

# POWDER COATED TOUGH

The Official Publication of the Powder Coating Institute®

# 2020 BUYERS GUIDE

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November/December 2019

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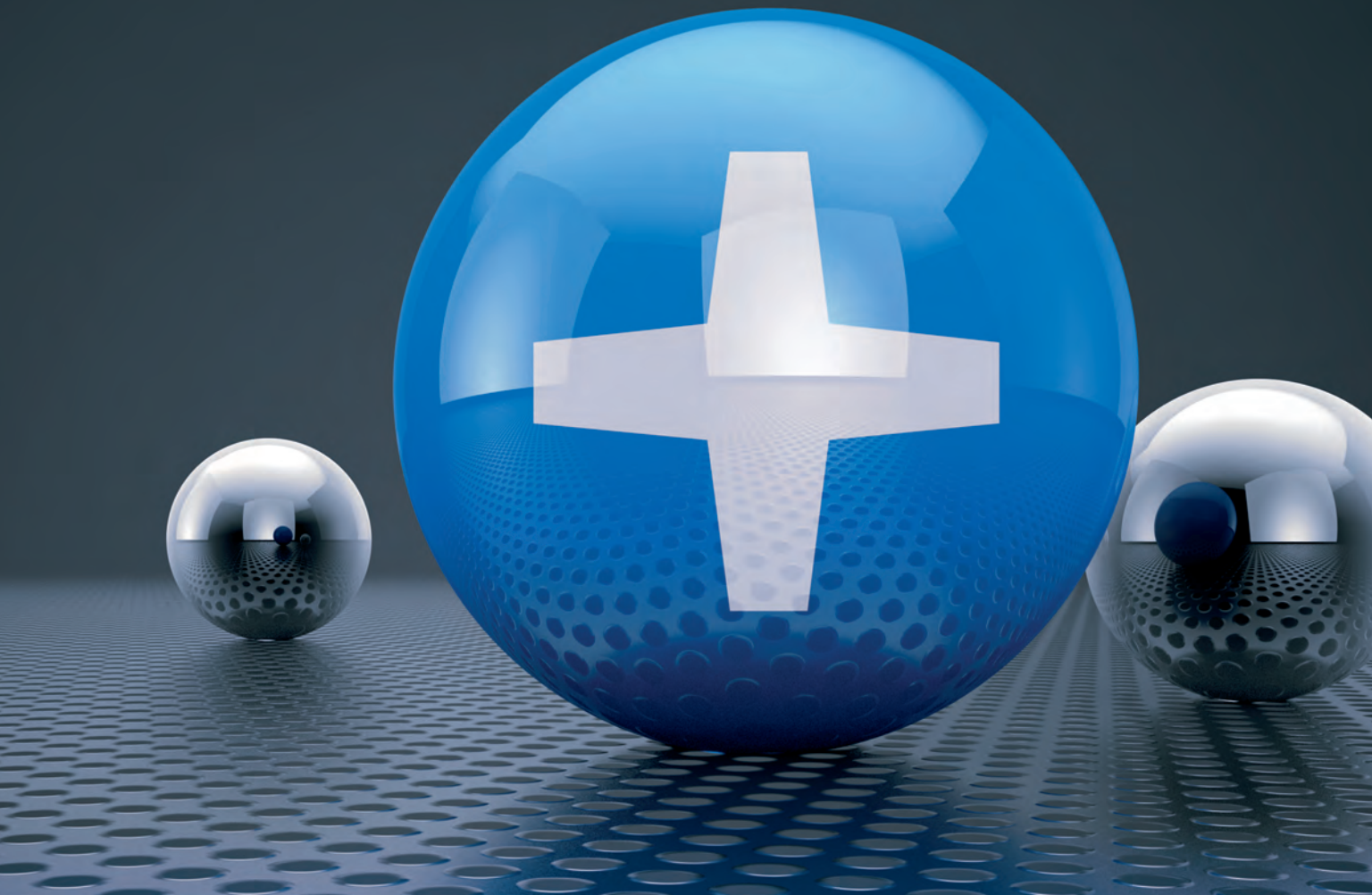
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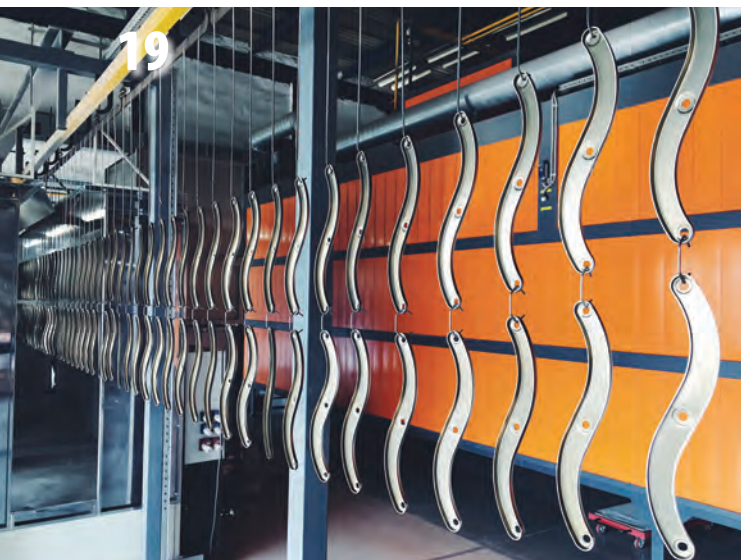
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Sieves/Screening Devices  
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Surface Contamination  
Surface Roughness  
Surface Tension  
Tech Briefs  
Test Laboratory for Coatings  
Test Panels  
Weathering

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Trena Benson



## Differentiating Strategies for your Marketing Plan

We have all seen the evidence of the growing need of today's consumers to become more aware and educated about the safety, quality and sustainability of the products they choose. And with a new allegiance to social responsibility, many are not only concerned with the specifics of the products they buy, they want to understand more about the company who makes the products and the technologies involved. Enter powder coaters. It's your opportunity to step in and educate.

The Powder Coating Institute (PCI) can help you in proclaiming the many benefits of powder coating technology. Awesome powder coaters care about their work and make a better finished product. Build your brand and enhance the consumers' trust at the same time by using the Powder Coated TOUGH Mark. Its 'Stronger. Greener. Better.' proclamation quickly gets attention and differentiates your business.



Join PCI in our mission to promote powder coating technology by using the Powder Coated TOUGH Mark when promoting your business. Visit our website, [www.powdercoating.org/promotepowder](http://www.powdercoating.org/promotepowder), to learn more. Member companies can register to use the Mark, free of charge. Use the Mark on uniforms, t-shirts, hats, storefronts, ads, social media campaigns, websites, business cards,

invoices, quotations, coated products, packaging, delivery vehicles, etc. Make the use of the Mark a staple of your entire marketing strategy or the foundation of your brand identity.



