in up to a 40% increase in plating speed or a substantial reduction in energy consumption per part.

Energy savings are driven by lower operating voltages and shorter plating cycles. Independent evaluations of production



Compact membrane anode (CMA) installation. Source | MKS Atotech

In practical terms, operators often see cathodic current efficiency drop significantly — particularly in low-current density areas. In barrel plating, it is not uncommon for efficiency to decline from an initial 80-85% to 65-55% until the bath stabilizes. This reduces plating speed, increases energy consumption and makes consistent quality more difficult to maintain.

A compact membrane anode, or CMA, was developed to address these issues. The CMA fundamentally changes what happens at the anode during plating. Instead of allowing the plating electrolyte to be in direct contact with the anode surface, the CMA separates the anode into its own compartment using a semipermeable membrane.

lines equipped with CMA technology have confirmed energy reductions on the order of 25-30%, depending on line configuration and operating parameters.

One of the less visible — but very important — advantages of CMA technology is improved day-to-day process stability. Because breakdown products do not accumulate in the electrolyte at the same rate, the need for corrective actions such as bath dilution or frequent freezing treatments are greatly reduced. Operators report more stable alloy composition, improved coverage in low-current density areas and fewer quality deviations over time. This stability is especially valuable in high-volume barrel plating, where consistent coverage of hardened fasteners is critical.

From a maintenance perspective, the CMA system is designed for practicality. The anode can be exchanged without removing the entire anode box from the bath, minimizing downtime. The compact anolyte tank design also simplifies installation and servicing, even in space-constrained plating shops.

Real line implementation

The CMA has been successfully implemented in rack and barrel zinc-nickel plating lines. In *barrel applications*, the benefits are particularly pronounced because barrel plating is highly sensitive to current efficiency losses and poor low-current density coverage. In *rack applications*, CMA systems enables higher effective current densities and shorter cycle

times, provided that part loading and handling capacity are sufficient. The result is improved throughput without sacrificing coating quality or thickness distribution.

CMA technology is especially well suited for high-throughput zinc-nickel operations, such as automotive fastener coating, where productivity, energy efficiency and consistent quality are critical. It is also attractive for plating shops that want to modernize existing alkaline zinc-nickel lines without replacing the entire installation.

Because the CMA fits into existing equipment layouts and does not require a fundamentally different electrolyte chemistry, it represents a practical upgrade path rather than a disruptive change.

In conclusion, compact membrane anodes address one of the core weaknesses of conventional alkaline zinc-nickel plating: electrolyte degradation driven by anodic oxidation. For platers facing increasing productivity demands and tighter cost control, CMA provides a technically robust and proven way to get more performance out of alkaline zinc-nickel plating without compromising quality. ■■



ABOUT THE AUTHOR

MARKUS AHR is global product manager for corrosion protection at MKS' Atotech brand, with more than 25 years of experience in electroplating technology, zinc-nickel processes and industrial corrosion protection.

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Boosting Finishing Line Efficiency Through Smarter Racking

Q: What advice do you have for using racking to improve finishing line efficiency?

A: Whether you are powder coating, ecoating, electroplating or anodizing, efficiency in a finishing system comes down to how well it supports throughput and quality. Your racking design is a large determining factor in how efficiently your line runs. A well-designed racking system should hold the maximum number of parts, include proper part spacing, have a quick load/unload design, offer consistent grounding with minimal touch points and have the durability to last.

The following highlights several areas where finishers can find meaningful gains.

Invest in custom racking solutions

Individual part hanging might seem fast, but it usually isn't. While it may be tempting, a comprehensive racking system will deliver better grounding, reduced labor costs and faster return on investment (ROI). A well thought-out racking solution can be either a standard system with adjustability, or a custom solution designed specifically for your parts, line parameters and process.

Whatever racking solution you decide upon, it should be chosen or designed with your specific part and process in mind. Also keep in mind that product mixes change. As the mix of parts you process evolves, your racking approach should also evolve through new rack designs or modifications to existing tooling. Incorporating modular or interchangeable

components into your racking system can make it easier to adapt when you need it.

