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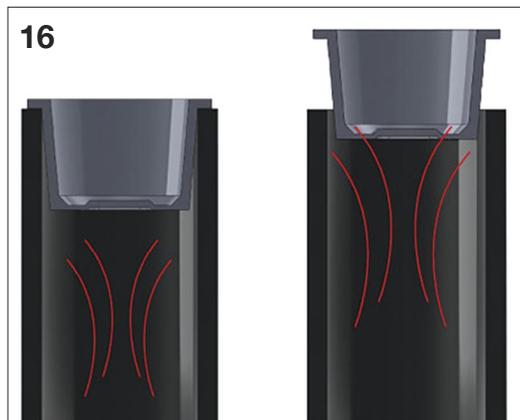
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On the Cover: CO2 snow blast cleaning device.
Courtesy of Venjakob.

Roll with It

This issue's cover on pretreatment reminds us that the pretreatment process is like the warmup before a workout. It sets you up for success down the line. Jumping right into a workout without warming up could simply result in a less-than-stellar workout, or it could end in disaster: injury. Similarly, a poorly prepared product prior to finishing will not yield the desired end result. We don't skip steps.

The same could be said for any business, at any time, but especially these days. In an article, *How to Bulletproof Your Business*, on thenterpriseworld.com, the writer details 11 key steps to building a scalable and profitable business. They are: having the right location, spending on advertising (shameless plug: we can help with that!), having a plan, having financial backup, learning from mistakes, being debt-free, following your passion, building relationships (we can help

here, too!), focusing on customer service, being happy, and taking feedback.

Sounds like common sense but always easier said than done, especially in a year of COVID-19 where some have seen business slow, markets drop, tradeshow get cancelled, and more. All the rules are being rewritten and new ways of doing things have emerged.

And we're surviving. In his column, Gary LeRoux, President and CEO of the Canadian Paint and Coatings Association, says in general, the forecast is slightly more optimistic for the Canadian paint and coatings market than at the outset of the pandemic, driven by the strong architectural DIY sector. "Overall, total volume and value is expected to be down about 3 percent for the year, before rebounding next year to the tune of 3.5 percent for volume and 6.1 percent for value," he writes.

Next issue, Bob Smith, President of



the Canadian Association for Surface Finishing, will begin sharing his association's Economic Impact Study.

None of us have been immune to the unprecedented events of 2020. Following established processes and plans while being able to roll with the punches has been essential. Let's embrace positivity and the idea that we're all better for it. Bring on 2021!

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PPG Reports Record Third Quarter 2020 Financial Results



PPG reported third quarter 2020 net sales of about \$3.7 billion, down approximately four percent versus the prior year. Selling prices increased by 1.3 percent. Sales volumes were down about five percent versus the prior year, which reflect ongoing negative economic impacts of the COVID-19 pandemic. Acquisition-related sales added less than one percent to sales growth, and the year-over-year impact from foreign currency translation was minimal.

“As reported earlier this month, we delivered record operating results in the third quarter, with both of our reportable business segments delivering higher segment income than the prior year, despite continued, negative pandemic-related economic effects,” says Michael H. McGarry, PPG chairman and CEO. “Strong year-over-year organic sales growth in global architectural coatings and continued cost management drove earnings growth in our Performance Coatings reporting segment. In addition, our leading technology and service capabilities benefited us as demand for automotive OEM coatings and general industrial coatings began recovering in the quarter, generating strong PPG operating leverage and boosting earnings in our Industrial Coatings reporting segment.

“Looking ahead, we are likely to experience normal seasonal trends in the fourth quarter, especially in our European and North American architectural coatings businesses,” McGarry adds. “Even with the continued uncertainty from the pandemic we expect overall economic activity to continue to recover, but in an uneven manner. The pandemic is still significantly impacting the demand for certain coatings products – most notably, global commercial aerospace, marine, and protective coatings that support the oil and gas industry. In addition, we expect that automotive refinish coatings demand in the U.S. and

Europe will remain below 2019 levels until there is a return to more normal commuting patterns. We remain well positioned to capture additional incremental earnings growth once these sectors, that represent about 30 percent of our business portfolio, begin to recover. Similar to the past several quarters, we will continue to focus on execution against all elements within our control. Also, the company’s balance sheet remains strong, and we are evaluating earnings-accretive cash deployment alternatives.

“We will continue to prioritize the health and safety of our employees, while providing excellent support to our customers with our technology-advantaged products. I am very proud of the entire global PPG team, and I want to thank everyone for their continued focus and diligence during these challenging times. As I said last quarter, I remain confident that we are on the path to emerge from this crisis as an even stronger company, and these record quarterly results lay the foundation for delivering on this commitment,” says McGarry.

www.ppg.com

Barentz To Acquire Maroon Group, North American Distributor of Specialty Chemicals

Barentz International, a global distributor of life science ingredients, has entered into a definitive, written agreement to acquire Maroon Group, a North American specialty chemicals distributor. The acquisition will expand Barentz’ activities and is aligned with its strategy to become a global leader in the life science and broader specialty chemical industries.

Maroon Group is a large specialty suppliers to the coatings, adhesives, sealants and elastomers (CASE); personal care and pharmaceutical; and food and nutrition, markets across North America.

Terry Hill, CEO of Maroon Group, and the Maroon management team, will continue to oversee operations.

“We are very pleased [Terry Hill] will join the Management Board of Barentz and guide us, with his very talented team of approximately 300 specialists, toward a smooth continuation of excellence and growth of both companies,” says Hidde van der Wal, CEO of Barentz.

“Our product portfolios are very complementary,” adds Hidde van der Wal. “We have no conflicts of interest and we can learn a lot from each other. Maroon Group has significant scale in North America - the biggest economy of the

world, where we were small, until today. The combination will immediately make Barentz a leading global distributor with an excellent opportunity to establish new business segments in North America. It is a natural combination that enables us to offer quality and expertise to our combined customer base.”

Exact terms of the transaction have not been made public.

www.barentz.com

Sherwin-Williams Introduces 2021 Trend Forecast for Industrial Wood Markets



The Industrial Wood Coatings division of Sherwin-Williams recently released Rhythm of Color, its annual Colormix Forecast. The forecast includes 40 finishes, categorized into four collections – Sanctuary, Encounter, Continuum and Tapestry.

Shaped by global, cultural and economic influences, the company says the collection inspires wood product developers and manufacturers to design finishes and curate palettes that align with consumer preferences. The forecast reveals finishes that will be on-trend three to seven years from now to account for the product development process, enabling wood product developers to meet customer and consumer expectations of the future.

Developed to complement the architectural paint 2021 Colormix Forecast, the collections within Rhythm of Color are inspired by nature and balance, examined through the lenses of the past, present and future, Sherwin-Williams says.

“After thoroughly researching macro-level trends around the world, the themes in this year’s Colormix Trend Forecast embody modern societal dichotomies, like change and comfort, which derive from the pandemic and social discontent,” says Lauren West, Global Color and Design Director, Sherwin-Williams Industrial Wood Coatings Division. “Consumer color preferences will shift because of these realities, which is why it’s important for wood product developers to follow forward-looking color forecasting. At the Global Color &

AI Startup Omnirobotic Raises \$6.5m

Omnirobotic, a robotics automation startup, announced in September it closed a seed round of \$6.5 million CAD to further develop and commercialize its AI platform for factory robots.

Fonds de solidarité FTQ (the “Fonds”) and Export Development Canada (EDC) led the round with participation from Real Ventures and a joint venture including the company’s current employees. The funding enables Omnirobotic to continue building autonomous robotic capabilities for high-mix production environments, allowing industrial robots to see, plan and execute high-value-added processes like painting, welding and machining with limited human oversight.

Founded in 2016, Omnirobotic says its platform has already allowed high-mix manufacturers to overcome skilled labor shortages and reduce the environmental impact of their production processes. Omnirobotic believes autonomous industrial robots will not only be more capable of adapting to constantly changing manufacturing environments, but can also help displace physically dangerous or unpleasant jobs the sector is still challenged to fill.

“Our AI platform shows potential for significant productivity gains, along with substantial energy and consumable savings per part produced that are meaningful to all kinds of industrial manufacturers,” says Omnirobotic CEO & Founder Francois Simard. “The technology itself is transformative because these manufacturers will finally be able to use industrial robots for value-added tasks on never-before-seen parts within unstructured environments.”

Manufacturers are looking for their own ways to automate tasks for which they otherwise have difficulty recruiting and retaining skilled,



qualified workers - even more essential in the wake of additional workforce challenges caused by the COVID-19 pandemic, adds Simard. “This is both critical for individual firms and also reflects a growing consensus among many robot and process equipment manufacturers.

“We started with industrial paint, but paint is just the beginning. Our investors believe in our plan to build the definitive AI platform for factory robots,” he adds. “This won’t just unlock robotics for the entire manufacturing industry, but will also make costly, extensive, painstaking robot programming a thing of the past, paving the way for a new era of autonomous manufacturing.”

www.omnirobotic.com

Design Center, we help our customers bring the forecast to life through the creation of custom, proprietary finishes that meet consumer demand.”

Industrial Wood 2021 Colormix Trend Forecast Collections

SANCTUARY

This range uses calming colors to “nurture wellness and serenity. Scandinavian simplicity was a key influence for soft, matte neutrals with rich, well-worn textures and sunbaked tones.”

ENCOUNTER

The Encounter collection’s earthy finishes “embrace heritage lux and global inspiration. Varying levels of gloss and sheen, balanced by dark, textured finishes enhance the natural beauty of wood. Rustic and tribal hues breathe life into burnished, charred stains.”

CONTINUUM

This range is described as a hybrid of synthetic and natural influences. “These finishes pull

inspiration from the past and future. With tactile, sensorial finishes, Continuum fuses technology with nature, blending whites, charcoals and pops of color found in the natural environment.”

TAPESTRY

“Vivid hues and finishes influenced infuse color through layers of pattern and texture. Maximalist metallics and jewel tone finishes.”

www.wood.sherwin-williams.com/colormix2021

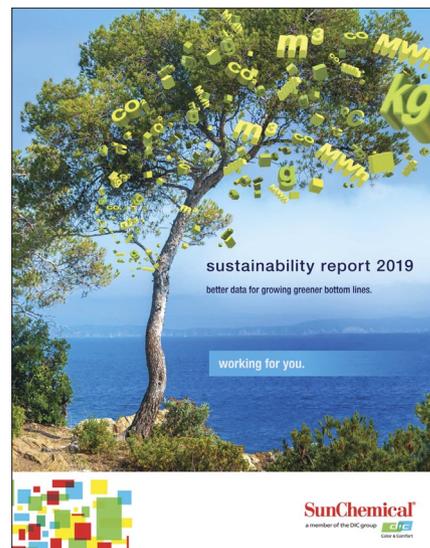
Sun Chemical Releases 2019 Sustainability Report

Sun Chemical released its 11th annual Corporate Sustainability Report in late October, for the year ending 2019.

The report describes how the company develops, manufactures and distributes its products while also showing how it works with customers and suppliers to improve sustainability goals.

Key research and development highlights include:

- a long-term strategic target to reduce manufacturing CO₂ levels by at least 30 percent by 2030



- waste reduction programs focused on improving the utilization of incoming materials, promoting recycling and optimizing the end of life of a product or material
- a silver corporate social responsibility rating by EcoVadis, a third-party organization that measures a variety of categories, including environ-

- ment, labor and human rights, ethics, and sustainable procurement
- partnerships with various industry associations and consortia focused on large-scale sustainability objectives
- products that are developed with bio-renewable raw materials
- solutions designed to improve PET bottle recycling and composting

“At Sun Chemical, we understand the importance of sustainability and the demands that consumers have to ensure that the environment is top of mind in the development and manufacturing of packaging,” says Gary Andrzejewski, Corporate Vice President of Environmental Affairs. “We’re proud to be a partner that our customers can feel confident to work with, knowing that we’re doing everything we can to prioritize sustainability both in our product offerings and in our operations.”

Michael Simoni, Global Product Stewardship Leader, Sun Chemical, adds, “The 2019 sustainability report shows that we’re taking the initiatives necessary to achieve our sustainability goals and in turn, helping our customers also reach their eco-efficiency targets.”

www.sunchemical.com/sustainability/

AkzoNobel to Strengthen Paints Business with Acquisition of Titan in Spain

AkzoNobel has agreed to acquire the decorative

AkzoNobel to acquire Titan Paints –
a leading paints company in Spain



- ▶ Headquartered in Barcelona, Spain
- ▶ One of Spain's best-known brands
- ▶ Products awarded with European Ecological label
- ▶ Founded in 1917

Revenue: ~€80 million 425 employees 3 Manufacturing sites in Barcelona and Las Palmas, Spain and Mac, Portugal 8 Logistics and service centers

paints business of Spain's Industrias Titan S.A.U. Completion is subject to regulatory approvals and expected before the end of Q1, 2021.

“The Spanish market has strong growth potential and this is an excellent opportunity for us to reinforce our position in the region,” says AkzoNobel CEO, Thierry Vanlancker. “The acquisition will enable us to better serve our customers and provides added momentum, while also offering further proof of us being the reference in paints and coatings in Europe.

“The fact that a significant part of Titan's portfolio has been awarded the European Ecological label also offers exciting possibilities for com-

binning our technologies and expertise, which will result in us developing better and more sustainable products.”

Commenting on the deal, Alberto and Joaquin Folch-Rusiñol, Industrias Titan S.A.U administrators, adds: “We’re delighted to hand over Titan's decorative paints business to a global

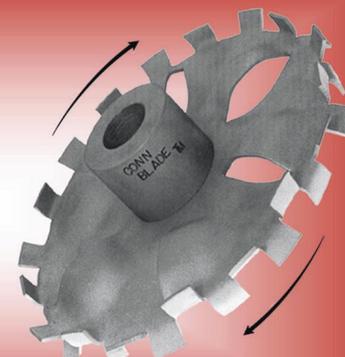
leader like AkzoNobel. We're confident they will care for Titan's legacy in the same way the family has done for over 100 years.”