Another differentiating strategy for powder coaters is PCI's certification program for both custom coaters (PCI 3000) and OEMs (PCI 4000). PCI Certification is an extensive audit process that evaluates the powder coating operation and can show, through audited performance measurements, that they have the equipment and processes in place to correctly clean, coat and cure products. Opening your operation to this powder coating focused third-party audit can help your company achieve more consistency and reassures your potential customers of your capabilities, which raises the quality bar for our industry. The audit results will then give you a baseline for your continuous improvement plans. Over the past few years, we have made significant improvements to the program and expanded our promotion of the program into various fabrication publications. Learn more by visiting our website, [www.powdercoating.org/certification](http://www.powdercoating.org/certification).

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# POWDER COATING WEEK 2020

## PCI Introduces Powder Coating Week

When it comes to powder coating, the Powder Coating Institute has delivered outstanding education and training to the industrial finishing industry for the past 30 years. PCI has combined the very best of their educational resources into POWDER COATING WEEK, which will take place from February 17 – 20, 2020, at the Renaissance Orlando at SeaWorld® in Orlando, FL.

The week begins with PCI's Powder Coating 101 Workshop: The Basics and its Custom Coater Forum running concurrently on February 17 & 18. PCI's long-running Powder Coating Technical Conference & Tabletop Exhibition

will take place immediately following the first two events, from the evening of February 18 through February 20.

By bringing these programs together into a week-long event, Powder Coating Week will provide an opportunity for those across the powder coating industry to gather in one place.

The following pages contain a brief overview of Powder Coating Week 2020. Visit [conference.powdercoating.org](http://conference.powdercoating.org) for complete presentation descriptions, registration fees, and more.





# SCHEDULE OF EVENTS

## MONDAY, FEBRUARY 17 POWDER COATING 101 WORKSHOP AND CUSTOM COATER FORUM

10:00 AM	Registration Opens
1:00 – 5:00 PM	Powder Coating 101 Workshop: The Basics
1:00 – 5:00 PM	PCI Custom Coater Forum
5:00 – 6:00 PM	Reception for Workshop & Forum Attendees



## TUESDAY, FEBRUARY 18 POWDER COATING 101 WORKSHOP, CUSTOM COATER FORUM & TECHNICAL CONFERENCE RECEPTION

7:30 AM	Registration Opens
8:00 – 8:30 AM	Breakfast for Workshop & Forum Attendees
8:30 AM – 4:30 PM	Powder Coating 101 Workshop: The Basics
8:30 AM – 4:30 PM	PCI Custom Coater Forum
Noon – 1:00 PM	Lunch for Workshop & Forum Attendees
4:30 PM	Workshop & Forum Conclude
8:30 PM	After Hours Welcome Reception for the Technical Conference

## WEDNESDAY, FEBRUARY 19 POWDER COATING 2020 TECHNICAL CONFERENCE AND EXHIBITION

7:00 AM	Registration Opens
7:30 – 9:00 AM	Opening Breakfast & Keynote Address
9:15 – 11:00 AM	Breakout Sessions
11:00 AM – 1:00 PM	Lunch and Tabletop Exhibition Open
1:15 – 4:15 PM	Breakout Sessions
4:30 – 6:30 PM	Reception and Tabletop Exhibition Open

## THURSDAY, FEBRUARY 20 POWDER COATING 2020 TECHNICAL CONFERENCE AND EXHIBITION

7:15 AM	Registration Opens
7:30 – 9:15 AM	Breakfast with Roundtable Discussions
9:30 – 11:00 AM	Breakout Sessions
11:00 AM – 1:00 PM	Lunch and Tabletop Exhibition Open
1:15 – 3:30 PM	Breakout Sessions
3:30 PM	Closing Session & Montana Trip Giveaway
3:45 PM	Powder Coating 2020 Technical Conference Concludes

## REGISTRATION

To register for any of the Powder Coating Week 2020 events, visit [conference.powdercoating.org](https://conference.powdercoating.org) and click the **REGISTER** button at the top of the page. See pricing and a complete listing of registration options at the back of this brochure. Combination discounts are available for attendees registering for both the two-day Technical Conference and either the Powder Coating 101 Workshop or the Custom Coater Forum. **Register by January 10 to receive the lowest rates.**

# POWDER COATING 101

## Powder Coating Done Right: The Basics

PCI's Powder Coating 101 is a one-and-a-half day workshop that introduces attendees to powder coating by focusing on materials, application, reclamation, testing & evaluation, quality control, the powder manufacturing process and much more. Attendees will gain knowledge of powder coatings and the powder coating process from industry experts as well as have the opportunity to network with speakers and other attendees during a reception on day 1 and lunch on day 2. This PCI training workshop is unbiased and commercial free and provides a great foundation for the technical conference that follows later in the week.



### Here are some comments from last year's Powder Coating 101 attendees:

- "Overall, the workshop has helped me out in many aspects. Very effective class, happy I attended."
- "This has been a great program. I learned a lot that I will be able to take back and use on the job."
- "The workshop was enjoyable and well put together. Speakers were very knowledgeable."
- "I'm a newbie, very good info."
- "I've learned a lot about the process of coating and many of the technical things that need to be done."



PCI's Custom Coater Forum is designed for custom coaters to network with peers and industry leaders, hear presentations on timely issues important to their business and participate in roundtable discussions that allow for sharing information. The event includes a reception on day 1 and lunch on day 2.



### The Forum will feature the following presentations:

#### **Powder Coating Industry and Quality Standards**

Marty Korecky, AkzoNobel Powder Coatings

#### **Lean Principles**

Doug Atkin, Optimization Consulting

#### **Key Metrics and Profitability for Custom Coating Businesses**

Tim Milner, J.I.T. Powder Coating

#### **Business Continuity Planning**

Rick Gehman, Keystone Coating, LLC

#### **Reviewing Key Metrics for Products Finishing Magazine's Top Shops Program**

Tim Pennington, Products Finishing Magazine

#### **Understanding the Needs of the Architectural and Agricultural, Construction and Equipment (ACE) Markets**

Michael Withers, Axalta Coating Systems

#### **Buying/Selling Your Custom Coating Business** **Panelists:**

G.R. Kearney, Acme Finishing

Dennis Walters, Acme Finishing

John Heyer, Kettle Moraine Coatings

#### **Improving Quality in Our Industry**

Sheila LaMothe, Goyer Management & Michelle Payden, ABITL Finishing

#### **Instagram and Facebook Strategies for Growth**

Troy Newport, Goyer Management

#### **Roundtables: Strategies for Growing Your Customer Base**



# Powder Coating Technical Conference

PCI's Powder Coating Technical Conference has been offering outstanding education to the industry for the past 32 years! The technical conference features general sessions of interest to all powder coaters, breakout sessions covering all aspects of powder coating and a tabletop exhibition, allowing for networking, learning and conversation with exhibitors and other powder coaters. This is your chance to learn about the latest innovations and explore all things powder coating! Review our keynote and breakout sessions on the following pages and register now!