Racking care and maintenance

Consistent grounding is often the difference between a quality finish the first time and rework. Many finishing processes — including powder coating, ecoat and electroplating — depend on strong electrical connections, which is why it is critical that your racking includes clean contact points. Paint or powder buildup, corrosion, rust or oil residue can cause loss of ground. While racking can (and should) be designed to minimize these problems, regular inspection and cleaning is necessary for any line.



Maximize part density

Racking efficiency is defined by fitting more parts on your line. Parts should be grouped as close as possible provided they do not touch and the space between parts is not so close that it interferes with coverage. For example, in powder coating operations, if the parts have a lot of surface area facing the spray guns and very little depth, they can be very close together. The more the depth increases, the more they must be spaced to allow powder to thoroughly coat the sides.

More parts per rack — and more parts per unit of system capacity — translates directly into higher throughput, chemistry/material savings and reduced labor costs.

Rack maintenance is one of the easiest efficiency gains to overlook — and one of the costliest. Periodic inspection of racks and hook points is highly recommended. Standard rack cleaning methods include burn-off ovens, blasting and chemical stripping. Having a regular cleaning schedule and proper storage for your racks will also help them last longer.

All of that said, racks are exposed to chemicals, heat and repeated handling, so eventually they will simply wear out. It is important to watch for the point where rack wear and tear starts to impact part quality. Watch for shifting or wobbling parts, increases in reject rates and excessive time spent cleaning and maintaining your racks. These are signs that it's time to consider a redesign or replacement. ■■■



ON THE LINE

MOVING THE FINISHING INDUSTRY AHEAD, ONE STORY AT A TIME

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Products Finishing's ON THE LINE podcast presents stories from the world of finishing told from the perspective of the pros in the trenches doing the work every day. ON THE LINE features expert interviews with leaders in our industry and stories about critical business topics and current issues. Growing in popularity since its inception in 2021, ON THE LINE enjoys hundreds of downloads each edition and is archived at PFOonline.com/podcast for continual access 24/7/365.

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Dürr Systems Inc. | durr.com/en

Dürr CTS Electric RTO Systems Expand Air Pollution Control to Industrial Scale

Dürr CTS extends its Oxi.X thermal exhaust air purification line with electrically heated regenerative thermal oxidation systems capable of handling volumetric flows up to 120,000 Nm³/h, high pollutant concentrations and corrosive exhaust gases.

BY GRACE STUBBINS SENIOR MANAGING EDITOR

► Dürr CTS (Southfield, Michigan) is now offering all of its regenerative thermal oxidation (RTO) system designs in an electrically heated version. For the first time, the company's electric RTO technology can be used in industrial applications involving high volumetric flows of up to 120,000 Nm³/h, high-pollutant concentrations and corrosive exhaust gases such as those found in the chemical, pharmaceutical and automotive industries.

Reliably purifying solvent-laden exhaust air from painting and coating processes is the core function of RTO systems. Most of these systems are heated using fossil fuels, primarily natural gas; previous electric models were limited to low volumetric flows. Dürr CTS is extending its Oxi.X range — the product line for thermal exhaust air purification systems — through these electrified designs.

Dürr CTS retains its tried-and-tested multi-chamber systems and replaces the gas-powered burner systems with electric heating elements. The basic principle of the thermal process remains the same: minimizing VOCs, HAPs and odors in the process air through oxidation, in accordance with legal requirements. The result is the same purification performance with no open flames, no thermal NO_x and no operational CO₂ emissions.

The extended RTO range ensures targeted handling of exhaust air flows with different characteristics using an optimal system solution for each application. The Oxi.X RV, for example, remains suitable for low initial loads, while other series are designed for medium to high throughputs and pollutant requirements such as corrosion, condensation or dust.

Previously, electric RTOs reached their design limits when dealing with corrosive exhaust gases, as metallic heating elements wear out quickly when exposed to aggressive media, such as those found in processes involving halogen compounds. To address this, Dürr CTS also offers the option of equipping the electric variant with ceramic heating elements. Ceramic materials are designed to withstand highly corrosive exhaust materials over the long term, promoting reliable production under challenging conditions.