Titan will provide a solid platform to further grow AkzoNobel's position throughout the region, the company says.

www.akzonobel.com

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6







AkzoNobel Boosts Powder Coatings Capacity and Accelerates Shift to Greener Production

AkzoNobel is investing €20 million to increase powder coatings capacity at its site in Como, Italy, hoping to strengthen its market position and sharpen its focus on greener manufacturing.

The Como site – already the company’s biggest plant in Europe for producing powder coatings – is set to house a major expansion for the production of automotive coatings. The new facility will provide strategic back-up for AkzoNobel’s Arnsberg site in Germany where a new line is also being added.

The extra capacity in Como is being installed in a renovated building where powder coatings were originally made. The company says it is introducing advanced equipment and technology to deliver higher productivity rates and efficiency gains, and will use recycled energy to reduce consumption.

It follows recent investments in China and Vietnam designed to install

greener facilities and production methods.

“We’re implementing a structured expansion plan to boost capacity at both our Como and Arnsberg sites,” says Daniela Vlad, Business Director of AkzoNobel Powder Coatings. “It will help to strengthen our market position and provide us with back up should we encounter supply issues.”

The building in Como and extra line in Arnsberg will help the company continue to grow with its customers, particularly in the automotive segment, AkzoNobel says.

“Although powder coatings are already inherently sustainable, we’re also committed to making our own buildings and facilities as sustainable as possible,” says Vlad. “The company has set a clear ambition to reduce its carbon emissions 50 percent by 2030 and become carbon neutral by 2050, so we’re accelerating our efforts to embrace renewable energy and introduce more smart manufacturing technology.”

www.akzonobel.com

SICO names Blue-winged Warbler Its 2021 Color of the Year

Sico is taking a cue from nature with its 2021 Color of the Year, Blue-winged Warbler (6160-52). Blue-winged Warbler is named after the North American songbird.

“While much of the world continues to shelter in place, consumers have turned to nature to receive the comfort and relaxation that they have been longing for after months of feeling unsettled,” says Martin Tustin-Fuchs, Senior Marketing Manager, Sico, a paint brand owned by PPG.

“This fresh aqua color instills a feeling of



positivity, transforming a space into a serene retreat from the world outside our doors.” Blue-winged Warbler is a combination of blue and green that creates a jade aqua tone. It pairs nicely with light creams and warm

beiges, a change after nearly a decade of smoky grays, Sico says.

The increasing need for self-care, comfort and relaxation were recurring themes at PPG’s recent Global Color Workshop. The annual event brings together more than 30 PPG global color stylists from the automotive, consumer electronics, aerospace, and home paint and stain industries. The stylists analyze the fashion runway, lifestyles, demographics, geographies, global events, and cross-cultural societal inspirations to determine what colors will resonate and represent current consumer mindsets, including the Sico paint Color of the Year.

www.sico.ca



PPG protects Stanley Cup

It is no secret that the Stanley Cup has a grueling travel schedule. Through year-round fan engagements, player celebrations and National Hockey League events, Lord Stanley's Cup is an honored guest.

With all of this wear and tear, the Hockey Hall of Fame was looking for a way to keep the black, elevated base of the Stanley Cup looking brand new, so it turned to PPG for a solution.

PPG will have applied its CORAFLOX and AMERSHIELD protective coatings on the base of the Stanley Cup beginning in the 2020 cup finals. www.ppg.com

People

Gema Welcomes New Employees to North American Team

Gema recently announced the addition of six new employees to its North American sales and



operations teams as a result of continued growth. They are:

- Jacob Argyelan, Operations Team
 - Shawn Hayes, Sales Team
 - Michael Roberts, Service Team
 - Jason Schwer, Sales Team
 - Aaron Thompson, Service Team
 - Quintin Toles, Operations Team
- www.gemapowdercoating.com

IGM Resins Appoints Key Team Member for North American Leadership

IGM Resins appointed Andre Berry as Vice President North America as Melissa Lutz steps down from her North American leadership role,

effective September 14. Berry is part of IGM Resins' Global Executive Leadership team and will report to Edward Frindt, CEO.

"Andre brings with him a track record of strategic positioning, and strong business growth and I look forward to him building on the culture of customer focus through operational excellence and advance technical product and service offerings. I am excited to welcome a seasoned industry professional to the IGM team," says Frindt.

Berry joins IGM from the Bostik division of Arkema where he held several positions of increasing strategic leadership during his 32-year tenure. He holds a Bachelor of Science (Chemistry) degree from Saint Joseph's University, Philadelphia. www.igmresins.com



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Calendar of Industry Events

February 23-26, 2021: Powder Coating Week, Orlando, FL.
<https://conference.powdercoating.org>

April 8-9, 2021: Canada Woodworking East, Espace Saint-Hyacinthe, Saint-Hyacinthe, QC.
www.canadawoodworkingeast.ca

April 28-30, 2021: Women in Finishing Forum, Embassy Suites South Bend at Notre Dame, South Bend, IN.
www.ccaiweb.com/page/WiF

May 26-27, 2021: Canadian Paint and Coatings Association Annual Conference, Quebec

City, QC. www.canpaint.com

July 13-15, 2021: SUR/FIN, Detroit, MI.
www.nasfsurfin.com

September 13-16, 2021: Fabtech 2021, McCormick Place, Chicago, IL.
www.fabtech-chicago-exhibition.com

September 21, 2021: CASF Golf Tournament, Whistle Bear, Cambridge, ON. www.casf.ca

September 28-30, 2021: ABRAFATI 2021, Sao Paulo, Brazil. www.abrafatishow.com.br

November 4-6, 2021: Woodworking Machinery Supply and Expo, Mississauga, ON.
www.woodworkingnetwork.com/events/woodworking-machinery-supply-conference-and-expo

April 5-7, 2022: American Coatings Show, Indianapolis, IN. www.american-coatings-show.com

April 26-29, 2022: PaintExpo, Karlsruhe, Germany. www.paintexpo.com

June 2022: Fabtech Canada, Toronto, ON.
www.canada.fabtechexpo.com



2021 Acura RDX Finished in Thermal Orange Pearl Paint

Acura is giving its top-selling SUV a dose of NSX supercar DNA with the creation of the 2021 RDX PMC Edition, a vehicle hand-assembled by technicians at Acura's Performance Manufacturing Center (PMC) in Ohio. Only 30 units will be built for the North American market, each using PPG's Thermal Orange Pearl paint, shared with the electrified NSX supercar. Deliveries begin in November.

Exclusive to the RDX PMC Edition are other special coatings: gloss black alloy wheels; a body color grille surround; black chrome exhaust finishers;

and gloss-black treatment for the roof, side mirrors and door handles.

Once the body-in-white arrives at PMC, each RDX PMC Edition is finished in the Thermal Orange Pearl paint, a premium paint offered on NSX since 2019. The paint is applied using PMC's advanced robotic paint system in multiple base coats to enhance color intensity. Next, a mid-coat of gold and orange mica is applied, giving off a pearlescent effect in the sunlight. Lastly, four layers of clearcoat are applied to increase the paint's luster and protect the finish. The total time in paint, including curing, is five days.

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Current Paint and Coatings Issues in Canada

BY GARY LEROUX

CANADIAN COATINGS MARKET UPDATE – FALL 2020

Shortly after the start of the economic lockdowns in April a CPCA Affiliate Member, Orr & Boss, provided CPCA with a forecast on the Canadian coatings market for 2020 and its recovery into 2021. Given the economic volatility caused by the pandemic, Orr & Boss recently updated the outlook.

In general, the new forecast is slightly more optimistic for the Canadian paint and coatings market than at the outset of the pandemic, driven by the strong architectural DIY sector. Residential construction activity returned to pre-COVID levels igniting new contract painter business and as homeowners began to allow contractors in their homes, further increasing paint sales. As a result, paint manufacturing activity is recovering faster than expected.

Overall, total volume and value is expected to be down about 3 percent for the year, before rebounding next year to the tune of 3.5 percent for volume and 6.1 percent for value. However, the market is quite volatile and these numbers obscure some of the realities experienced by specific sectors. The largest segment, architectural coatings, had a good year, up 4.3 percent in volume and 7.1 percent in value. With homeowners staying home and spending less time traveling, eating in restaurants, or at other entertainment options, many have focused on upgrading their homes.

Other non-architectural industrial coatings segments have not been as strong. The auto-OEM market is down significantly as it is closely tied to the number of new automotive builds in Canada, which are down 43 percent through June of this year. The auto-refinish market is similarly down, as it correlates directly with the number of auto accidents, which have decreased because of reduced traffic and congestion with many working from home. In fact, major Canadian cities have traffic congestion levels 32 percent below September 2019 values. Other industrial coatings segments such as powder coatings are largely driven by manufacturing activity. Canadian manufacturing activity is slowly returning to pre-pandemic levels but as of August it is still below last year's levels. Orr & Boss forecasts that manufacturing activity will continue its upward trajectory in the coming months and by year-end will be above last year's level.

Overall, it has been a difficult year for many in the coatings sector, especially those companies supplying the non-architectural and industrial coatings markets. Industry leaders are hopeful that the worst is behind them as the initial shock of the recession and its associated operational changes have faded. Also, there continue to be growing opportunities in various coatings markets such as antimicrobial and anti-viral coatings. Assuming further lockdowns do not significantly affect manufacturing recovery, the sector as a whole should continue trending upward into Q4 of 2020 and materialize into some growth, however modest, in 2021.

CANADIAN ENVIRONMENTAL PROTECTION ACT

CPCA contributed to the Industry Coordinating Group's (ICG) formal submission to the federal government on industry's real concerns with the prospect of CEPA reform and the continued functioning of chemical assessment under the CMP during the COVID-19 pandemic. ICG is comprised of more than 20 associations representing companies in the chemical industry. In July 2020, the federal government assured ICG that work on CEPA reform and renewal of the Chemicals Management Plan (CMP) was continuing.

There have been a number of legislative timelines pushed back in Canada and throughout the world due to the pandemic. Hence, government reached out to industry to determine if any of these changes affected industry's views on possible CEPA reform or CMP renewal. CPCA supports the wider chemical industry position that the flexibility of CEPA allows more effective chemical assessment under the current legislation, especially if accompanied by appropriate policy innovations. The ability to evolve and set new targets is already built-in to the chemical assessment process in Canada with the focus on risk assessment, which has made the CMP among the best in the world for assessment.

Industry urged government to focus on completing the work already committed to under the CMP process and any proposed changes should be consistent with the many efforts made to date both for chemical assessment and risk management. Industry encourages the federal government to explore new directions, which can easily be accommodated without any changes to the CEPA statute.



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GOVERNMENT SEEKS TO ADD PLASTICS AND MICROPLASTICS TO LIST OF TOXIC SUBSTANCES

Earlier this year, the federal government published a Draft Science Assessment of Plastic Pollution that recommended taking action in accordance with the precautionary principle, to reduce macroplastics and microplastics that end up in the environment. The impetus behind this initiative remains the Liberal government's comprehensive agenda to achieve zero plastic waste and eliminate plastic pollution by 2030. Voluntary and non-regulatory measures alone were determined to be insufficient and regulatory measures would require an amendment to the Act, CEPA. The Proposed Order to amend the Act has now been published with the recommendation of adding "plastic manufactured items" as a broad CEPA-Toxic category to Schedule 1. This is an action that enables Ministers to propose risk assessment and risk management measures for chemicals in commerce.

However, "plastic manufactured items" is, by far, a much too broad an approach for consideration under Schedule 1, which generally includes "chemicals" used in a wide range of products, not "manufactured" items. For the coatings sector, the main concern remains microplastics on which further scientific research is needed, as admitted by the government's Order. During the summer, many industry associations – including CPCA – joined in efforts urging against this particular action and for government to adopt more appropriate strategies to address plastic waste pollution. If not, industry pointed out the huge detrimental trade impact this would have on numerous industries, potentially leading to bans or use restrictions that would hurt Canadian businesses and cause regulatory misalignment with our largest trading

CHECK OUT

partner. Industry proposed a pan-Canadian provincial approach, which includes full consultation for these regulations as many parts of the world are still grappling with the current public health emergency where single-use plastics currently play a critical role in preventing further spread to vulnerable populations.

CHEMICALS ASSESSMENT OF COATINGS CHEMICALS CONTINUES

Several substances and groups of substances have been assessed under Phase 3 of the CMP, which resumed publications this summer after being temporarily halted at the outset of the pandemic. The operational burdens placed on many stakeholders by the pandemic mean that government initially prioritized assessments with non-toxic conclusions. Among the chemical groups with implications for the coatings sector, and of greatest impact, was the Final Screening Assessment (FSAR) for the Epoxides and Glycidyl Ethers Group. None of the substances in this group were found to be toxic but Significant New Activity provisions were proposed for three of those implicated in paint and coatings due to several new uses for the substance in the coatings sector. The final screening assessment report for the Poly(amines) group contained six substances implicated in CASE products, none of which met the toxicity criteria under CEPA. The preliminary Draft Screening Assessment for the Aromatic Amines group concluded that dimethylaniline, which is used in coatings, meets the toxicity criteria and a risk management scope was published to reduce skin and inhalation exposure to this substance from automotive adhesives and sealants.