## Check out a few of the comments from last year's Technical Conference Attendees:

- "Very well-run conference; clear and concise."
- "I learned a lot!"
- "Awesome content; very relevant material."
- "Speakers were helpful and knowledgeable on respective topics!"
- "Great enthusiasm at this event."

## TECHNICAL CONFERENCE PROGRAM

Read through the wide variety of sessions and presentations available during PCI's Powder Coating 2020 Technical Conference. Review them closely then select your sessions during the registration process. You will be able to switch sessions on-site, but pre-selection of sessions helps immensely in setting each room with the appropriate number of seats.

### KEYNOTE PRESENTATION | Wednesday, February 19; 7:30 - 9:00 AM

#### **Sweat the Small Stuff - Attention to Detail Helps You Create a Workplace Culture that ROCKS!**

**Lisa Ryan, Grategy**

In a full-employment economy, employees have a choice – do they stay with their company or take their skills to the competition? In this entertaining, engaging and fun program, you'll learn specific strategies that you can put into practice immediately which when applied consistently, create a workplace culture where people want to come to work and stay working.

Here are just a few of the things we'll cover:

- Why the focus should be on employees who are doing things well, instead of those who are sucking the life out of a company.
- How to build your company's reputation as a great place to work.
- How to tackle the generational divide and ensure boomers, millennials and Gen Z "play nice" with each other.
- How many of these ideas work in your personal life as well.



Paying attention to the small stuff can make all the difference in your business. Take these ideas back to your company and encourage positive changes that build a positive culture.

# TECHNICAL CONFERENCE PROGRAM

**WEDNESDAY, FEBRUARY 19**

## **TROUBLESHOOTING TRACK**

9:15 – 11:00 AM

### **Best Practices for Operating Your Cartridge Booth System**

Mark Folcik, *Nordson Corporation*

### **What Is This Stuff...Can We Clean It?**

Ken Kaluzny, *Coral Chemical Company*

### **Be Nice to Mother Earth! How to Remove Oils & Soils from Your Wastewater and Recycle Your Aqueous Cleaning Solutions**

Ray Graffia, *Arbortech Corporation*

## **MARKET TRACK**

9:15 – 11:00 AM

### **Tattoo Your Metal with Sublimation Technology!**

Marco Menin, *Memphis s.p.a*

### **Curing Heat Sensitive Substrates: Tricks of the Trade**

Marty Sawyer, *Trimac Industrial Systems, LLC*

### **Architectural Aluminum**

Steve Edens, *Henkel Corporation*



## **AUTOMATION TRACK**

All Day Track

### **Is an Automated System Right for You?**

Nick Liberto P.E., *Powder Coating Consultants*

### **Pretreatment Considerations for Process Changes**

Kirk Beaster, *BASF/Chemetall*

### **Industry 4.0 and IIoT, Something for Everyone**

Bobby Benson, *Nordson Corporation*

### **How is IIoT Helpful to Me?**

Hector Flores, *Wagner Industrial Solutions*

### **Demonstration of a State-of-the-Art Automated Finishing Control System**

John Claman, *IntelliFinishing*

### **Robotics Presentation**

Barton Faylor, *FANUC Robotics Americas, Inc.*

### **Tolliver Powder Coating Case Study**

Mark Folcik, *Nordson Corporation*

Brandon Greer, *Tolliver Powder Coating*

## **NEW TECHNOLOGIES TRACK**

1:15 – 4:15 PM

*NOTE: Speakers in this session are permitted to use commercial brand names to explain the new technology.*

### **Zirconium-Based Cleaner-Coater with Improved Low Temperature Performance**

David Montrose, *Henkel Corporation*

### **Breaking the Voltage Barrier with PowerBoost Technology-110,000 Volts & 110 micro amps**

Jeff Hale, *Gema USA, Inc.*

### **Flexible, Automated, Cutting Edge Material Handling**

Chad Andreae, *Therma-Tron-X, Inc.*

### **Powders Coatings for Extreme Edge Coverage and Corrosion Protection**

Kathryn Shaffer, *PPG Industrial Coatings*

### **OptiStar All-In-One, Combining Delivery and Application Control Into One Compact Device**

Chris Merritt, *Gema USA, Inc.*

### **Inertial Powder Separation – A New Direction in Powder Booth Design**

Larry Savage, *Particle Recovery, LLC*

### **Non-Reactive vs. Reactive Pretreatments**

Sergio Mancini, *Bulk Chemicals, Inc.*

### **LayerCheck Device**

Hector Flores, *Wagner Industrial Solutions*

## **BATCH TRACK**

1:15 – 4:15 PM

### **Effective and Efficient Batch Powder Coating Systems**

Mike Withers, *Axalta Coating Systems*

Greg Dawson, *Nordson Corporation*

John Sudges, *Midwest Finishing Systems*

### **Evolution of a Batch System Operation: A Fabricator's Case Study**

Marty Sawyer, *Trimac Industrial Systems, LLC*

Neal Spencer, *Ernest-Spencer Metals Inc.*

### **What a Mess...Keep the Powder in Your Booth!**

Frank Mohar, *Nordson Corporation*

**Tabletop Exhibition and Reception  
will be open from 4:30 - 6:30 PM**



# FEBRUARY 19-20, 2020

WEDNESDAY, FEBRUARY 19

## GENERAL SESSION & BREAKFAST

7:30 – 9:15 AM

### Powder Coating Roundtables



## FORMULATION TRACK

All Day Track

*NOTE: Many of the presentations in this session include new technologies where speakers are permitted to use commercial brand names to explain the new technology.*

### Polyester Powder Resins for One Shot Matte Application

Paul Buijsen, *DSM Coating Resins*

### New Generation Reactive Matting Additive for Epoxy and Hybrid Powder Coatings

Atman Fozdar & Ronald Lewarchik, *Chemical Dynamics LLC*

### FEVE Fluoropolymer Resins for Highly Weatherable and Corrosion Resistant Coatings

Hongli Wang, *AGC Chemicals Americas*

### New Antistatic Powder Coatings

Jongchun Oh, *KCC Corporation*

### Graphene/Wax Composites for Anticorrosion

Rich Czarnecki, *Micro Powders, Inc.*

### Multifunctional Additives for Powder Coatings

Michael Watson & Mouhcine Kanouni, *Clariant Additives*

### Specialty Crosslinkers for Improved Powder Coating Properties

Bernd Knobloch, *EMS-GRILTECH*

### High Weatherability Powder Paint for Automotive Exterior Parts and Weatherproofing Method

Hwang Sangok, *KCC Corporation*

## MAXIMIZING EFFICIENCIES TO MAXIMIZE PROFITS TRACK

All Day Track

### Guide to Purchasing a Finishing System

Rich Saddler, *Industrial Finishing Solutions LLC*

### Real Cost to Powder Coat

Mike Withers, *Axalta Coating Systems*

### Improved Efficiency Through Racking: How to Eliminate Wasted Labor and Space

Isaiah Haley, *Production Plus/Magic Rack*

### Optimizing Quality and Material Consumption with Non-Contact Film Thickness Measurement

Martin Rola, *Sapience Automation*

### Benefits of Automating Industrial Finishing Door Systems

Zach Morrow, *RollSeal, Inc.*

## TESTING & MEASUREMENT TRACK

9:30 – 11:00 AM

### Know Your Options

Mike Beamish, *DeFelsko Corporation*

### Study to Measure Mechanical Properties like Hardness, Elastic Modulus, Creep and Much More of a Variety of Powder Coatings using Nanoindentation