Companies can also benefit from dynamic electricity rates, especially when combined with their own solar panels and battery storage. For existing systems, Dürr CTS offers electrically heated retrofit solutions. Newly installed systems can also be designed to retain the option of switching between gas- and electricity-powered operation in the future — an option that may gain importance should CO₂ prices continue to rise.

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PPG Debuts Virtual Aircraft Painter Tool for Aviation Sector

PPG (Pittsburgh, Pennsylvania) has debuted its Aeroview virtual aircraft painter, a web-based digital tool that provides an interactive platform for users to select from a variety of aircraft models and digitally apply colors from PPG's aerospace color library to visualize custom paint schemes in real time.

"By allowing users to digitally customize paint schemes on specific aircraft models, this tool helps reduce design uncertainty, minimize costly repaint errors and accelerate project approvals," says Lirong Bao, PPG global platform director, aerospace coatings.

The Aeroview virtual tool is designed primarily for business and general aviation markets. Key benefits include reduced need for physical color books; creative support with hundreds of color and finish combinations; an ability to select aircraft models and digitally apply colors and finishes for realistic previews; integration with PPG's Liverylab studio; and more.

PPG | ppg.com/en-US



Cortec Corrosion-Inhibiting Desiccant Pouches Boost Protection for Summer Metal Shipments

In the summer, manufacturers face a heightened challenge for metals protection: navigating the higher risk of corrosion from hot, humid air and temperature swings. Cortec Corp. (Saint Paul, Minnesota) offers Desicorr VpCI Pouches, dual moisture-absorbing, corrosion-inhibiting materials for boosting protection during shipping and storage.



Desicorr VpCI Pouches go beyond moisture-absorbing action by combining desiccant and vapor phase corrosion inhibitors in the same package. These protective vapors diffuse out of a breathable membrane and throughout the enclosure in which they are placed, forming a molecular layer

on metal surfaces to inhibit corrosion reactions even in the presence of humidity or other corrosives. By combining moisture absorption and corrosion inhibition, Desicorr VpCI Pouches are designed to improve corrosion protection strength while still addressing other moisture-specific concerns.

Desicorr VpCI is typically dosed based on the size of the package or space in need of protection. The Desicorr VpCI 1/6 Unit and 1 Unit offer sufficient corrosion protection for enclosures of 1 and 5 ft³ (28 and 140 L) with a moisture absorption capacity of 1.32 g and 9.9 g, respectively.

Larger packages with volumes of 20 or 40 ft³ (560 or 1,120 L) can use Desicorr VpCI 4 Unit or 8 Unit non-windowed pouches, respectively, which offer moisture absorption capacities of 39.6 g or 79.2 g. **Cortec Corp. | cortecvci.com**

AkzoNobel Debuts AAMA 2605-Certified Extrusion Coating

AkzoNobel (Reading, Pennsylvania) has unveiled its Trinar SC Series, a self-cleaning extrusion coating that uses natural rainfall to remove dust and stains from exterior walls.

Launched in China, the coating line was developed specifically to support that country's urban renewal, as well as demand in the high-end building market for products capable of protecting buildings with curved surfaces and irregular architectural forms.

The coating's hydrophilic self-cleaning technology is AAMA 2605-certified — an international weatherability standard — offering long-lasting surface protection while retaining a like-new façade appearance over time.

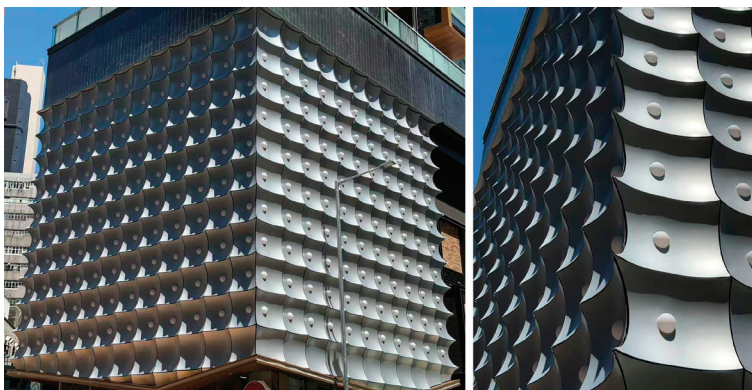
"This is a significant innovation which will enable customers to unlock the long-term value of self-cleaning technology, with no changes to existing customers' coating lines — and zero compromise on color selection or finish texture," says James Kavanaugh, commercial director of AkzoNobel's coil and extrusion business.