The other substances in the group are not proposed to be toxic, although new activity provisions will be considered for two of them in the future if used in different quantities or circumstances than previously reported

by industry. Draft screening assessments for the following groups containing CASE-implicated substances were also published and found to not meet the toxicity criteria, with no follow-up activities planned at this time: Silver and its compounds, Thallium and its compounds, TMSS, Alkanolamines and Fatty Alkanolamides. This is a welcomed outcome for the coatings industry in Canada.

PERFORMANCE EVALUATION REPORTS REVEALS INDUSTRY IN COMPLIANCE

Several performance measurement evaluation reports for chemical substances and groups found to be toxic under CEPA have recently been published as part of the federal government's strategy to measure the effectiveness of risk management instruments and to help inform the public of possible residual risks. Each evaluation compares the current state of a toxic substance with its state before risk management tools were implemented and determines whether objectives were met, or if further action is required. The recent publications refer to Bisphenol A, Isoprene, Lead, 2-Butanone Oxime (MEKO), Mercury, Poly-brominated Diphenyl Ethers (PDBEs), and Pigment Red 3. With the exception of the report on MEKO, all other performance measurement evaluation reports for health and environmental concerns concluded that the risk management objectives were being successfully met with no further regulatory actions required. Regarding the MEKO report, CPCA has been engaged with Health Canada officials to obtain changes to the wording and tone of the public online report to further recognize industry's compliance efforts and reformulation challenges due to a lack of viable alternatives. ■

Gary LeRoux is President and CEO of the Canadian Paint and Coatings Association. www.canpaint.com

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Canada's Source for News & Information in Surface Finishing

BY BOB SMITH

This edition of Canadian Finishing & Coatings Manufacturing Magazine should hit your desks sometime before the end of 2020, the year of the pandemic. As I write this, the news on the pandemic front is getting quite gloomy with 700 new cases of COVID-19 yesterday in Ontario – the most in a single day since the start of the pandemic – and 799 in Quebec and believed to be rising. Thankfully, notwithstanding the difficulties those affected are dealing with, most businesses in our collective industry group are enjoying a full or mostly full return to a pre-COVID scale of activity. In meetings with industry leaders across North America it seems there is a confidence, backed up by order sheets, of an almost full return to work, which has to be excellent news for all. If the current ramp up of the pandemic is kept under control, this could signal the beginnings of a far better year in 2021 for Canadian business.

There are no new pressing regulatory matters at the moment that have not already discussed in my previous columns. This, of course, is very good news for all the Environmental Management staff out there working diligently to keep up with the stream of updates and requirements in this area. If you need any help in this regard, we have CASF board members and members at large as well as our professional service provider group who are all here to help. Call on us at www.casf.ca.

Due to the fact that we are in a time defined by this pandemic, even September's Throne Speech did not really touch on environmental regulatory matters, as there is still a large focus on protecting Canadians from the Pandemic. As it stands now, we continue to engage with our government partners to monitor regulatory proposals that will change our members' compliance obligations. This includes, but is not limited to NPRI (National Pollutant Release Inventory), Metal Finishers Industry Standard, OBPS (Output-based Pricing System), EPS (Emissions Performance Standards - new to Ontario), chromium regulations, PFAS/PFOS, water taking, (refers to gaining government approval to draw groundwater from wells), hazardous waste, and others.

One issue of emerging great concern for medium-to-large businesses in Canada is the pending but inevitable introduction of the Canadian Fuel Standard (CFS) that is destined to become a large and additional drain on the cashflow of Canadian industry. Industry can expect a double-digit percentage increase in energy costs, just to start, that will quickly increase. The increase is justified, according

to government spokespeople, because these costs will simply be passed downstream, but industry experts cite the possibility of passing this level of burden down to customers, especially OEM automotive customers, as an impossible dream and say they fear many of them already operating on slim margins will get pushed over the edge. The plastics industry and the oil and gas industries will be hit very hard by this legislation but so will all industries whose members are readers of this magazine.

Jonathan Wilkinson, the federal minister for environment and climate change, has been quoted as saying the CFS will diversify the economy and promote investment in clean solutions. But many who will bear the brunt of this new tax are less enthralled. Although the government says this new CFS is complementary to the carbon tax, it is actually in addition to existing carbon pricing. John Ivison, writing in the National Post, quotes Bob Masterson, President of the Chemical Industry Association of Canada, as saying the CFS "Will be a disastrous policy."

Wilkinson is said to have requested an internal study to find out the break point – the price beyond which people would be motivated to move away from fossil fuels. Figures released last year show that Canada is on course to fail to meet its Paris Agreement target by 77 megatonnes or 15 percent in 2030, but in his mandate letter, the Prime Minister urged Wilkinson to meet or exceed that target and Wilkinson has been said to have taken that message to heart. Certainly, for Canada to even meet, let alone exceed its Paris target, Ottawa will have to curtail the expansion of the oilsands and more. We have heard of cases of industry-involved readers of the CFCM magazine who are in the process of appealing this pending economically crushing legislation, and we are following that closely.

In good news, the Institute for Supply Management, (ISM), has reported that U.S. manufacturing activity accelerated to a near two-year high in August, aided by a surge in new orders. Employment remains low but this is the natural delay which is being closed by the increase in new business and has strengthened expectations for a significant end to the third quarter.

CASF is in the beginning stages of planning an online "Introduction to Electroplating" course either in the Fall or early in the New Year. The course and exam, which ran for 1.5 days last Fall concurrent with our CASF Conference, and which earned the successful attendees a certificate of accomplishment, proved to be very popular and we have



had a lot of interest. With the continuing pandemic and travel restrictions, we are working out the details of running the course online.

We also feel the benefits of an online course will be reduced travel costs, elimination of the hotel and meal charges, and make taking this valuable educational course easier to access for those interested located in all parts of Canada and beyond. Details are being firmed up and if you have interest or have employees who wish to improve their value to the company, please see our website for details shortly.

I have mentioned the Orr & Boss Economic Impact Study on our Surface Finishing Industry several times in these columns and many of you have shown interest in the content of that report. Starting in our next CFCM column, we will be serializing this material and sharing it with you. We encourage feedback from you and this can best be done on our website.

Also, of great interest to us and hopefully to you too, is an upcoming CASF Survey of our members. This has been a subject of interest for us at our last two Board meetings. We will be trying to focus in on your biggest concerns and how we can help you with them. We make assumptions all the time and sometimes we are wrong, and we feel that if we give you the opportunity to tell us what's on your mind, whatever that is, you'll do that, enabling us to better serve your needs.

CASF Board members are all volunteers but are always here for you. Our members across Canada and beyond value our advocacy on their behalf at all government levels including our relationship with the MOE. That advocacy can be seen as we recognize regulatory changes, understand their potential impact on your business and support you in managing change as a result of that emerging legislation. We are also closely involved with authorities in advising on and compiling Technical Standards that directly affect our industry. If this, and other support and programs are something you think your company can benefit from, please give us a call and join us by visiting our website. ■

Bob Smith is President, Canadian Association for Surface Finishing (CASF), www.casf.ca

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Preventing Masking Caps and Plugs

from Blowing Out During Curing

BY LEE LECHNER

TORNADOES CAN HAVE SPEEDS of up to 300 mph. That's the same speed your plugs go when they pop out during the baking process! Just kidding. It isn't that fast, but it may look like a tornado went through your curing oven if you're not using a cap or plug designed to withstand intense internal pressure. Don't let your oven look like a wasteland. You can avoid this type of disaster in the future with some simple fixes.

WHY DO PLUGS AND CAPS POP OUT?

When you're plugging a pipe or some other component that is open on one end and closed on the other, there is no room for air or gas to escape. This causes the internal pressure to build up during high-temperature baking, ultimately resulting in the dreaded pop (your plug popping out).

Tapered plugs are the biggest culprit for popouts. Why? It comes down to the amount of surface that the tapered design grips onto. Unlike a pull plug where most of the plug is 'grabbing' onto the surface keeping it firmly in

place, the tapered plug design only allows for a fraction of the plug to grip to the surface. This means that it's much easier for the plug to pop-out once pressure builds.

THE SCIENCE BEHIND PRESSURE

When gases, liquids, and solids are heated, they expand. When the gas is heated in a closed container (like an air reservoir tank), the particles collide with the sides of the container, resulting in pressure. The greater the number of collisions, the greater the pressure buildup becomes. Enough pressure can result in unwanted results, such as something as simple as a silicone plug popping out.

PREVENTING CAP AND PLUG BLOWOUTS STANDARD VENTED PLUGS

During the curing process, the vent in the plug allows internal pressure caused by high heat to escape. It does this by having a small slit (the vent) that opens when pressure builds up and gases push outward. This means no more plugs popping out.



Graphic demonstrating plug blowing out due to pressure buildup.



Silicone Vented Tapered Plug.

During the coating process, external pressure, like your powder paint or e-coat, pushes on the plug. But won't paint or dirt go through the vent as well? No. There is extra buildup material placed around the slit on one side that comes together as pressure pushes on it. This results in the slit closing even tighter, protecting your part from paint and debris. The slit only opens when pressure pushes gases outward during the baking process.

CROSS-VENT PLUGS

Putting your parts through a shotblast application? We've literally had customers pour out blast media to show how badly standard vented plugs perform during blasting.

Because they weren't designed for that, a new breed of vented plugs was developed called "cross-vent plugs". There is still a vent integrated into the design but the difference is that there is a top section with a cross-vent area that protects the inside vent but also allows pressure to escape during the curing process.



Cross Vent Masking Plug.

POP-PIN VENTS

Pop-pin caps and plugs are an excellent way of keeping coating out while releasing pressure buildup. Customers use these types of caps and plugs during tricky processes, like e-coat.

When pressure increases, the central "pin" releases the air. During this time, the air being released prevents liquids from entering the part being coated or washed. Once the pressure is low enough, the pin returns to its original setup and seals out pretreatment and paint.



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MASKING



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Internal vent implemented into a masking cap.



Overmolded Threaded Plug.

INTERNAL BARBED VENTS

These are meant specifically for cap applications during powder coating processes. The spline vent feature gives the ability to release pressure during the entire process.

These types of caps require a solid foundation of engineering design and tooling design to manufacture effectively. This feature is not as common in masking, but can be used in ex-

treme scenarios where nothing else has worked.

OVER-MOLDED THREADED PLUGS

If the surface you're masking is having issues with plugs blowing out and it involves a threaded hole, you can't go wrong with an over-molded threaded plug.

This is a great option as it would

take an immense amount of pressure for these to blow out. You're also able to tighten the plug as needed to ensure an effective seal.

The drawbacks of this option will be the amount of time needed to install and remove them. They will also be slightly more expensive than the other all-silicone options due to the addition of a metal bolt.

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EXPANDABLE CAPS

These are some of the more highly engineered masks that powder coaters and e-coaters will come across. Expand caps/plugs combine high-temperature resistant plastic with silicone rubber in a way that expands when the handle is pulled down in order to seal the metal from having any e-coat leak in, while also preventing it from popping off.

While this does make them a more expensive option, it's more than worth the price due to the cost savings from minimal installation and removal times and a decrease in rejection rate.

QUICK FIX SOLUTION FOR CAPS

If you're having issues with your standard silicone caps popping off during powder coating, one quick solution is making a very small slit or poking a hole in the top of the cap. This will allow pressure to escape, preventing po-



Expandable cap that grips onto tube as the lever is pressed down, resulting in expansion of the cap's internal area.

tential cap blowouts.

Won't this result in powder getting in? If you poke a large hole, then yes. But, the nice part about using rubber is that a small enough hole will result in the rubber still closing

If you're having issues with your standard silicone caps popping off during powder coating, one quick solution is making a very small slit or poking a hole in the top of the cap.

upon itself while you apply powder to your part, while also giving it the ability to release pressure as it goes through the baking process.

Caps and plugs do pop out, so you're definitely not alone. Luckily, there are options such as vented plugs, even for larger-scale coaters. There are plenty of different designs you can explore using, each with its own pros and cons. ■

Lee Lechner is Digital Marketing Specialist, Echo Engineering.

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Setting Up for **Success**



Left: CO2 snow blast cleaning device offers parts cleaning suitable for all industries.

THE PRETREATMENT PROCESS is designed to prepare a product's surface for painting, plating or other types of industrial finishing, and is probably one of the most important processes on the way to a finished product. If a plant is applying paint or powder, it allows for the proper adhesion of the coating to the substrate and sets up the long-term success and durability – or not – of that coating.

The surface cleaning process removes unwanted layers or particles from component surfaces. This can be done in a variety of ways such as CO2 blasting, dust removal/ionization, water-based cleaning, or degreasing.

MECHANICS

Venjakob's CO2 blasting machines can be used as a standalone solution or installed upstream into existing processes. The company recommends this process for guaranteed residue-free cleaning of components and thus flawless coating.

CO2 blasting can be done by snow blasting or using dry ice on small 3D parts to large workpieces in large batches.

With snow blasting, a cold burner produces its own dry ice from liquid CO2. The cleaning blast consists of a mixture of CO2 snow particles, CO2 gas that's not converted into particles and compressed air.

Dry ice cleaning works in a way that's comparable to abrasive blasting or hydroblasting. Solid CO2 pellets (solid carbon dioxide, often referred to as "dry ice pellets") are used rather than water, sand or other abrasive materials. Made from a mixture of compressed air and dry ice particles, the cleaning jet hits the surface to be cleaned at high speed. It is suited for metal, plastics, glass, ceramic, and building materials.

TTX offers all sorts of multi-stage pretreatment equipment. Using spray, immersion or a combination of pretreatment methods, dirt, oils and contaminants are removed from the product's surface and phosphate or conversion coatings are applied to help prevent corrosion and increase paint adhesion, the company says.

Systems can be customized to suit any electrocoating, powder coating, liquid spray-painting, cleaning, pretreatment, or heat-treating operation.