Rahul Nair, *Fischer Technology, Inc.*

## POWDER COATING DONE RIGHT

1:45 – 3:30 PM

## CLOSING SESSION & MONTANA TRIP GIVEAWAY

3:30 – 3:45 PM

Join us as we wrap up Powder Coating Week 2020 and end with a very special giveaway – a trip to PCI's 2020 Annual Meeting from June 22 – 24, 2020, in Whitefish, Montana, near Glacier National Park. The trip includes a 3-night stay at the host hotel; complimentary registration to the meeting and \$500 towards airfare for the lucky winner. The prize does not include optional activities fees. Winner must pay for any optional activities in which they wish to participate. Prize is non-transferable.

*Giveaway value: \$2,300*

For complete session descriptions, registration fees, hotel information and to register, visit [conference.powdercoating.org!](http://conference.powdercoating.org!)

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Tabletop exhibitors are listed as of September 20, 2019. Tabletop exhibitors are added frequently, so be sure to check our website for an up-to-date listing.

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# Emerging Trends in Powder Coating Technology

by Kevin Biller

*On the eve of MMXX, the year which marks the 65<sup>th</sup> anniversary of the original powder coating patent authored by Erwin Gemmer, we offer a review of the most recent breakthroughs in powder coating technology. Gemmer, if you recall, patented a novel process to coat preheated hand tools with a thick film by dipping them into a fluidized bed of thermoplastic particles. Over the ensuing decades, wise formulators and engineers advanced powder coating technology beyond Gemmer's wildest dreams to create the thin-film world of thermosetting chemistries possessing remarkable durability, performance and economics.*

As requirements for improved performance in extreme working environments have emerged and the ever-present need for exacting process control and reasonable economics continues, technologists have stepped up to the plate to deliver the goods. Functional coatings are being pushed to perform in harsher environments, including more aggressive chemicals and higher operating temperatures. Architects are looking to the powder coating industry for a finish that can withstand 20 to 30 years of sunlight, precipitation and various other environmental attacks. Consumers are demanding more durable finishes on more diverse surfaces. Regulation and public sentiment continue to guide manufacturers toward more environmentally-friendly processes.

In this Buyers Guide edition of Technology Interchange we look at advancements in powder coating technology, equipment, and process improvements that, with all of the aforementioned pressures, continue to answer the call.

## Functional Coatings

Functional coatings are typically used in extreme environments where the ultimate in corrosion and chemical resistance are required. Good examples are powders designed to coat pipelines and rebar. Energy companies are accessing crude oil and natural gas in harsher environments and using more aggressive means of extraction. The drilling equipment and corresponding pipelines need to withstand temperatures as high as 177 degrees Celsius (350 degrees Fahrenheit). Conventional functional powders, often described as fusion bonded epoxies because of the manner in which they are applied and cured, can withstand temperatures in the 120 to 135 degrees Celsius (250 to 275 degrees Fahrenheit) range. Recent advances in epoxy resin technology and powder formulating have pushed that boundary.

Functional powder coatings with very high T<sub>g</sub>s (glass transition temperatures) can be formulated thanks to



innovations in epoxy resins by the Kukdo Chemical Co. Ltd. Polymer scientists there have developed a unique powder coating grade resin, KD-2012H, that yields coatings with a Tg of over 160 degrees Celsius (320 degrees Fahrenheit). (The significance of cured film Tg is that it marks thermal performance that allows the coating to maintain integrity at or just below that temperature.) Olin Chemical (formerly Dow Chemical product line) has developed an epoxy resin, DER 6510HT, that can be used to create cured powder coatings with a Tg as high as 170 degrees Celsius (338 degrees Fahrenheit). Both of these unique resins are commercially available.

SABIC, a relative newcomer to the powder coating industry, has developed epoxy resins that have the ability to produce cured film Tgs up to 200 degrees Celsius (392 degrees Fahrenheit). This unique chemistry is dubbed PPPBP-Epoxy and was presented last year at a major powder coating technology event. SABIC's PPPBP-Epoxy can be used as a modifier resin with more conventional epoxy resins to dial in a specific Tg or as a sole resin crosslinked with either a phenolic or DICY-based curing agent.

Not only do functional coatings require durability at high operating temperatures, they also need excellent chemical resistance to handle fracking chemicals and proppants (e.g., sand, bauxite or ceramics). Kukdo has developed an epoxy resin, KD-9211, which is based on Bis-Phenol F with a long molecular chain. They recommended combining it with a multi-functional epoxy novolac and cure with a phenolic hardener. The resulting coating provides a highly chemical resistant surface capable of withstanding a barrage of aggressive compounds.

Another key property of functional coatings is resistance to moisture. Hydraulic fracking requires the use of aqueous media. In addition, pipelines can also be used for the transport of hot water and steam. Kukdo has developed a high humidity-resistant hardener for epoxy-based powder coatings. Laboratory tests have shown that powder coatings based on this phenolic hardener, KD-420A, maintain adhesion after nine days of immersion in 90 degrees Celsius (194 degrees Fahrenheit) water.

Adhesion to stainless steel and non-ferrous metals such as aluminum, magnesium and titanium alloys is always a challenge for the powder coating formulator. Kukdo has developed an epoxy resin, KSR-950, that incorporates a silane pendant group which provides a significant improvement in adhesion compared to conventional epoxies. Test results show a powder based on KSR-950 maintains adhesion to un-pretreated aluminum substrates after 24 hours submersion in 90 degrees Celsius (194 degrees Fahrenheit) water.

### Low-Temperature Cure Polyesters

Stapan Company has developed a new LTPC (low temperature powder coatings) carboxyl polyester resin, Rucote 9900, designed for cure with TGIC. This resin exhibits excellent cure performance and appearance with bakes as low as 130 degrees Celsius (266 degrees Fahrenheit).