The coating is designed to help lower operation and maintenance costs across a building's entire life cycle by reducing the frequency of manual high-

rise cleaning procedures and reducing the amount of water, chemicals and maintenance resources typically associated with cleaning building exteriors.

On-site testing of the Trinar SC Series took place at an office building project in Dongying Economic Development Zone, where it demonstrated consistent self-cleaning performance throughout the trial period.

AkzoNobel Powder Coatings | interpon.us



Reflections From the Shop, 25 Years After 9/11

Matt Kirchner shares a personal story of business, fate and tragedy on a day that continues to shape the lives of millions of Americans.



MATTHEW KIRCHNER
Host of the TechEd Podcast
mkirchner@labmidwest.com

► Sept. 11, 2001 — I arrive at the plant even earlier than usual today. I have two important customer meetings and plan to check out a little sooner than normal. My plans have changed in recent weeks; I was supposed to travel to Washington D.C. today, but switched my schedule to accommodate two VIP visits to the plant, instead.

Mick Anderson, president of Loves Park, Illinois-based metal stamper Modern Metal Products, shows up right on time for a meeting and tour. Unbeknownst to either of us, the flight path of an airliner that lifted off from Boston's Logan Airport an hour before is about to change history.

We tour the plant. He's looking for a new phosphate finisher for the automotive seating components he manufactures. I'm aggressively trying to fill our shop, formerly captive to Rockwell Automation, with new customers. It's a perfect match.

We approach the back of the warehouse where I depress the button to call the elevator that will take us up to our employee training room. As the door opens, I'm approached by our maintenance manager. "A plane just crashed into the World Trade Center in New York City," he tells us.

My response then still gives me chills. It's just six syllables. "Osama bin Laden," I say, recalling a July 1998 *Reader's Digest* article entitled "This Man Wants You Dead." That article has haunted me ever since.

We complete the tour. Mick departs and I settle into my office to check my go-to news sources. AMERICA UNDER ATTACK screams the Drudge Report.

My wife calls. She's at home with our 19-month-old son watching the carnage unfold in real time on cable news. By now a second plane has struck the South Tower at 2 World Trade Center and yet another has slammed nose first into the Pentagon in Washington D.C. "It's so horrible," she says through tears. "People are jumping from the windows."

I tune my computer to the CNBC feed where the regularly scheduled Squawk Box veers far off its normal Wall Street content to cover the continually breaking story. It's 9:28 a.m. as the second tower comes crashing to the ground. Following a stunned silence, co-anchor Mark Haines says solemnly and slowly, "The World Trade Center is no more."

The unfathomable news continues streaming in and it occurs to me that, but for the important meeting I just finished and the one scheduled for 1:00 p.m. this afternoon, I would have been in Washington D.C. I'll learn later that my friend and fellow trade association member Jaimie Malizewski, president of Milwaukee's Reliable Plating Works, traveled

there for the same meetings I was to attend, and saw the plane hit the Pentagon from his seat on the commercial plane ferrying him to D.C. Likely I would have been on the same flight.

But I'm here for my big meetings. The next one is scheduled for 1:00 p.m. but with everything going on there's no way Todd Teske is showing up. He's a big deal at Briggs and Stratton. Vice president of operations or something like that. He will later become CEO of this major engine manufacturer. I assume my afternoon will open up. He's got more important things to worry about as the world melts down.

My evening opens up, too. Late in the morning, baseball commissioner and fellow Milwaukeean Bud Selig announces that all Major League Baseball games are canceled. I'm relieved. No longer in a baseball mood, what I want more than anything is to go home and hug my family.