Pretreatment systems are PLC-controlled, have automatic startup and shut down programs and are designed with computer-aided rinse ratios allowing reduced water usage and in some cases, a zero discharge system, TTX says.

Once a workpiece is clean, it will likely undergo a surface activation process.

Many materials don't have the necessary surface tension for further processing such as bonding and coating, Venjakob says. Potential reasons include surface imperfections resulting from flaws or pores or possibly the chemical composition of the substrate, which may result in substance or processing aid diffusion on the component

surface, ultimately leading to nonpolar (low-energy) surfaces. Activation, which refers to the modification of the component's top molecular layer, can convert these nonpolar (low-energy) surfaces into polar (high-energy) surfaces, making these activated surfaces more wettable for improved coating.

The company offers components for flame silification, plasma or flame treatment surface activation.

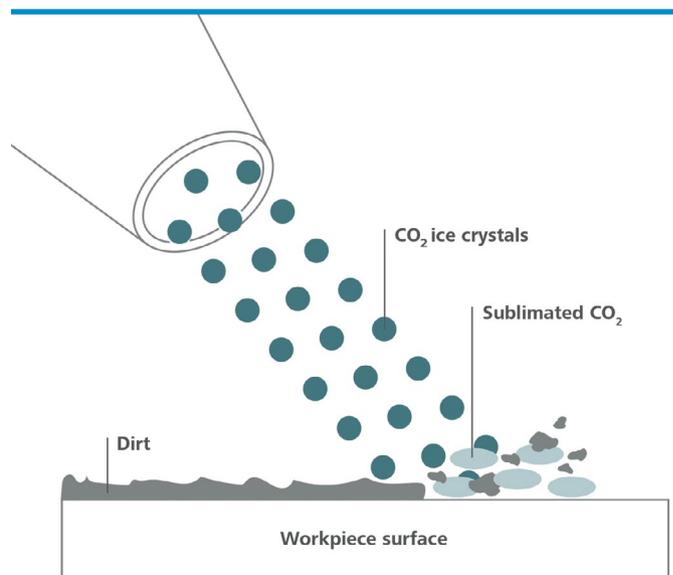
With flame treatment, plastic workpieces are flame-treated with a gas burner prior to coating to improve the surface tension, Venjakob says. Not a form of heat treatment, flame treatment relies solely on the chemical effect of the gas flame.

This breaks the molecular bonds in the surface of the treated substrate so that oxygen and oxygen-containing groups can attach themselves to the broken chains. "In this way, polar groups are generated in the originally nonpolar material that enable the reliable adhesion of printing inks, coatings, adhesives, and more," Venjakob says. "The development of polar groups increases the surface energy of the treated substrate, which can also be measured."

CHEMISTRY

PPG offers a line of pretreatment products such as multi-metal safe cleaners, ambient temperature cleaners, iron, zinc, and ambient temperature phosphates, as well as thin film treatments that strengthen and protect metal substrates, the company says.

The PPG VERSABOND Pretreatment is a fast, kinetic-efficient zinc-phosphate pretreatment system that improves corrosion resistance on mixed-metal substrates. PPG says manufacturers realize the benefits of extended bath life, reduced sludge and lower processing temperatures.



Operating principles of CO2 blasting technology.

PRETREATMENT AND WASHING



Venjakob's VEN ACTIVATE FLAME flame treatment unit for activating workpiece surfaces prior to coating.

PPG X-BOND Pretreatment is a zirconium-based, thin-film pretreatment system that prepares steel, galvanized steel and aluminum substrates for paint adhesion. With performance equivalent to that of iron phosphates, it provides corrosion resistance and is compatible with low application temperatures.

Henkel's Bonderite division offers

multiple options in conversion coatings for metal pretreatment in dip or spray applications.

"Our extensive technology range covers traditional conversion coatings, but also new generation coatings as green alternatives to conventional phosphating processes," Bonderite says.

The company says its Zirconate coating range offers new pre-treatment solutions as a substitute for zinc and iron phosphating. The thin-film conversion coating provides paint adhesion and corrosion protection, while



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reducing environmental impact. It is suitable for multi-metal conversion (steel, zinc, aluminum) and can be applied using dip and spray methods.

The range includes a phosphate-free, liquid pre-treatment based on trivalent chromium and zirconium for the treatment of steel, galvanized steel and aluminum surfaces; and an innovative liquid cleaner / coater designed for ferrous material, aluminum, zinc and alloys, which creates a strongly adhering, zirconium-based conversion layer for various types of paint.

The process is fast and can be done at room temperature, Bonderite says.

No matter how you slice it, clean workpieces are essential to the success of downstream processes such as paint or powder coating, and form the foundation for high-quality coating. An optimal process can be achieved by adjusting a few parameters individual to each business. ■

Powder Coating Pretreatment Tips

The pretreatment process requires three steps: cleaning, rinsing, and chemical conversion of the surface.

Cleaning removes soils, oils, oxides, smut, and contaminants. Factors to consider include accurate levels to improve soil removal, decrease the cleaning time and provide an optimum surface for the phosphate layer. Titration readings measure the total alkalinity or acidity levels. Increased temperatures will improve the action of the detergent and allow for less time in the cleaning process. Sludge or soil build up in tanks should be monitored as it will reduce the cleaning activity even with good titration readings.

Rinsing removes any remaining contaminated solutions from the surface while diluting the chemicals to stop their action. It also adjusts the pH for the next step.

Chemical Conversion of the surface commonly includes iron phosphate for ferrous metals, zinc phosphate for ferrous metals, chromate conversion for aluminum, or manganese phosphate.

Conversion coatings are a complete film which changes the physical and chemical nature of the metal surface. These coatings deposition weights are measured in milligrams and are grey to blue iridescence or blue to gold iridescence. A clean surface is required for the reaction.

Seal with a neutralizer to stabilize the conversion coating. The temperature of the rinse increases the solubility of the residues and improves dry time. Proper flow patterns and rinse volume promote a more thorough rinse. Overflows and screens are used for the removal of the soils, oils, and other contaminants.

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Today's surface finish testing instruments can detect all kinds of blemishes and imperfections – and also confirm that your process is running well



Konica Minolta's CM-26dG spectrophotometer.

CHECKING THE SURFACE of finished parts for regularity and smoothness is a critical step in any process where appearance is important. This applies all the way from mass-production systems, such as automotive plants, down to body repair shops, as well as in construction where coating quality and appearance are significant factors.

Today's measuring instruments can perform at levels rarely claimed, let alone achieved, just a few short years ago. This is desirable not only to ensure the quality of a finish, but also for making sure that a production line is not using too much material, and therefore quietly running up costs.

Rapidly improving algorithms drive much of today's hand-held instrumentation. Components have also been miniaturized to an increasing degree, often making the devices lighter than a cellphone. Add to this improved er-

gonomics, and it becomes clear that finish testing is a far less hit-and-miss business than it used to be.

There is a broad selection of finish testing devices on the market today, and new variants are launched all the time. DeFelsko's PosiTector range includes the model SPG, which is a surface profile gauge for blasted steel, textured coatings and concrete profiles. Surface profile gauges use a digital depth micrometer to measure and record peak to valley surface profile heights in preparation for the application of coatings.

As with the rest of the interchangeable PosiTector range, any probe produced by the company can be fixed to a single gauge body. This model can produce over 50 readings per minute, which is useful for large surfaces.

It can connect via USB, Bluetooth or WiFi to a PosiSoft PC, an Apple computer, or Smartphone software. It is



DeFelsko's PosiTector SPG measuring device.

designed to be resistant to solvents, acids, oil, water, and dust.

The PosiTector LPD and HHD units can help ensure there are no defects or discontinuities present that expose the substrate, after a protective coating has been applied. Small areas of thin or missing coating, known either as “pinholes” or “holidays”, can become foci for corrosion, and can seriously reduce the life of a protective coating system. A holiday detector is a non-destructive instrument used for detecting these discontinuities.

The low voltage (wet sponge) LPD are typically used on coating systems less than 500 µm (20 mils) thick. High voltage spark testers, like the PosiTector HHD, operate at voltages up to 35,000 volts and are typically used on coatings more than 500 µm (20 mils) thick.

Environmental conditions during pre-treatment and application of a coating system are major factors af-

fecting the long-term performance of coatings on steel structures, and PosiTector meters can be used to monitor environmental conditions before, during and after painting. An electronic Dew Point Meter (DPM) determines the likelihood of dew forming on structures being painted.

Additionally, the PosiTector IRT infrared thermometer is a non-contact gauge that uses a button-activated laser pointer for accurate targeting. It offers seven pre-set material options, and the user can select a custom emissivity value, or adjust to a known temperature.

The Statistics Scan mode on the instrument continually displays and updates average or standard deviation, minimum-maximum surface temperature, and number of readings, while measuring one reading per second.

Elcometer hails its model 311 Automotive Paint Meter as being the fastest automotive paint gauge on the

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An Elcometer model 311 being used to check a car's paint finish.

market today. It is used to instantly measure paint thickness and provide an indication of the overall condition of paint work.

The unit, the company says, “allows the user to quickly identify vehicle’s damage not reported in public or commercial condition reports.” This can include hidden rework, vehicle impact damage, vehicle respray or filled body panels.

The gauge offers a reading rate of over 60 readings per minute, which Elcometer says significantly reduces inspection times. It also measures coatings on steel.

It features an ergonomic design, important for workers measuring vehicles all day, and has

automatic temperature compensation to measures accurately in desert or alpine conditions alike.

An automatic rotating display allows a user to read the thickness value on horizontal and vertical surfaces, and an ambient light sensor automatically adjusts the screen brightness to current lighting conditions.

It is proof against dust and water, with a design equivalent to IP64, and is thus capable of measuring in wet or dry conditions. It features large, easy-

to-read values in mils and microns, and has a scratch-, solvent- and water-resistant color display for protection against accidental damage.

A similar product, the Elcometer 500, performs equivalent testing on concrete and similar substrates.

Fischer Instruments’ MMS Inspection SPG (surface profile gauge) determines the profile of a surface precisely and quickly. Users can tell immediately whether the reading is within the specification or not by means of an LED light, a sound and vibrations. The profile measurements comply with ASTM 4417-B and SSPC-PA 17, among others.

The unit’s ergonomic design and four function keys make it easy to operate with just one hand, even when wearing gloves. A dustproof and waterproof housing (IP65) protects the surface profile gauge.

There is full oversight of the measurement via LED, sound and vibration. The high-contrast, automatically rotating display is reportedly easy to read even in poor lighting, and the unit is available with large memory, offering 250,000 values in up to 2500 batches. It has a USB interface for fast data transfer.

Standards in the automotive indus-

try are very strict. Car exteriors use lacquers as protection from corrosion and external damage, and these need to be checked very carefully.

Fischer’s Fischerscope HM2000 is designed simplify the determination of material characteristics such as surface hardness, crosslinking, elastic modulus and healing behavior in case of scratches.

“These lacquers are exposed to environmental influences such as extreme temperature fluctuations or moisture and salt,” the company says. “In addition, automotive coatings must exhibit a certain toughness to make them resistant to stone chips and scratches, for example in car washes. This requires the right balances between hardness and elasticity.

“Car paint has to fulfill different functions and possesses therefore various properties. A quick differentiation and determination of its properties is possible with the characteristic parameters obtained from the instrumented indentation test.”

The Martens hardness (HM) and the Martens hardness after creeping (HMCR) are values that specify plastic and elastic properties of the paint coating. The indentation hardness (HIT) test considers only the plastic portion of the material deformation. The hardness parameters provide conclusions about aging, curing, cross-linking, embrittlement through UV radiation, hardness change through temperature influences and the degree of polymerization of the lacquer.

“One of the most important advantages of an instrumented indentation test is the determination of elastic properties,” the company says. “Parameters like the modulus of indentation (EIT), elastic recovery (hIT), creep at maximum load (CIT 1) and creep at minimum load (CIT 2) can be detected using this method.”

Konica Minolta’s CM-26dG spectrophotometer works on a different principle to other surface measuring instruments. This is a portable sphere spectrophotometer with an integrated 60-degree gloss sensor

that allows distinct color and appearance measurements to be made using just one instrument. The unit's horizontal alignment means it can fit into narrow spaces.

It features a lightweight, ergonomic design to permit easy operation by both right and left-handed users, and has an optional Bluetooth and high-resolution TFT color display.

"The CM-26dG portable spectrophotometer offers unprecedented accuracy/inter-instrument agreement (IIA), usually reserved for laboratory-grade instrumentation," Konica Minolta says. "This precision will allow superior color communication throughout the supply chain from supplier to final assembly. The inter-instrument agreement of the chromaticity value (average for 12 BCRA color tiles) is within E 0.12 for the CM-26dG spectrophotometer, an improvement of about 40 percent over previous models."

The CM-26dG spectrophotometer can switch between Ø8mm and Ø3mm measurement areas for measuring parts of different sizes. In addition, it is equipped with an illuminated viewfinder for accurate positioning on patterned subjects or small parts. The instrument surfaces, which come in contact with the measurement subject, are designed to minimize subject damage, giving repeatable results.

CM-CT1 Configuration Tool software is available as a free download that allows users to create or write instrument settings as well as compile these into a file and share the data within the supply chain to ensure instrument settings are consistent. This permits filtering of stored data based on additional information (tagging), as well as image-based workflows for easy and simple usage by operators with limited instrument experience.

Every industrial operation has to

determine its particular production needs. It can be easy to select an oversophisticated solution to a relatively basic application, and equally, it can be tempting to cut corners and opt for something that delivers barely a minimum of the necessary data.

The advantage customers have at the present time is that, as shown above, instrument suppliers now provide a range of options that allow a user to customize a purchase. And, if business conditions require it, an upgrade to an existing instrument is easy to buy, rather than abandoning a serviceable but currently under-performing device.