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*Advancements in powder binder technology has improved powder coating capabilities on heat-sensitive substrates such as MDF (medium density fiberboard).*

Targeted end-uses include assemblies that are comprised of multi-components that have some parts that cannot endure typical high bake temperatures, finishing lines seeking lower temperature oven economics and higher speed coating lines with short oven residence time.

Allnex has developed a comprehensive range of low-temperature cure polyesters designed to be cured with epoxy resins (hybrids), TGIC,  $\beta$ -hydroxy alkyl amide (HAA) and Araldite™ PT-910. Hybrid and PT-910 cure is claimed to be as low as 150 degrees Celsius (302 degrees Fahrenheit), whereas these specialized polyesters can cure as low as 140 degrees Celsius (284 degrees Fahrenheit) with TGIC. Low-temperature curing polyesters designed for cure with HAA can be processed as low as 160 degrees Celsius (320 degrees Fahrenheit). This sales range of polyesters is focused on meeting the needs of heavy substrates, pre-assembled goods and heat-sensitive substrates such as plastics and engineered boards.

DSM has continued to optimize their Uralac® Ultra line of low-temperature cure polyester-based powder binders.

This system is comprised of an unsaturated polyester and a divinyl ether curing agent and is said to cure as low as 120 degrees Celsius (248 degrees Fahrenheit). The target market for this technology is replacing liquid paint and/or laminates on MDF (medium density fiberboard). Infrared curing is recommended to speed up the cure speed of this unique technology. Cure times in as little as three minutes are achievable according to DSM.

### *Film Thickness Measurement*

Evaluating film thickness on a coated (and cured) part is easy due to magnetic and eddy current instrumentation technology developed decades ago. Film thickness gauges are compact, easy to use and relatively inexpensive. Every powder coating finishing line and laboratory should have one or more of them. Measuring the film thickness of an uncured powder layer is not so easy. Enterprising engineers have developed ultrasonic devices that can get the job done but are sometimes cumbersome when switching powder coating products and substrates. Recent advances have offered an alternative to these ultrasonic devices.

Winterthur Instruments AG, and their flagship product, the Coatmaster, have developed a non-contact means to measure the film thickness of both uncured and cured powder coatings. This technology is called ATO (Advanced Thermal Optics) and is based on the thermodynamics of a layer of powder and how it responds to a light pulse that warms the powder. Following the light pulse, high-speed infrared sensors detect the rate at which the material cools. Using proprietary algorithms, the Coatmaster is able to translate this rate of cooling to a highly accurate film thickness measurement. The time to take a reading varies by application, but is typically 100-300 milliseconds, and individual point readings can occur as quickly as once every 1.5 seconds.

The Coatmaster device can be mounted at distances from two to 48 inches and can read parts traveling as fast as 350 feet

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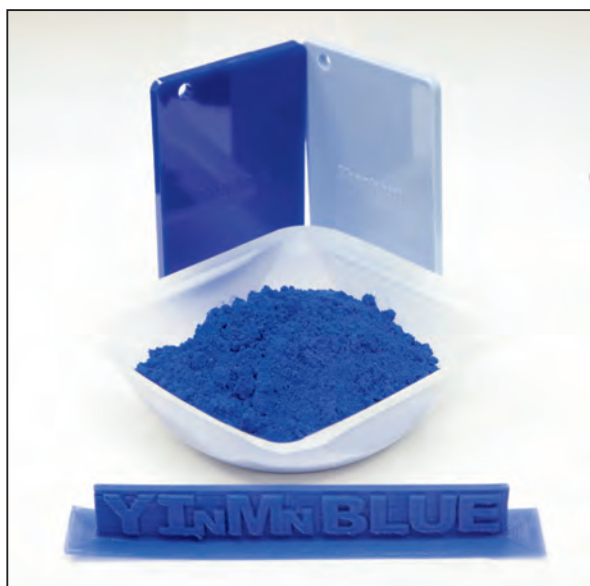


per minute. Data can then be captured and processed by quality control software that can emit alarms and analyze trends.

### High Durability Pigments

Formulators now have more choices in high-performance colorant pigments. Shepherd Color has partnered with Oregon State University to bring YInMn (yttrium-indium-manganese) blue to the coatings and allied industries. This dark blue shade of inorganic pigment based on mixed metal oxides has high solar reflectivity, which is conducive to cool surfaces on roofs and other architectural applications. In addition, it has excellent UV durability, chemical resistance and IR properties.

Shepherd Color has also introduced micro-mirror technology based on silver coated glass flakes. These



YInMn (yttrium-indium-manganese) blue has high solar reflectivity, which is conducive to cool surfaces on roofs and other architectural applications.

special effect pigments, dubbed StarLight, offer remarkable reflectance and sparkle and are designed for the transportation, architectural, electronics and consumer goods markets.

### Antimicrobial

Poly Group, LLC has developed a novel antimicrobial technology based on positively charged compounds that attack and destroy negatively charged pathogens. This technology, named Nouvex™, creates no chemical binding or linking issues, unlike other quaternary ammonium compounds, and has a large molecular structure providing limited toxicity. Nouvex™ has proven performance through licensed laboratory testing, so the EPA preservative and health claims will be accessible to the end-use product manufacturers. This makes Nouvex™ a potential replacement for silver ions, triclosan, copper, and other quaternary substances with little or no process modification.

### Processing Technology

Advancements have been made in how powder coatings are manufactured. Specifically, extrusion equipment companies have listened to powder operations managers and have designed feed systems that can accommodate difficult-to-feed premixes and materials. Some powder formulations are based on lightweight, low-density materials and have a tendency to build in extruder feed ports causing unwanted surging and variable torque. Material builds up in the feed zone and seriously compromises throughput and therefore, processing economics.

Baker Perkins' Max<sup>3</sup> feed system is based on a redesigned feed port and screw design which significantly improves the consistent flow of material into the extruder. Pilot plant studies show outputs of difficult-to-feed materials increased as much 34 percent. This innovative feed system is available on all new machines and as a retrofit option on existing machines ranging from the MPX24 up to MPX80 model.



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## Laser Curing

PhotoFusion Technologies, Inc., has developed a novel technique to cure powder coatings. Everyone is quite familiar with convection ovens and perhaps to a lesser extent the varieties of infrared curing technology available to heat and cure thermosetting powder coatings. PhotoFusion Technologies, Inc., takes powder coating curing to a whole different level with their laser technology. Basically, the way the technology works is by applying powder to a surface and then melting and curing it with a moving patch of laser-directed light. The laser in this case is diffused and forms a large pattern that is traversed over the powder coated surface. Within seconds the powder layer melts, flows and cures to a hard, durable finish.

PhotoFusion Technologies, Inc., sees opportunity to revolutionarily change the heat-sensitive substrate market including composites and a myriad of plastics. These processes are expected to impact the automotive graphics and aerospace industries, among others. In addition, the ability to deliver high intensity energy to a surface could open up opportunities in the petrochemical industry where heavy-duty assets may be able to be coated and cured in the field.