It's 12:58 p.m. and I'm standing in the front office, pondering the day's events with my teammates as we process their horrors and attempt unsuccessfully to make any sense of what's happening. The front door opens and in walks Todd Teske.

"I didn't think in a million years you were showing up today!"

"Well, we had an appointment," he responds. Say what you want about Todd Teske, he keeps his appointments. He earns my respect that day as we lay the foundation for future collaboration. Several years from now I'll acquire his metal finishing operation and move it into mine.

It's a good meeting on a dreadful day. Todd walks back out the door he entered an hour before.

I'm spent. After two high-stakes business meetings, watching the country I love attacked, and staring on futilely as thousands of my countrymen lose their lives, I'm emotionally drained. I consume the remainder of the workday glued to my computer, hungry for new information, wearied by the news.

I cut out a bit early. When I arrive home, I sit in shocked silence for hours, flipping news channels. The video of people screaming as they run down the streets of New York City, away from the collapsing towers, rolls again and again.

Over and over, cable news plays a clip. In East Jerusalem some are dancing in the streets. Celebrating. That video will repeat itself in my head long after they stop showing it on the news. Maybe forever.

Exhausted, at 10:00 p.m. I retire for some much-needed sleep. It doesn't come. ■■■

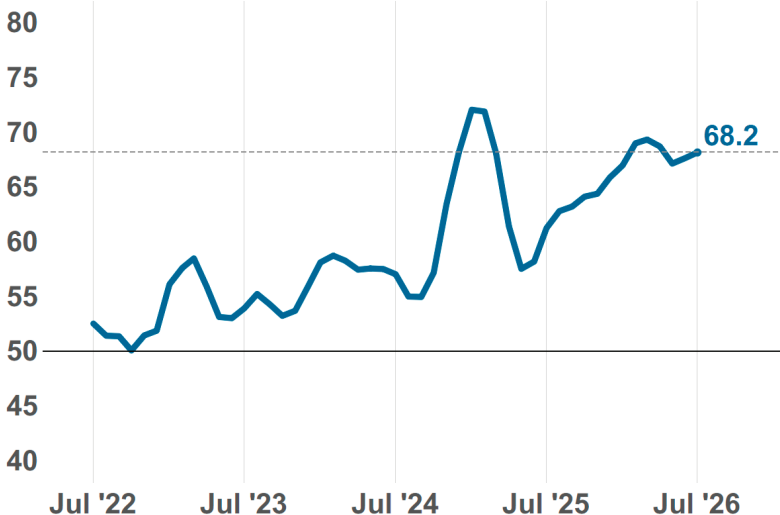
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Exports	▼	▼

FUTURE BUSINESS INDEX



MIKE SHIRK

Senior Market Research Analyst
GROW Industrial Intelligence

Mike has been an essential part of GROW Intelligence for over eight years, and has led research and analysis in various industries. mshirk@gardner.media

The Gardner Business Index (GBI) is an indicator of the current state of finishing industry activity considering survey responses regarding new orders, production, backlog, employment, exports and supplier deliveries. Over 50 is expansion. Under 50 is contraction.

The GBI Components Scorecard reports the monthly change rate of primary finishing industry market factors contributing to the overall monthly index reading.

Reading the Scorecard: **Color** indicates where a component value falls relative to 50 for the current month. **Shade** indicates a value's distance from 50 — the darker the shade, the farther from 50. **Direction** indicates a value's change versus the previous time period.

The GBI Future Business Index is an indicator of the future state of composites fabricating considering industry respondents regarding their opinion of future business conditions for the next 12 months. Over 50 is expansion, under 50 is contraction. ■■■