In short, the ideal finished surface measurement instrument does not perhaps exist. But suppliers today can provide progressively more capable and easy-to-use gauges, without them necessarily having the high price tags they used to carry. ■

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Lacquers and Varnishes Make Wood Glow

LACQUERS FOR WOOD have been around for millennia, and were already used in decorative wooden art-forms in China around 1600 BC. That might make it seem like there's not much new to be discovered.

But of course, chemistry and its applications are always pushing into fresh areas. And we no longer need to rely on extracts of tree resins and insects, as the ancients did, for the raw materials.

The public, however, expects an appealing look to wooden products. It also wants practical protection for them.

Axalta has a broad portfolio of varnishes in its product lineup. A recent inclusion was its Ultraguard A UW 492X White Conversion Varnishes.

These are post-catalyzed, acid cured topcoats formulated for high build and superior performance on MDF and other wood substrates used in interior finishing. The company says they are easy to apply and offer superior film build, scratch, chemical, and moisture resistance properties.

"When properly applied with the companion undercoat,

the film properties of this system provide a tough, durable finish that passes all KCMA performance standards," Axalta states. The product is designed solely for professional application only, and while it is recommended for cabinetry and wood furniture, it is not recommended for exterior applications.

It is offered in gloss, soft gloss and satin finishes, and features an 18-month shelf-life.

The product can be tinted with approved industrial colorants such as Opticolor XP. The maximum tint load is 4 oz per gallon (three percent by volume).

Colorants must be mixed in completely with mechanical agitation before use. Users, Axalta says, should choose the appropriate sheen from the series and agitate the blend well before applying. While under agitation, the conversion varnish can be catalyzed at a rate of three ounces oz per gallon (2.5 percent by volume) with CXC4000. This must mix for five to 10 minutes or until the catalyst is thoroughly incorporated.

The company's AUF472X Ultraguard Conversion

Varnishes are post-catalyzed, acid cured varnishes formulated for high build and superior performance. They are, Axalta asserts, easy to apply and offer superior scratch, mar, chemical and moisture resistance, along with excellent UV resistance.

“This product passes all KCMA performance standards when properly applied as a self seal system or with a companion sealer,” the company says.

The finish must be sanded between coats for proper adhesion. No more than three coats at three to four wet mils per coat should be applied when it is used as a self seal system. Maximum film thickness of the total coating system must not exceed four dry mils.

Canlak, which took the 2020 prize for Best Specialty Wood Coatings Manufacturer in Canada, has a full range of solvent-based lacquers and varnishes, as well as pre-catalyzed and post-catalyzed lacquers. It also offers conversion varnishes.

“We have developed a complete line of conventional nitrocellulose products,” the company says, “with options ranging from opaque to transparent finishes. Our products have excellent non-yellowing properties, and were designed to dry rapidly.”

Further, Canlak adds, the products are all designed to respect the most recent VOC and HAP regulations. The primary areas of application are finishing of kitchen cabinets, furniture, and similar wood articles.

As one example, its Canguard Varnish Series 2358 product is a clear, acid-cured conversion varnish used as a topcoat for interior woodworking. In addition to non-yellowing properties, it reportedly offers excellent moisture and chemical resistance.

The series can be used over any of the company’s vinyl or post-catalyzed sealers. It can also be used as a self-seal system, providing high clarity. It is also claimed to be easy to sand and fast drying.

For white varnishes, Canlak has its Canguard Titanium Series 3357-1XX. This is a high solid, post-catalyzed con-

version varnish developed for a variety of interior woodwork.

This series, the company says, provides excellent hiding and is fast drying. It also has excellent flexibility and yellowing resistance as well as mar and chemical resistance.

It is specifically designed to be used over Canprime primers, but it may also be used over solid wood surfaces. Canprime is an acid cured, post catalyzed, white primer formulated for interior use on MDF and solid woodwork. Be-

cause of its overall resistance properties, Canguard Titanium is recommended for kitchen cabinets, bathroom vanities and furniture.

Gemini Coatings also has a wide range of varnishes and lacquers. A recent introduction is its Nexus products, which the company describes as “a new generation of pre-catalyzed lacquers specifically designed to combine ease of use with exceptional durability.” The products are offered in flat, satin, semi-gloss and gloss finishes.

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Lacquers for wood have been around for millennia, and were already used in decorative wooden art-forms in China around 1600 BC.

These topcoats are water clear, are stated to have excellent sanding properties, and may be combined either with a companion sealer or used self-sealing. They are formulated for kitchen and bathroom cabinetry, architectural woodwork, and fine furniture.

Their dry-to-sand time is between 18 and 22 minutes, and the formulations include a UV inhibitor. Weight solids are at 27.85 percent, and volume solids are 20.55 percent.

Gemini also produces conversion varnishes, including its 275 premium clear, high-solids products. These feature a super-high build, no HAPS and very low formaldehyde.

Weight solids are 51.4 percent, and volume solids are 50 percent. Dry-to-sand time is two to three hours.

Katilac Coatings Inc. offers varnishes with an unusually long pot-life of up to five days. Its D Series Kativar Plus is a two-component, solvent-borne, alkyd/amino resin based post-catalyzed clear conversion varnish, characterized by reported ease-of-use. Kativar Plus is specifically designed for high-end interior wood finishing such as cabinets, household furniture, office and commercial furniture and interior millwork.

D Series topcoats can be used self-sealing or in conjunction with KCI's VS4 Quickseal post-catalysis vinyl modified sealer or EK8 Katilac vinyl sealer.

Katilac's KD Series Diamond is a line of solvent borne, two-component, alkyd/amino resin based conversion varnishes. These are clear, yellowing resistant topcoats that feature fast drying and easy sanding along with reportedly outstanding chemical, moisture and abrasion resistance. The Diamond Series topcoats can be used in a self-sealing system or in conjunction with KCI sanding sealers on high demand furniture and cabinet applications.

The company's PHS Series Pinnacle HAPS-free clear conversion varnishes are a line of solvent borne, water-white, HAPS-free, two component, alkyd amino resin based clear conversion varnishes. They are yellowing resistant, and have purported high clarity combined with outstanding chemical, moisture and abrasion resistance.

Pinnacle topcoats, Katilac says, have exceptional application properties, ultra-low formaldehyde and exceptional hardness combined with an incredibly smooth feel. They are recommended for kitchen cabinetry, mill-

work and residential, office and high demand furniture.

Sherwin-Williams has a range of water-based conversion varnishes in its Kemvar range. The Kemvar products include pigmented varnishes.

Sher-Wood Kemvar LF Water White Conversion Varnish is a low formaldehyde, HAPS-free, water white conversion varnish for coating interior wood products. This product is a pale, clear, catalyzed coating material for finishing natural woods, pickled finishes, and other applications requiring good resistance to discoloration and yellowing.

"Water White LF," the company says, "offers superior performance properties for kitchen cabinetry, office and institution furniture, and other finished products requiring the benefits of a premium catalyzed coating system."

Regular Sher-Wood Kemvar Conversion Varnish, the company adds, is a fast-drying, acid cured, water-white conversion varnish for interior woodwork. This varnish can be used as a self-sealing system with reportedly excellent clarity, durability, and scratch-resistance. It also meets KCMA/CKCA standards and features a low HAPS content. ■

Introduction of Antimicrobial Wood Coatings

At Katilac Coatings, we pride ourselves on innovation. We offer a breadth of products to suit virtually all wood coatings applications. We have a comprehensive line of pre- and post-catalyzed lacquers, conversion varnishes, waterborne coatings and colour systems. At the forefront of KCI's new product introductions is an antimicrobial enhanced line of wood coatings, KCI-AMA™. These superior wood finishing products are designed, manufactured and certified exclusively in Canada. In addition to achieving the highest performance ratings, these products meet all the latest Health, Safety and Environmental Standards found across North America.

Conveniently, all KCI topcoats can be supplied with this built-in enhancement. This is a factory-built solution that is available ready-to-go. The standard performance characteristics of each topcoat remain unchanged when enhanced as a KCI-AMA™ solution. All KCI-AMA™ topcoats provide long term, dry film protection against a wide range of bacteria, mold, and fungus. They are non-leaching, non-toxic and certified for use in both Canada and the United States. Applied at the proper dry film thickness KCI-AMA™ dosed topcoats result in an antibacterial surface that provides long term protection against a wide range of pathogens including disease causing germs and viruses.

KCI-AMA™ enhanced coatings are available in waterborne, formaldehyde free, HAPs free, low VOC, as well as traditional solvent borne. Ideal for use in kitchens, schools, hospitals, restaurants, and senior care facilities. KCI-AMA™ coatings offers an unsurpassed level of durability for premium cabinetry, millwork, furniture, doors and windows.

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Our professional wood coatings are based on industry leading chemistry using the highest quality raw materials. With 40 years of experience in formulating, Dr. Richard Johnston and his staff of chemists are capable of handling even the most specialized client request for wood coatings. All products are manufactured and thoroughly tested at our production facility in Burlington, Ontario, that has been manufacturing wood coatings since 1962.

Distribution Centers

Katilac Coatings has a network of highly skilled distributors across Canada and into the US, which includes two company owned locations. All of our locations offer high quality custom colour matches, a full assortment of KCI products, as well as technical and application support.

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Opposites Attract

E-COATING – also known as electrodeposition coating, electrophoretic painting, electrocoating, and electropainting – uses electrical current to deposit paint on a surface. It works according to the “opposites attract” principle.

The process has been developed over the last 50 years, originally for applying an anti-corrosive coating over steel car bodies, says ClearClad Coatings, which offers e-coat products. E-coating is also used for a wide range of consumer goods including hardware, jewellery, giftware, and eyeglass frames.

The benefit is the ability to paint high volumes of parts with a unique combination of decoration and protection. “Material utilization is close to 100 percent,” says ClearClad. “This high production efficiency coupled with advanced quality results in lower unit costs.”

HOW IT WORKS

The e-coat process is divided into four main steps, says PPG Coating Services, which offers e-coat services.

Pretreatment: The metal is cleaned and a phosphate is applied to prepare the surface for application of the e-coat. This process is essential to achieving the performance requirements desired by product end users, PPG says. The most appropriate chemicals for cleaning and phosphating must be chosen based on the type of metal to be processed. The most common pretreatment regimen for steel and iron parts is immersion in a high-quality zinc-phosphate system.

Coating application: Coatings are applied to the pretreated metal in an electrocoat bath using precisely calibrated process control equipment. “The e-coat bath consists of 80 to 90 percent deionized water and 10 to 20 percent paint solids,” PPG says. “The deionized water acts as a carrier for the paint solids, which are under constant agitation. The solids consist of resin – the backbone of the final paint film, which provides corrosion protection, durability and toughness – and pigments, which contribute color and gloss.”

Post-rinsing: This enhances the quality of the coating and enables the recovery of excess paint. During the e-coat process, paint is applied to a part using a regulated amount of voltage to achieve the desired film thickness. Once the coating reaches the prescribed thickness, the part “insulates” and the coating process slows down. As the part exits the bath, paint solids that cling to the surface are rinsed off to maintain application efficiency and aesthetics. This residue material, which is called “drag out” or “cream

coat,” is returned to the tank, enabling the e-coat process to achieve application efficiency rates above 95 percent.

Baking: After rinsing, the part is placed in a bake oven that cures and cross-links the paint film to maximize its performance properties. The minimum bake time is 20 minutes with a part temperature at 375 deg. F for most e-coat technologies.

ADVANTAGES

One of the main advantages of e-coat, says e-coat service provider Valmont Coatings, is the ability to get into hard-to-reach places. The process ensures that any small holes, deep recesses or other areas inaccessible with conventional sprayers are evenly covered. Even the most complicated shapes can be completely coated and parts can be more densely packed on the rack to increase production rate.

“E-coat is so effective, it is often used as a primer prior to powder or liquid coating parts,” Valmont says. Products can also be coated after final assembly.

In fact, e-coat technologies are categorized according to their primary use which is generally either as a primer or as a topcoat, both of which PPG offers.

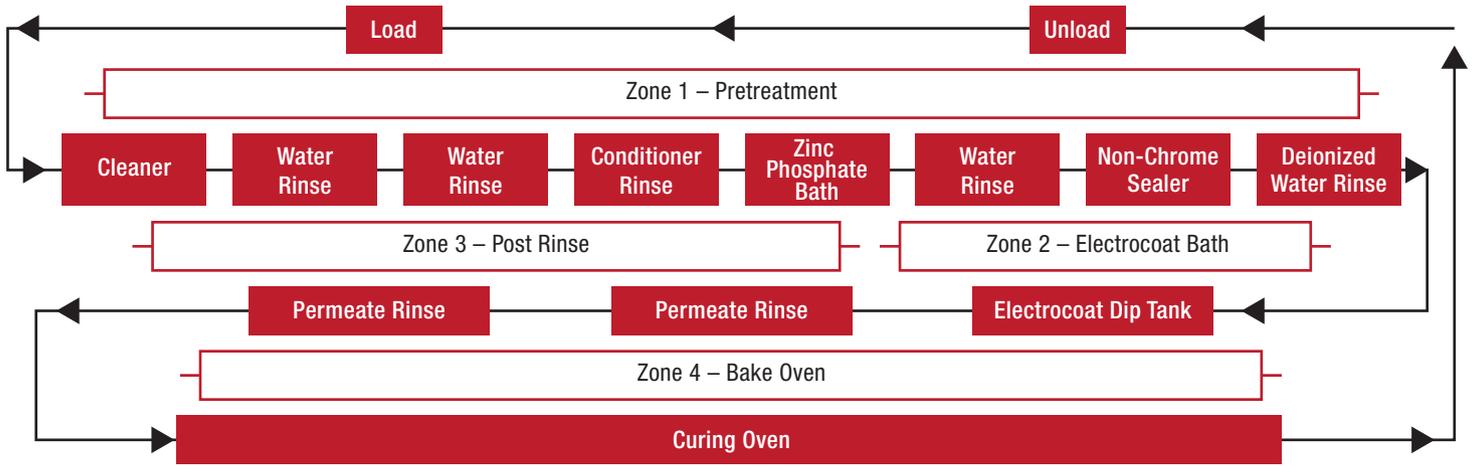
Cathodic epoxy electrocoat is a popular primer technology because of its superior adhesion and corrosion protection properties, PPG says, as well as its compatibility with a wide range of liquid and powder topcoat materials. It can also be used for single-coat applications where resistance to UV from sunlight is not a factor. The materials are environmentally friendly and suited to parts with cure temperatures above 380 F, the company adds.