Powder coating technology is not sitting still. Clever scientists, formulators and engineers are solving age-old problems with technological breakthroughs and energetic entrepreneurs are finding new opportunities to expand the reach of the highest quality, most environmentally-compliant finishing technology. The increasingly more demanding needs of the pipe coatings industry are now being addressed by innovative work at the resin manufacturers. Technologists continue to chip away at expansion into new markets by developing extraordinary new curing technology with lasers. Their breakthroughs may be able to open untapped markets that utilize heat-sensitive substrates. And the age-old powder coating processing issue regarding low-density materials has been tackled by the pioneering engineers at extruder companies.

### Companies mentioned in this article:

SAIBC - [www.sabic.com](http://www.sabic.com)  
 Kukdo Chemical Co., Ltd. - [www.kukdo.com](http://www.kukdo.com)  
 Stepan Company - [www.stepan.com](http://www.stepan.com)  
 Allnex - [www.allnex.com](http://www.allnex.com)  
 DSM Coating Resins - [www.dsm.com](http://www.dsm.com)  
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 Baker Perkins - [www.bakerperkins.com](http://www.bakerperkins.com)  
 Winterthur Instruments AG - [www.coatmaster.ch](http://www.coatmaster.ch)  
 PhotoFusion Technologies, Inc. - [www.photofusiontech.com](http://www.photofusiontech.com)

*Kevin Biller is technical editor of Powder Coated Tough and president of The Powder Coating Research Group.*

**PCT**



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*Continued on page 20*

Continued from page 19

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EPSI Masking Solutions  
**Mighty Hook, Inc.**  
**MOCAP**

**Masking Supplies, Custom**

Caplugs/Shercon  
Custom Fabricating & Supplies  
**Echo Engineering & Production Supplies, Inc.**  
EPSI Masking Solutions  
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 EPSI Masking Solutions  
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 EPSI Masking Solutions  
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**Mighty Hook, Inc.**

**Stripping Equipment, Burn-Off Ovens**

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**Stripping Equipment, Fluidized Sand**

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Kolene Corporation  
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**Stripping Equipment, Solvent**

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 Kolene Corporation  
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**George Koch Sons, LLC**  
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**Col-Met Engineered Finishing Solutions**  
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 Intek Corporation  
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**Sherwin-Williams Company**

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Elcometer, Inc.

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Graper Enterprises  
Heraeus Noblelight America, LLC  
Industrial Finishing Solutions, LLC  
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Memphis s.p.a.

### Nordson Corporation

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### Pneu-Mech Systems Mfg.

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**Powder Coating Research Group, Inc.**  
PROEM Solutions, LLC

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Trimac Industrial Systems, LLC

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Nix Coatings  
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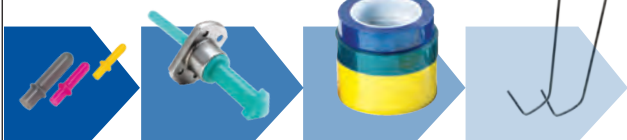
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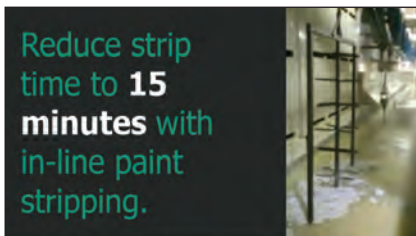
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Erie Powder Coatings, Inc.  
IFS Coatings  
IGP North America  
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PPG Industries  
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*The Powder Coated Tough staff, along with the Powder Coating Institute's PCT Subcommittee, worked hard this past year to plan exciting features for our readers. Here are the engaging topics we will tackle in 2020: Improving Your Pretreatment Process, Extreme Coaters, Technology and Today's Powder Coater, Taking Temperatures to New Highs (and Lows), Bringing Powder Coating In-House.*



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## Not Just White. VERY White

**Q** Dear Joe,  
My problem is that a customer wants a white powder paint (very white), and all those that I have applied are too yellowish. Is there a solution?  
Thanking you in advance,

Aissa K.  
Montreal, QC

**A** Dear Aissa,  
Thanks for the question; this is a common problem. Your customer requests a very white powder. While “very white” is a relative term, I think I can still provide some guidelines to allow you to provide the whitest finish for your situation.

First of all, the chemistry of the powder coating affects whiteness. For example, hybrid and especially epoxy type powders have a tendency to yellow upon baking. Powder types less prone to yellowing include polyesters, polyurethanes, and acrylics. Formulating technique also affects the yellowing of these chemistries. The choice of pigment, crosslinker, and additives can significantly influence yellowing resistance. So be sure to evaluate more than one version of these types of powders.

Overbaking (high temperature and/or extended time) exacerbates this problem. Furthermore, the quality of your oven affects whiteness. Gas ovens cause more yellowing than electric or infrared types. Incorrectly adjusted gas/air mixtures will cause more yellowing as well, so it is imperative to keep your oven burner adjusted properly and to avoid overbake

conditions. In addition, make sure your oven is properly vented, as accumulation of combustion by-products can cause yellowing.

If your customer requires an extremely highly reflective white powder for an application that involves lighting fixtures, then a specifically formulated powder is required. These products will incorporate special grades of titanium dioxide (white pigment) and quite possibly an optical brightener and antioxidant.

I hope that this helps solve your problem.

Warm regards,

- Joe Powder

## Matchmaking

**Q** Hi Joe,  
We currently are being asked to match a powder so we can powder coat steel parts that need to match an anodized aluminum hinge. So far, we have not had much success. Do you feel I’m spinning my wheels trying to match a powder to a plating finish? I’m thinking it’s kind of like the chrome powders that are offered, they call it chrome powder, but it really doesn’t look anything like chrome plating. Would I be better off asking them to powder coat the steel parts and the hinge if they want everything to match?  
Thanks in advance for your help.

Jim A.  
Oklahoma City, OK

**A** Hi Jim,  
Powders can be formulated to approximate the appearance of anodized silver. It won’t be an exact match but will come pretty close. This will be a low gloss metallic effect, and recently powder companies have offered them as a specialty product line. Depending upon the eventual environment that the coating will be exposed to, you may have to apply a low gloss clearcoat for extra durability because the metallic pigments used to create the effect can oxidize in outdoor conditions. The clearcoat will seal the surface and provide significantly improved durability. If this is for an interior application that won’t see much wear and tear, then the clearcoat won’t be necessary.

Best regards,

- Joe Powder

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## I'd Like a Bamboo Sandwich, Please

**Q** Hey Joe,

We build high performance composite skateboards (bamboo sandwiched between fiberglass/epoxy) and we're looking for 2 things:

1. A non-toxic or low toxicity sealer for the edges and bottom surface of the board.
2. A non-toxic or low toxicity finish to act as a grip surface on the top of the board.