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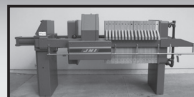
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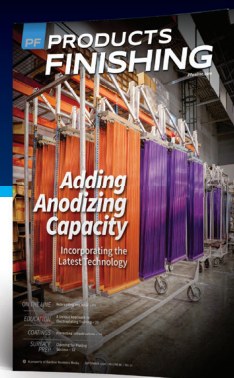
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American Plating Power LLC	3	R J Manufacturing Inc..	46
biganodes Inc..	46	Reliant Aluminum Products	7
Chemical Coaters Association International (CCAI)	39	Reliant Finishing Systems.	4
Columbia Chemical Corp..	14	Sames North America Corp.	18
CONTRAX.	9	Spray Tech Junair	17
FABTECH	Inside Back Cover	Steelhead Technologies.	13
Gema USA Inc	15	Steelman Industries Inc.	30
GPB Distributing	20	Technic Inc.	21
Hubbard-Hall	Back Cover	Top Shops Conference.	Inside Front Cover
Lanco Corp.	46	Tri-Mer Corp..	35
Luster-On Products Inc.	31	United Finishing Systems LLC	19
MacDermid Enthone	1	Vitracoat America Inc.	16
Met-Chem Inc..	46	Water and Wastewater Equipment Co..	46
Midwest Finishing Systems.	18		
National Association for Surface Finishing (NASF).	47		
Palm Commodities International LLC	5		
PEM Corp.	4		

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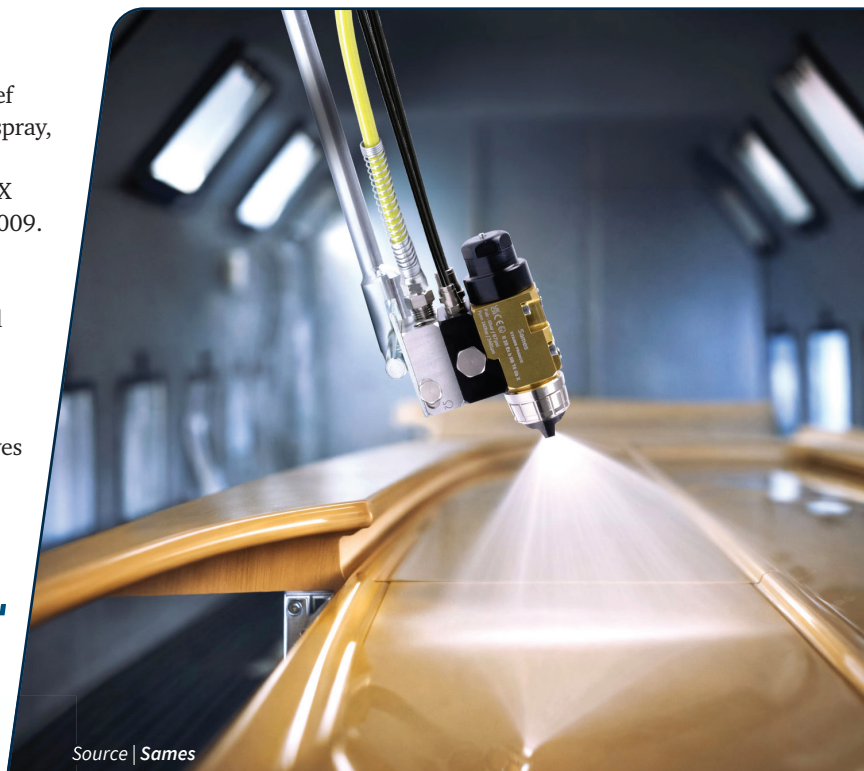
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Sleek & Smooth Applicator for Any Surface

Liquid coating operations all want certain things, chief among them higher transfer efficiency, reduced overspray, improved finish quality and lower operating costs.

Sames North America's (Plymouth, Michigan) AVX platform has been present in finishing shops since 2009. Sames, continuously expanding on its native Airmix architecture, has upgraded its spray gun offerings with the AVX Pro Airmix, seen here finishing a wood substrate. An optimized fluid design produces finer droplets at lower pressure, resulting in a consistent, high-quality finish and reduced material consumption, while a patented indexed aircap system improves repeatability and simplifies maintenance via quick spray configuration return after cleaning. Designed for general industrial applications, the AVX Pro also features integrated NFC connectivity, which plugs operators into Sames' customer support resources. ■■



Source | Sames

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The best way to grow our industry is to share winning strategies for success. Topics to consider include:

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