Anodic epoxy electrocoat materials also are commonly used as primers because their adhesion and corrosion resistance properties are generally better than some liquid paint primer materials, PPG says. Anodic epoxy e-coat materials are well-suited to components coated as assemblies that contain heat-sensitive parts such as bearings and seals. The part temperature for curing can be as low as 180 deg. F.

Cathodic acrylic electrocoat materials are viable topcoat applications because they feature very good UV resistance, PPG says. They also perform well in single-coat applications.

Because e-coat technologies are typically restricted to a single color, PPG recommends using cathodic acrylic e-coat as the primer for liquid or powder topcoat, or as a one-coat system for a primary product color when additional color options are required

Typical Electrocoating Process Sequence



Courtesy: PPG

Another key advantage of e-coat is the electrical deposition method itself, ClearClad says. The application of electricity causes the resins and other ingredients to deposit onto the parts' surface. Controlling the electrical current enables a predictable and consistent thickness of coating to be applied. "This is essential if tinted coatings

are required such as brass or gold colors over bright nickel or zamak," where consistent color effect demands consistent thickness, the company adds.

And with a water-based process, there are no flammability issues during application or need to dry parts after water-based cleaning or pretreatment processes, says



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E-COATING



TTX has been supplying e-coating equipment since 1990.

ClearClad. Using filtration technology, rinse water can be extracted from the bath itself and used to recycle nearly 100 percent of drag-out back into the bath. This maximizes material usage and minimizes costs.

E-coat systems can deliver a wide range of finishes with a combination of performance and decorative effects, many of which are unavailable by

spray application, says ClearClad.

TTX has been supplying e-coating equipment since 1990.

The company says its Econ-E-Coat system offers high-density throughput and has similar features to its Sliderail Square Transfer system, but in a smaller envelope. Specifically designed to be portable, the modular unit can be relocated easily.

The unit features an indexing monorail carousel load/unload conveyor loop; automatic transfer from load/unload stations; automated material handling; multi-stage phosphate or conversion coating pretreatment system; immersion anodic or cathodic e-coat paint application with ultra-filtration, temperature control and rectifier; automatic paint feed based on square-feet of surface processed; a three-stage recirculated immersion post rinse; glass-enclosed pretreatment; and a bottom entry/exit dehydration/cure oven mounted above the tank section.

The unit's coating capacity is 50 to 150 square-feet per load, up to 3,000 square-feet per hour, 6 million square-feet per year, per shift.

ClearClad promotes e-coating as a high-tech, environmentally friendly coating that can be accessible to all users, both OEM and job-coaters.

"Electrocoating itself provides total coverage and is ideal for high productivity, uniform coating and low rejection rate," TTX says. ■

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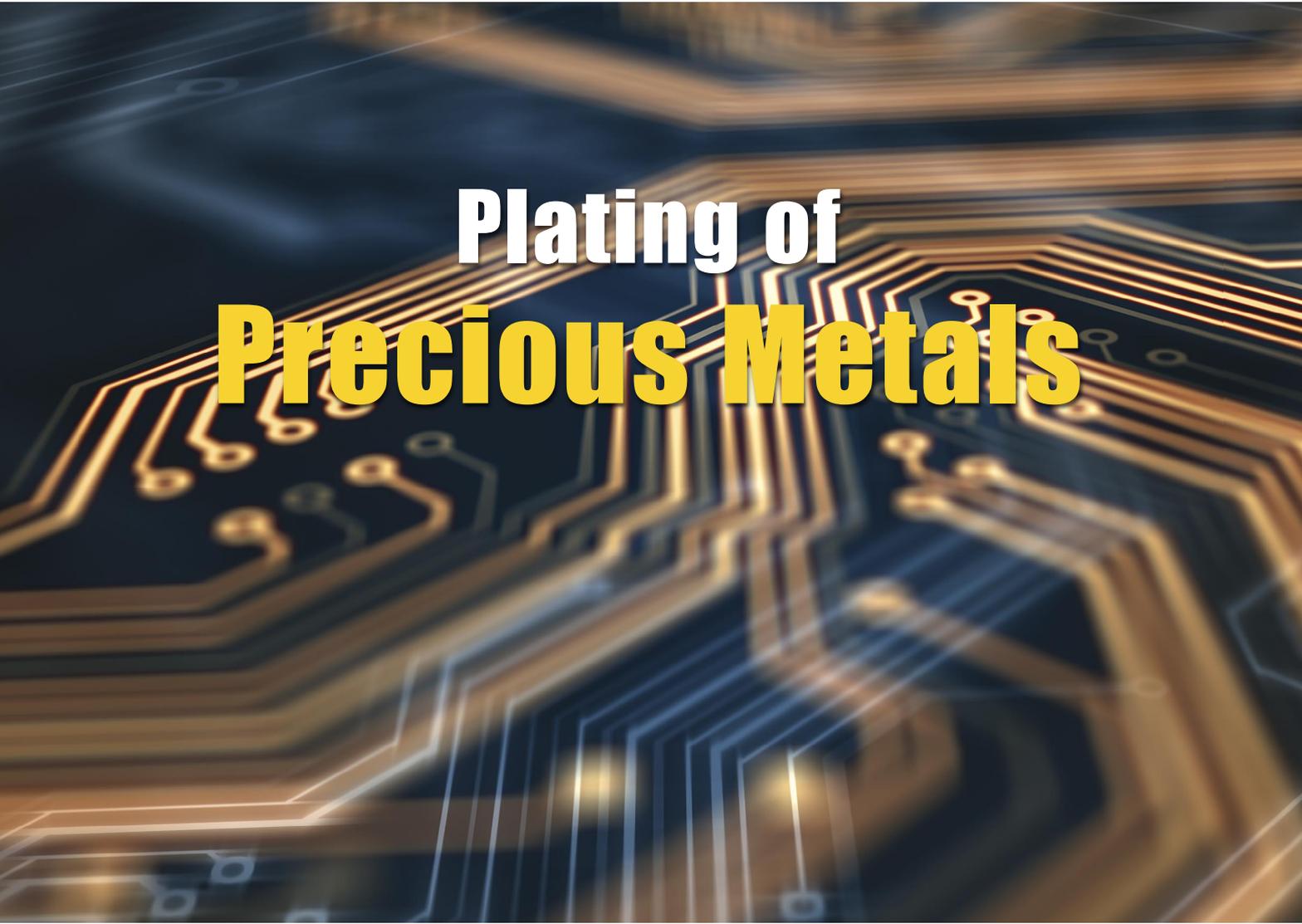


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Plating of Precious Metals

BY PAUL FREDERICKS AND JEFF LOGAN

PRECIOUS METALS have been used for centuries now for their corrosion-resistant properties and aesthetic. They have become essential for the production of engineered systems and high-tech devices, especially in the communication and electronic industry sectors.

Precious metals also have widespread applications in the automotive and aerospace industries. These metals are rare and expensive but irreplaceable because of their properties, such as high positive electrode potentials, meaning they are relatively resistant to most aggressive environments. Due to their high cost, it is necessary to closely control the chemical processes in which they are used, such as chemical surface treatment technology, to make the processes efficient and economically viable.

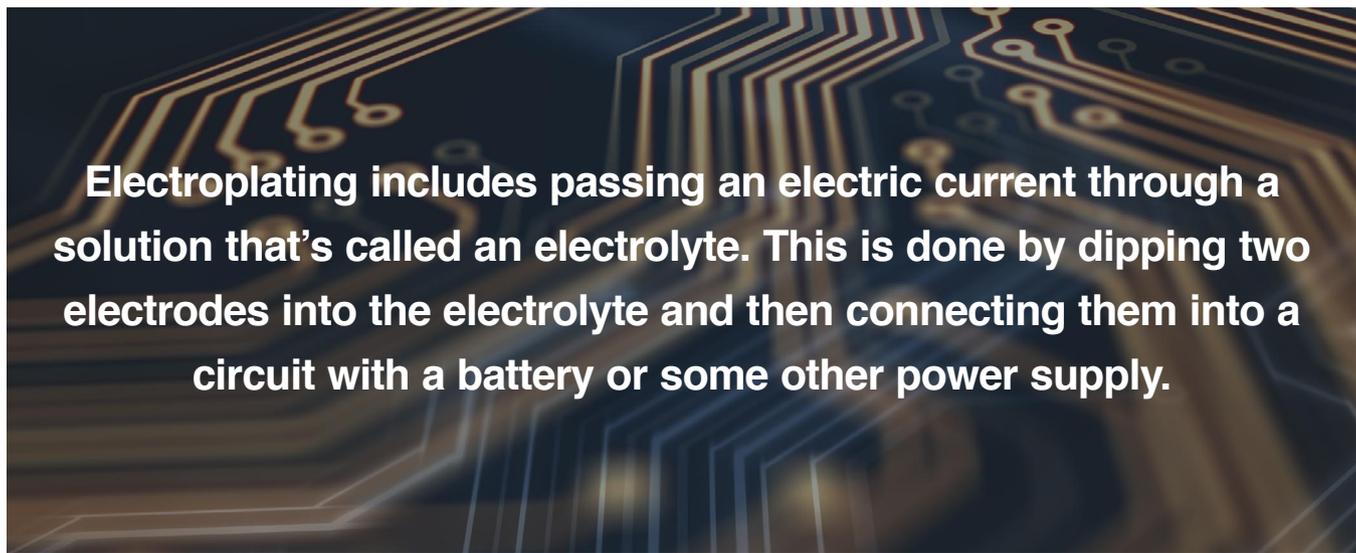
The two most common types of precious metal plating are gold and silver.

GOLD

Gold is considered malleable, practically indestructible, and completely recyclable, while also being virtually immune to the effects of water, air and oxygen. This unique combination of properties makes it an essential component in many industrial, medical and electrical applications. Gold is one of the most electrically conductive metals and is also an excellent conductor of heat or thermal energy.

Gold plating is useful for parts that need wear or corrosion resistance while still maintaining their flexibility. It has a high electrical conductivity, and it is non-reactive with other elements. Although it is the most expensive option for electroplating, it's by far the best method for securing the value and quality of your product.

Gold plating is often used in electronics in order to add a corrosion-resistant electrically conductive layer to copper, usually in printed circuit boards and electrical connectors.



Electroplating includes passing an electric current through a solution that's called an electrolyte. This is done by dipping two electrodes into the electrolyte and then connecting them into a circuit with a battery or some other power supply.

SILVER

Generally, silver is a more cost-effective plating solution; it is cheaper than gold, and it also plates copper well. It has the highest thermal and electrical conductivity of any metal. Other attractive characteristics of silver are that it has the highest optical reflection, whitest color, and lowest contact resistance of all metals.

Issues that may arise with silver plating include galvanic corrosion and humidity. Silver plating is not recommended for applications that are subjected to humidity since it is prone to flaking and cracking, which could eventually expose the base substrate.

With the exception of luxury goods, the industries that utilize silver plating the most are the electronics (semiconductors and connectors, musical instruments, and bearings) and modern power generation (battery and solar).

PRECIOUS METALS COATING PROCESS

The electroplating of precious metals such as silver and gold coatings can be done from a variety of aqueous electrolytes. Typically, solutions of cyanides are used.

Pre-Treatment

The pre-treatment depends on the condition of the components that need to be treated and generally includes the following process:

- Mechanical pretreatment
- Degreasing
- Rinsing
- Activation, sometimes by making the substrate electrically conductive
- Rinsing
- Nickel or copper deposition
- Rinsing

Gold and Silver Plating - Deposition

The deposition of gold and silver is similar to other electrodeposition processes. Considering the cost of precious metals, deposition is done under very exact conditions (A/sec.m²) so that the layers can be deposited with precise thickness. Special care needs to be taken in order to minimize the losses of noble metals during the post-plating rinsing process.

After-Treatment

Normally, gold layers don't need an after treatment. Sometimes the layer is gently polished with a soft tissue. Silver layers sometimes get coated with a thin layer of rhodium.

WHAT IS ELECTROPLATING?

Electroplating includes passing an electric current through a solution that's called an electrolyte. This is done by dipping two electrodes into the electrolyte and then connecting them into a circuit with a battery or some other power supply. The electrolyte and electrodes are made from carefully chosen compounds or elements. When the electricity flows through the circuit that they complete, the electrolyte separates. At this point, some of the metal atoms it contains are deposited in a thin layer on the surface of one of the two electrodes, thereby completing the electroplating process. All sorts of metals can be plated in this way, including gold, silver, platinum, etc.

Electroplating is similar to electrolysis (it includes using electricity to split up a chemical solution). These are all examples of electrochemistry, which is a chemical reaction caused by producing electricity that gives industrially or scientifically useful end-products.

HOW ELECTROPLATING WORKS

First, we need to choose the right electrolyte and electrodes by deciding on the chemical reactions we want to create

when the electric current is applied. The metal atoms that plate an object come from the electrolyte, so if we want to gold plate something, we need a gold-based electrolyte, and so on.