It needs to be flexible, durable, and clear or amber. We currently use a water-based urethane dispersion for both, with a silica aggregate for the grit surface. Any help or thoughts would be appreciated.

Don T.  
Culver City, CA

**A** Hey Don,

Powder coatings, which are non-toxic by their nature, can be applied to composites. A number of issues need to be considered with this process. The composite board probably does not have sufficient conductivity to electrostatically spray powder onto its surface. Therefore, a conductive preparation will have to be applied to the board prior to powder coating. I can provide you with a few options if you wish.

The next issue is identifying a powder coating that can be applied and cured at temperatures low enough to avoid distorting the board or causing volatiles to evolve from the composite. Some low-temperature powders can be cured around 250 degrees Fahrenheit for around 20 to 30 minutes. If your composite remains intact under this condition, then I would pursue this option.

If 250 degrees Fahrenheit is too high, then you can consider using UV-curable powder coatings. This technology allows you to process powder coatings in the range of 200 to 250 degrees Fahrenheit. Using these products will require a low temperature melt phase followed by exposing the warm powder surface to intense UV energy. The UV is generated by specially designed lamps that are commercially available. The advantage of the UV process is much lower operating temperatures and a much shorter curing cycle. The melt phase typically takes one to five minutes and the UV step requires a couple seconds. Both the low-temperature cure powder and UV-cure material can be formulated in clear or amber appearance. A grip surface can also be formulated using silica or other inert material.

Good luck,

— Joe Powder

## A Screwy Situation

**Q** Dear Joe,

I want to color the heads of stainless steel 18-8 screws, as well as nuts, white and have them last in an exterior environment. Can you recommend a process, and a resin or stain?

Thanks,

Ron J.  
Sparta, WI

**A** Dear Ron,

You can powder coat these; however, I would offer these guidelines:

- Be careful not to coat the threads. You will need some kind of masking scheme or alternately you can blow excess powder off with a gentle puff of compressed air.
- Roughen up the surfaces to be coated. This will provide the best adhesion. Media blasting is best, but a wire brushing process will work.
- Ensure that surfaces are absolutely clean before applying the powder. Solvent washing is a good technique. I recommend using acetone to remove any oil or dirt.
- Use a polyester TGIC powder for exterior durability. Apply about 1.8 to 2.2 mils of coating. More than that can result in sags. Too little and you may have incomplete coverage.
- Make sure the powder is completely cured. Follow the curing guidelines of the powder supplier's product data sheet.

I hope this helps. Good luck with your project.

— Joe Powder

Joe Powder™ is trademarked and owned by Kevin Biller, technical editor for Powder Coated Tough. Please send your questions and comments to Joe Powder™ at [askjoepowder@yahoo.com](mailto:askjoepowder@yahoo.com).

**Editor's Note:** Letters to and responses from Joe Powder have been edited for space and style.

### Not Your Average Joe...

Each issue, we take the padlock off the PCI® Test-Lab door for a few minutes so our favorite technical editor and "powder guru" Joe Powder can run in the yard. When he's not gnawing on a rawhide bone, he loves to answer readers' questions. Go ahead and send him one at [askjoepowder@yahoo.com](mailto:askjoepowder@yahoo.com)... he doesn't bite. Maybe it'll end up in the next issue!



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## A New Member of the PCI Family

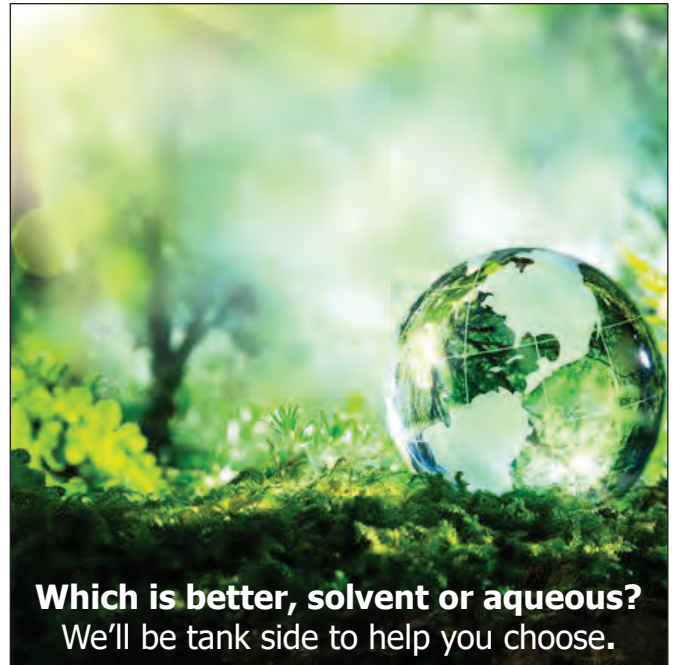
To make a very long story short, over Frank Lowe's 60-plus years of existence, we have gained quite a few customers in the powder coating industry without even knowing it. Through market research we found out that we were helping OEMs, fabricators, and custom powder coaters prevent damages during packaging, transportation, and storage of powder coated products. Shortly after, we expanded our research to see how we could efficiently better understand the industry and spread the word. As the old saying goes, all roads lead us to the same path, which in this scenario is the Powder Coating Institute. After several conversations with Leslie Muck to truly understand PCI and what it represents, I'm happy to say that Frank Lowe became a PCI member in December of 2018.

Since then, we have exponentially gained new customers through a variety of PCI's platforms. One particularly beneficial event was PCI's Powder Coating 2019 Technical Conference in Orlando, FL. Frank Lowe participated with a tabletop exhibit and I finally had a chance to meet some of the powder coating community and PCI members. Everyone was extremely welcoming and had a plethora of knowledge to share about the powder coating industry. I could not believe the number of attendees that flew in from around the world! Each attendee that stopped by our table expressed interest and provided valuable feedback which has helped us improve our products and processes to best suit the powder coating industry. Needless to say, it was an absolute success and we will surely be back in 2020!

There are also several resources and reports from PCI that I use regularly in order to continuously learn about the powder coating industry. This year's Executive Director's report has helped immensely with categorizing each market segment and really focusing my attention on specific coating segments that could be most useful to our company. This report certainly opened my eyes to the variety of coated products that could benefit from protective packaging. From wood finishes to coil finishes and more, PCI members do it all!

I'm truly honored to be a member of such a wonderful community that continues to grow and raise awareness of powder coatings and the benefits it offers towards creating a greener environment. The Powder Coating Institute really has that family feel to it. I very much look forward to being an active member for years to come and to help improve the packaging process of powder coated products worldwide!

*Anthony Valerio is in business development for Frank Lowe.*



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**This Edition's Deadline:**  
**December 3**  
**Good Luck!**

Test your powder coating knowledge interactively with others in our industry and enter for a chance to win a PCI long- or short-sleeved t-shirt!