Next, we need to make sure the electrode we want to plate is entirely clean. If it's not clean, the metal atoms from the electrolyte can't form a good bond with the surface, allowing them to be easily removed with friction. Usually, the cleaning is done by dipping the electrode into a strong alkaline or acid solution or by connecting the electroplating circuit briefly in reverse. When the electrode is completely clean, atoms from the plating metal can bond to it effectively by adhering to the crystalline structure's outside edges.

Now we're ready for the most important part of electroplating. We need an electrolyte, two electrodes that are made from different conducting materials, and an electricity supply. One of the electrodes is usually made from the metal we want to plate, and the electrolyte is usually a solution of a salt of the same kind of metal. So, for example, if we're silver plating a piece of brass, we need a silver electrode, a brass electrode, and a solution of a silver-based compound. Precious metals like silver and gold don't easily dissolve, which means they require strong and dangerous cyanide-based chemicals to be made into electrolytic solutions. The electrode that will be plated is typically made from a more affordable metal or a nonmetal material coated with a conducting material like graphite. In either case, it needs to conduct electricity in order for the plating to occur.

We dip these two electrodes into the solution and connect them into a circuit, so the silver becomes the positive electrode, and the brass becomes the negative electrode. When we turn the power on, the silver sulfate solution splits into ions (atoms with too many or too few electrons). Silver ions (that are positively charged) are attracted to the negatively charged electrode and slowly deposit on it, creating a thin layer of silver plate. Meanwhile, sulfate ions (that are negatively charged) will get to the positively charged copper anode and release electrons that move through the battery to the negative electrode.

It takes some time for electroplated atoms to build up on the negative electrode's surface. How long this will take depends on the strength of the electric current used and the concentration of the electrolyte. Increasing either of these factors can increase the speed at which electrons and ions move through the circuit, which will increase the speed of the whole plating process. As long as electrons and ions continue to flow, the plating process will continue. ■

Paul Fredericks is Founder and CEO, Aerospace Metals LLC. Jeff Logan is President, Saporito Finishing.



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and wastewater treatment.

The string wound cartridge filters are manufactured using a high speed, continuous wind process which creates a superior one-piece filter with hundreds of diamond shaped tunnels, the company says.

Pleated filter cartridges are “manufactured using a proprietary, electro-sorptive media technology that is capable of removing submicron pathogens and inorganic contaminants through electro-adhesion and ion exchange,” Filter Pump Industries says.

Canadian Finishing Systems also carries a full line filters and filter systems, in both re-usable and disposable filter technologies. The company offers bag, plate, overside, tube and candle filters with various flow-through configurations. Filter systems can either be manual or fully automated.

Finish Thompson offers sealless, sealed, vertical and drum pumps to cover the full spectrum of needs for electroplating and anodizing.

Its DB and SP Series pumps are magnetically coupled, sealless centrifugal pumps designed to pump corrosive chemicals in electroplating and anodizing facilities.

They feature no mechanical seal, with a “powerful rare earth magnetic drive system to eliminate the troublesome mechanical seal”; are manufactured from polypropylene or PVDF for corrosion resistance; have a run dry ability making them less prone to operator error or system upset; and a self-priming option to lift fluid from as deep as 25 feet below the pump or pull liquid out of the top of a tank to eliminate through-the-sidewall bulk-head fittings.

Flo King Filter Systems manufactures pumps, filter systems and cartridges, and carbon treatment devices, to promote solution cleanliness and waste minimization in a variety of operations.

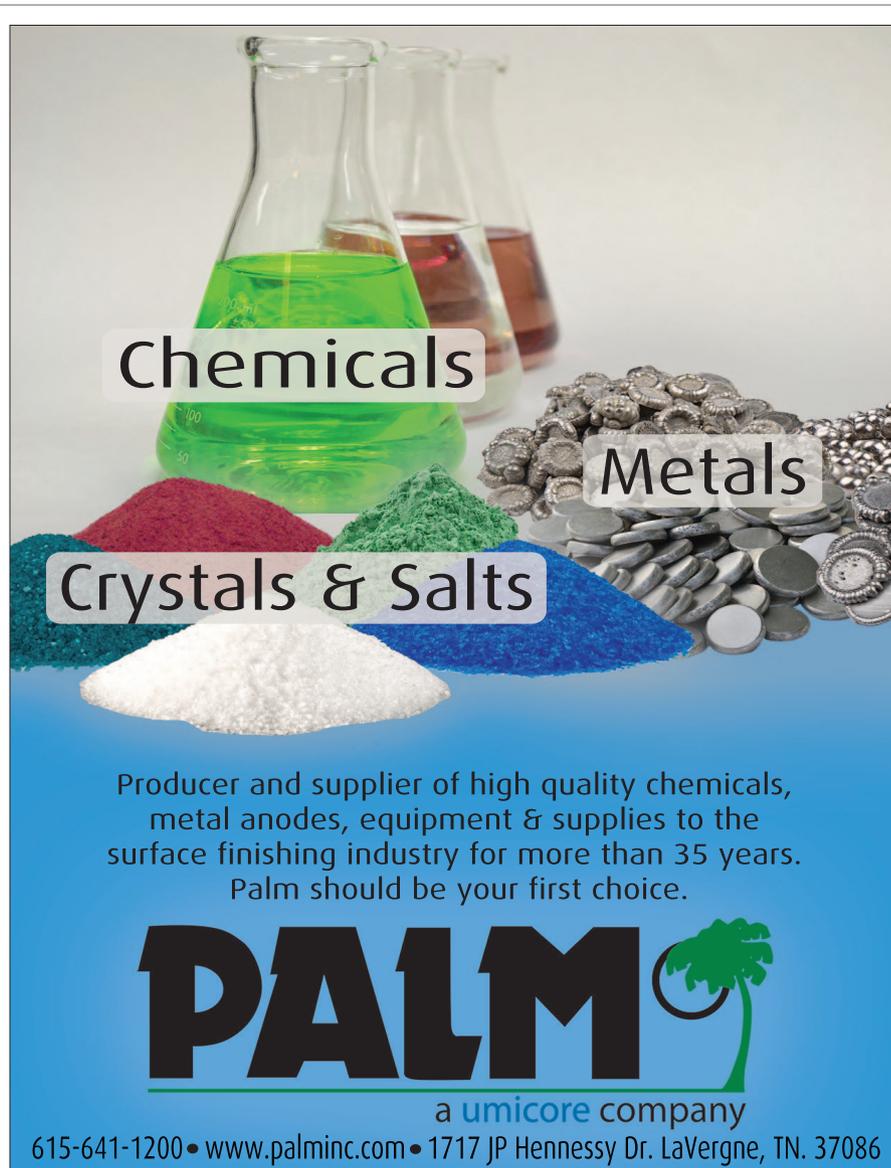
The company’s “four-in-one” in-tank system can pump, filter, agitate, and treat electroplating, anodizing, printed circuit, low-sludging iron phosphate,

and allied metal-finishing solutions.

Flo King says this offers many advantages, including the elimination of leaks and spills associated with out-of-tank filter systems; agitation as a natural byproduct of filtration, a feature that can often replace air or mechanical agitation systems; easy filter cartridge changes, without the need for tools or production interruptions; and in-tank carbon treatment for the removal of organic impurities, such as brightener breakdown products. Flo King adds, the system offers a lot of versatility as it can be used stationary in one tank or moved from tank to tank as a utility pump; the system is less costly than

out-of-tank filter systems; there are models for small and large tanks; CPVC, polypropylene, PVDF (Kynar), or stainless steel construction can be chosen; and it can be used with the company’s own reusable filter cartridges or with disposables. Installation is out of the box.

Systems can be used to filter decorative and functional plating solutions, including brass, bronze, cyanide cadmium, trivalent and hexavalent chromium, hard chrome, acid copper, cyanide copper, electroless copper, electroless nickel, acid gold, cyanide gold, bright nickel, nickel chloride, nickel sulfamate, silver cyanide, tin,



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The solutions must be handled with care and many factors such as chemical compatibility, pH, pressure, temperature, and flow must be considered.

acid chloride zinc, alkaline non-cyanide zinc, and cyanide zinc. Other applications include acid pickling, anodizing, blackening, cleaning, chromating, post-anodize dye and sealing, electro-forming, electropolishing, passivating, and zincating.

Stenner Pump Company sells peristaltic metering pumps to accurately inject brighteners or phosphates into plating baths.

Its Classic Series single head adjustable pump can inject additives such as brighteners or phosphates for plating baths and acids or alkalis for pH control of metal finishing wastewater.

“The SVP is a variable speed pump that can be adjusted manually or operate via a 4-20mA signal for pH control systems,” Stenner says. Some installations may use two Classic Series fixed output pumps wired to a

pH controller for batch treatment systems or continuous chemical feed. Both the Classic single head adjustable and fixed output pumps are available as a tank system consisting of a metering pump and solution tank that is shipped pre-assembled for easy installation. Tanks can also be purchased separately.

Stenner’s Econ OEM pump can be customized for easy integration into controller enclosures. It is compact, economical and available in a variety of voltages, capable of metering plating solutions with outputs of up to two gallons per hour, the company says.

The Econ OEM Batch pump is designed for dosing plating additives in precise amounts based on a pre-set run time from .01 seconds to 24 hours per activation. Outputs are available up to 267 ounces per hour at 80 psi. A man-

ual activation switch is standard and customized input signal is optional.

“If utilizing a process control system, the S Series is your go-to pump,” Stenner says. Select from several modes of operation and pump performance indicators relevant to the specific application. Program features such as tube leak detection, tube change timer or transfer operation to a backup pump.

Platers and finishers have special requirements when it comes to pump and filtration equipment. The solutions must be handled with care and many factors such as chemical compatibility, pH, pressure, temperature, and flow must be considered. Working with an experienced company will help you determine the right specs for each component of your operation. ■

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BRUSH PLATING:

A Variation of (Tank) Electroplating

BY PETER J PAINE

ELECTROPLATING is a general name for well-established processes that create a coating (i.e. plating) of a given metal (e.g. zinc, nickel, copper, chromium, etc.) on a solid substrate (such as steel) through the reduction of cations of that metal in an electrolyte (i.e. the plating solution) by means of a current source.

Electroplating processes typically take place in plating tanks. Plating tanks can range in size from aquarium-sized tanks to very large tanks, in some cases 30 feet in length and as much as 20 feet (or more) deep. The parts which are to be plated and which form the basis of a company's representative work usually determine the dimensions of their plating tanks. The larger or longer the part, the larger and longer (and/or deeper) the tank.

Plating tanks are made of steel and in the case of chromium plating, will use a PVC liner. Other plating processes can use either PE or PP tanks. The tank not only holds the plating solution but also supports the busbars and (where necessary) hoods for ventilation requirements. For chromium plating in Canada and the USA, Cr6+ emissions are controlled by either surface tension reduction or by use of a control device such as a scrubber.

In electroplating, the part to be coated is the cathode (negative electrode); the plating solution is a solution of a salt of the metal to be plated; the anode (positive electrode) is usually either a block of that metal, or of some inert conductive material. The plating solution should contain positive ions (cations) of the metal to be deposited. These cations are then reduced at the cathode to the metal in the zero-valence state. The direct current is provided by an external power supply.

For example: the plating solution for conventional hexavalent chromium plating is a solution of chromic acid (H_2CrO_4) which dissociates into Cr^{6+} . At the cathode, the Cr^{6+} is reduced to metallic chromium by gaining six electrons. At the anode, oxygen anions (from the dissociation of CrO_3) are oxidized and released from solution as oxygen gas. The release of both hydrogen (at the cathode) and oxygen (at the anode) and the generally not very efficient chromium plating process (about 12 to 15 percent efficiency) accounts for the release of plating mists from these solutions. (This, of course, has resulted in environmental and OSH legislation which has been and continues to be

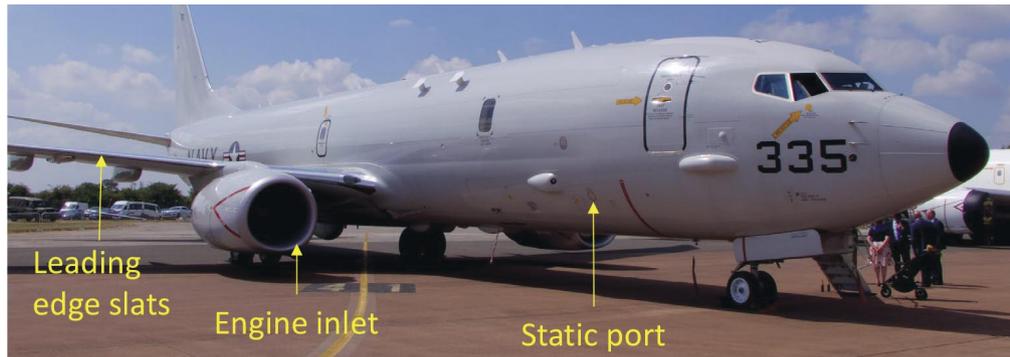


Figure 1: P-8 Poseidon showing areas with bare aluminum subject to corrosion.

directed toward hexavalent chromium plating).

Electroplating is widely used in industrial applications to improve the surface qualities of objects such as resistance to abrasion and corrosion, lubricity, reflectivity, electrical conductivity, or appearance. More importantly, electroplating (and especially chromium plating) may also be used to build up thickness on undersized or worn-out parts thereby restoring these parts to their original specifications. It is this aspect of chromium plating which makes hard chromium plating an important part of the industrial world. Chromium plating allows a part to be used many times due to its ease of removal (stripping) from the part and relative ease of replating. Chromium also brings several engineering benefits to the part – such as hardness, lubricity and improved corrosion protection.