How it works: We've developed questions that test your powder coating knowledge using a copy of *Powder Coating: The Complete Finisher's Handbook*. Pop Quiz questions can be found in each issue of *PCT*.

Put on your thinking cap and then email your answer to [popquiz@powdercoatedtough.com](mailto:popquiz@powdercoatedtough.com) using the subject line "Pop Quiz." All correct answers received by the deadline will be entered in a drawing to win an official PCI long- or short-sleeved t-shirt! In each subsequent issue of the magazine, the correct answer and the lucky winner's name will be published.

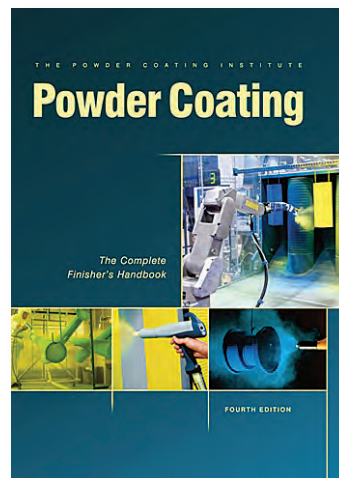
## This Issue's Question:

**Q:** *Part hangers can become coated with powder build-up, which reduces its conductivity during subsequent uses. Which of the following is considered a hanger design that can facilitate conductivity, especially for heavier parts?*

**Choose the correct answer:**

- A.** Barrel edge
- B.** Razor's edge
- C.** Knife edge
- D.** Rifled edge
- E.** None of the above

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## Last Issue's Question:

The question for the September/October edition of Pop Quiz, along with the answer is:

### Q: True or False

*If you use a powder application room, you should have ample space to store at least 24 hours' worth of powder supply so the powder can acclimate to the temperature of the room before use.*

**A:** *The answer is True. Page 227 of the Handbook recommends acclimating powder to the temperature of the room before use. Powder should be stored on racks and/or in an enclosed closet to prevent cross-contamination of the different materials or colors being sprayed. Also, by having the powder materials stored in an enclosed closet, airborne fibers produced by open cardboard boxes can be isolated from the booth and recovery equipment.*

Pop Quiz continues to enjoy great participation. We appreciate all those who took the time to answer!



*This month's winner is:  
Chris Bennett  
Technical Service Representative  
The Sherwin-Williams Company*

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**Congratulations!**

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The Powder Coating 101 Workshop is an introduction to powder coating recommended for those with little or no knowledge of powder coatings.

### **UPCOMING WORKSHOPS**

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*Part of Powder Coating Week 2020*

Cleveland, OH - April 21-22



## **Powder Coating 202:**

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The Powder Coating 202 Workshop is an advanced workshop that focuses on in-depth knowledge of all aspects of the powder coating process. At least three years of industry experience and/or prior attendance at PCI's Powder Coating 101 Workshop required.

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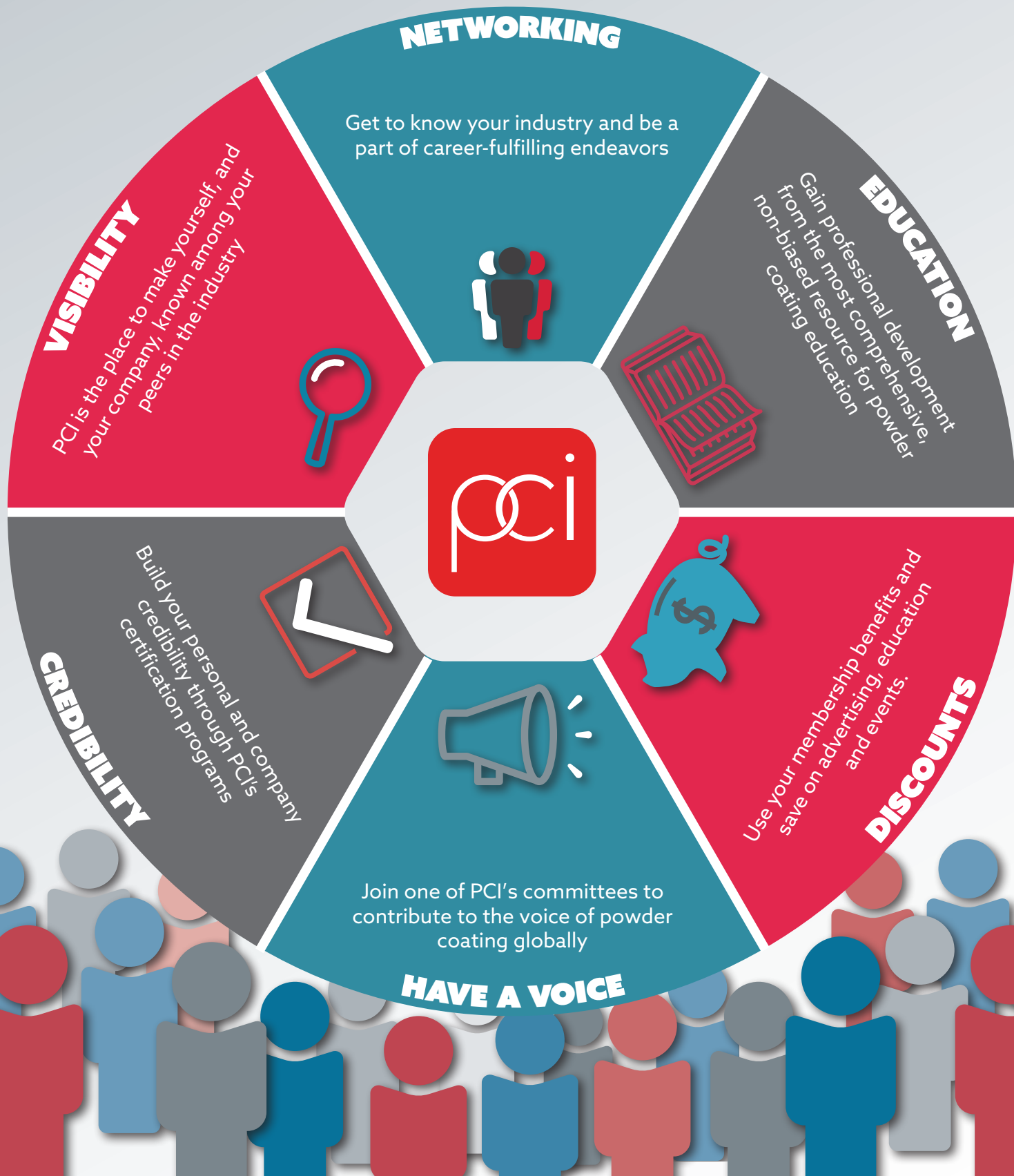
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