BRUSH ELECTROPLATING

A closely related process to conventional “tank electroplating” is Brush Electroplating, also called Selective Electroplating. It is typically used to repair relatively small areas on large objects, and especially to repair components in-place on vehicles, ships, aircraft and machinery to avoid the cost and down-time of disassembling the equipment.

Brush electroplating was first developed in France in 1938 by Georges Icx. In 1945, Icx and Daloze created the first commercial brush plating process and were awarded a French patent for their process in 1948. Through the 1950s and 60s this process was picked up and used by many companies, which resulted in further refinement of the equipment and chemistry.

The mechanics of brush plating are fairly straightforward:

- An AC power pack converts voltage into DC current.
- A ground cable (negative charge) is connected to the part making it the cathode.

BRUSH PLATING



Figure 3: Typical on-aircraft brush plating showing set-up for masking and runoff control.

- A second cable (positive charge) connects to the plating tool (making it the anode).
- The anode (plating tool) is wrapped in an absorbent material which holds the plating solution between the anode and the cathode and also prevents direct contact with the item being plated.
- Electrical current travels from the anode (plating tool) through the plating solution to the work area (cathode).
- Plating occurs where the wrapped plating tool contacts the work piece.
- The plating tool is replenished (with plating solution) by dipping the tool in the plating solution.
- The plating tool is moved continually over the surface of the part to achieve an even distribution of plating material.
- Upon completion the plated part is then rinsed off and sent for further inspection.

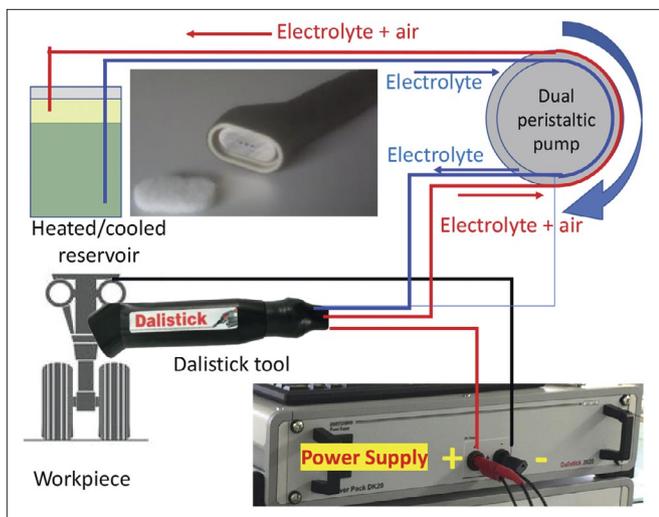


Figure 2: Non-drip selective plating system and closed-loop circuit.

In brush electroplating, localized areas or entire parts can be plated using a brush saturated with plating solution. The operator can move the plating tool over the area to be plated or the part can rotate with the plating tool stationary. In either case, operator experience is important.

Brush electroplating has several advantages over tank plating, including portability, ability to plate items that cannot be tank plated, low or no masking requirements, comparatively low plating solution volume requirements and being able to repair components in-place. A disadvantage compared to tank plating is the need for greater operator involvement, which makes the success of the process dependent on the skill of the operator. Brush plating is also limited in thickness by the time the operator can spend plating; tank plating (especially hard chromium plating) is frequently done over plating times of 24 hours, with minimal attention.

Brush electroplating is now specified by manufacturers and OEMs alike. Brush plating is used in several industrial sectors such as:

- Transportation (Aircraft, Marine, Rail, Automotive)
- Electrical (Power Generation, Motors)
- Industrial (Moulds and Dies, Hydraulics,)
- Printing (Cylinders, Bearing Journals, Housings)
- Resources (Mining, Pulp and Paper, Petroleum, Refineries)
- Food (Pharmaceutical, Mixers)

This process can also be used for Brush Anodizing especially in the aerospace industry. In Brush Anodizing, the same mechanics of applying the solution pertain however the polarity of plating tool and part are reversed so that the part is the anode. Brush anodizing is finding increasing use in aerospace repair.

The two main sectors using Brush Plating and Brush Anodizing are the aerospace and nuclear industry where it is used for salvage and repair of parts in situ.

DISADVANTAGES OF BRUSH PLATING/ANODIZING

For conventional Brush Plating/Anodizing applications on horizontal surfaces (involving the plating tool being dipped in the solution and transferred to the part and then dipped in solution to replenish the brush again and then applied to the part, etc.) there are few issues with the process. It is really akin to “painting with conventional paint”.

However, for vertical or inclined surfaces, brush plating can become a little complicated as the plating tool and solution have to work against gravity.

Figure 1 shows the Poseidon P-8 (based on the Boeing 737-800) which is used in maritime patrol and is subject to corrosion from proximity to the ocean as well as low altitude flying (60 m above sea level). Brush anodizing is used to repair areas of corrosion on the aircraft as shown in the figure.

In situ repairs on inclined or vertical surfaces (and de-

pending on the chemistry of the plating solution) need careful operator protection (PPE and OSH requirement) and environmental protection such that there is no loss of solution to the environment. The process is messy and prone to spills and plating chemicals tend to drip onto the floor and run down the object being plated. When the process is carried out on aircraft, great care has to be taken to prevent plating chemicals from running into the aircraft itself. This usually necessitates extensive masking to keep the plating chemicals contained and creating runoff channels to catch them. Plating overhead is particularly difficult because chemicals can easily drip onto the operator. When the plating chemicals are toxic (e.g. cadmium, chromium plating), highly regulated (e.g. chromates), or corrosive (e.g. sulphuric acid) brush plating may pose a significant environmental and/or OHS concern.

In order to overcome these concerns, the French company Dalic developed the Dalistick non-drip selective area plating and anodizing equipment that can be used in any orientation.

The principle of the Dalistick is shown in Figure 2. The electrolyte is held in a reservoir or bottle, from which it is drawn by a peristaltic pump (blue circuit) and fed into the plating tool. The tool is constructed so that the electrolyte runs into the center of a pad, while air and electrolyte are both drawn out around the periphery by a second peristaltic pump (red circuit) that has a higher pumping rate. The flow rates of electrolyte delivery and electrolyte plus air return are balanced so that the pad is properly wetted, but excess electrolyte does not build up and drip out of the pad. This ensures that the surface being plated or anodized remains wet to allow a constant ionic path, but the tool does not drip, regardless of its orientation, and regardless of whether it is being used on the surface or held in the air, obviating any need for a seal around the plating area.

Figure 3 shows the Dalistick being used to repair the Static Port on the P-8.

The process for this specific repair is: (Figure 4)

1. Clean the static port area to remove gross contamination
2. Mask the peripheral paint circle and the central sensor holes
3. Clean and prep the entire area within the red painted circle with fine Scotchbrite
4. Attach a catch basin with aluminum tape to catch the runoff – a thin liquid layer on a vertical surface coalesces and runs off. A larger tool would eliminate the runoff by sucking the liquid away before it coalesced
5. Clean the area with acetone
6. Anodize using the closed-loop system – because of the small size of the standard tool and the large size



Figure 4: Preparation of the static port for anodizing. a) masking painted circle, b) Scotchbrite cleaning, c) masking with catchment, d) anodizing.

of the static port, the anodizing process took 30 minutes to achieve ~7 μm coating thickness, which is close to the maximum time that a maintainer could continuously move the tool overhead. The temperature of the anodizing solution was 28 deg. C (82 deg. F)

7. DI rinse using a single-pass system with the Dalistick tool
8. TCP seal using the closed-loop tool
9. DI final rinse with the Dalistick tool
10. Warm air dry
11. QA – electrical insulation measure by multimeter, thickness measured by dry film gauge

Because the process is non-drip, the only items of personal protective equipment needed, even when plating overhead, are vinyl gloves, safety glasses and lab coat. There is no need for the rubber aprons and thick rubber gloves typically used by brush platers.

CONCLUSION

Brush or selective plating has made incredible strides since its development in the 1930s and subsequent improvements in the 1950s and 60s.

Brush plating is used in several industrial sectors for in-situ repairs where tank plating is not possible because of the size of the part.

The Dalistick developed by Dalic in France now allows non-drip selective plating and sulphuric acid anodizing with minimal operator and environmental issues. This technology can probably be considered state-of-the-art.

The process is finding increasing application in aerospace plating, where LHE zinc-nickel is now replacing the use of toxic cadmium. ■

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Non-Drip Selective Plating and Anodizing for Aircraft
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Blaze of Glory

Intumescent Coatings Offer High Growth Opportunities

INTUMESCENT COATINGS – typically paint on steel – act as a protective layer which works by chemical reaction generated by heat, resulting in swelling and formation of an insulating charred layer on the surface. They are a growing sub-segment of industrial maintenance and protective coatings.

The Global Intumescent Coatings Market report by Market Research valued the intumescent coatings market at \$852.35 million (US) in 2018. With projected growth at a compound annual growth rate of 3.94 percent, the market will be worth an estimated \$1.2 billion (US) by 2026.

In addition, the Global Market Analysis for the Paint & Coatings Industry (2015–2020) report released by the International Paint and Printing Ink Council (IPPIC) and prepared by ChemQuest Group, Inc., also looked at intumescent coatings as a sub-segment of industrial maintenance and functional coatings which are formulated to provide protection for exterior and interior substrates against corrosion, abrasion, thermal, and chemical and ultraviolet (UV) degradation in both industrial and critical service environments.

It says the demand for intumescent coatings is closely tied to construction spending. “The split between U.S. residential and non-residential construction is 60/40,” the ChemQuest report says. “Overall, the average growth in total construction spending has been a robust 8.1 percent over the last five years.”

There is also significant demand for intumescent coatings in specialty coatings sub-segments, such as marine, transportation, onshore/offshore oil and gas production, and new industrial and commercial construction, the report continues. The increased use of lightweight materials for transportation, modular homes, and insulation applications is a key driver. Intumescent paints are increasingly used to protect spherical structures containing natural gas, peroxides, and other chemicals.

In new construction of commercial buildings, intumescent coatings incorporate flame-retardant chemicals to achieve two distinct industry efficacy ratings. The first measures flame spread, or how effectively the coating limits flammability (according to ASTM E84). The second rating demonstrates coating efficacy for delaying and resisting the effects of fire (expressed in hours).

With intumescent coatings, “the fire-retardancy property is project-dependent but generally understood to mean a coating can withstand temperatures in the range of 200 deg. C to 600 deg. C for a period of time,” the

ChemQuest report says.

The increase in volume and subsequent decrease in density slows the heating of the substrate, increasing the time before the steel itself begins to melt, says US Coatings. “Intumescents typically swell to 25 times their original thickness when engulfed in flames. This expansion allows them to provide a barrier between the flames and the steel that is exponentially larger than a coating that does not swell.”

Increasing the thickness of an intumescent coating application increases the amount of swelling that will occur in the case of a fire.

“For example, if a 350 mil coating of a given intumescent has been determined to have a fire rating of 1.5 hours, 700 mils would theoretically be necessary to achieve a fire rating of three hours,” says US Coatings. “In reality, though, added thickness is sometimes specified in certain areas such as curves and crevices, so something like a thickness of 750 mils may be required in order to achieve a three-hour rating.”

When intumescent coatings come in single-component formulas, they are much simpler to apply than dense concrete and lightweight cementitious coatings and are therefore accompanied by far lower labor costs, US Coatings says.

“Additionally, since they are applied directly to steel, no gap is created in which moisture can sit and incite corrosion. Intumescent coatings fight corrosion in much the same way as traditional protective coatings, the difference being their ability to swell and the much greater thicknesses at which they are initially applied.”

In new construction applications in the oil and gas industry, a massive change moving toward OEM fireproofing was a trend noted by ChemQuest in 2015; whereas fireproofing in maintenance and repair applications, by comparison, could be cost prohibitive. In older plants, installing intumescent coatings sometimes requires removing cementitious structures (otherwise “hidden” corrosion behind the concrete, which, left untreated, can put the cementitious structure at high risk of collapsing). Concrete removal is where the high cost emerges.

In this hydrocarbon industry, intumescent coatings from Sherwin-Williams provide passive fire protection of up to four hours on steel. Its Firetex intumescent coatings mitigate the effects of jet fires, pool fires, boiling liquid, expanding vapor explosions, and blasts, the company says.

Typically, intumescent coatings technology includes vinyl toluene acrylics, styrene acrylics, silicone acrylics, fluoropoly-

mer, epoxies, urethanes, and chlorinated rubber, ChemQuest adds. For cellulose, intumescent coatings can be either solvent- or waterborne, with the latter generally based on vinyl acetate or acrylic.

In contrast, intumescent coatings used against hydrocarbon fires are epoxies. Thin film is typically used in general construction including structural steel, while the thick-film coatings tend to find use in the oil and gas industry, such as for protecting petroleum refineries. Depending on the application, an array of low-VOC, (often) thick-film chemistries can be used to achieve specified requirements, such as the ability to adhere to urethane foam.

Accordingly, Firetex M90/03, for example, is a two-component, borate free, 100 percent solids, anti-corrosive epoxy fireproofing coating. "Designed to thermally insulate both carbon steel and galvanized steel during a hydrocarbon pool fire, Firetex M90/03 is a highly reinforced coating with superior application characteristics and certified performance properties," Sherwin-Williams says. "It is ideal for both on-site and off-site applications, such as in shops and in modular yards."

Other top-line growth opportunities cited for intumescent coatings include applications requiring low smoke generation, combustion prevention, or as a polymer for formulating thinner films to improve aesthetics on steel surfaces. Eliminating the need for a topcoat over the intumescent product may also be desired in some exterior applications.

Hilti Canada says its Fire Finish 120+ CFP-SP WB is a high-performance, water-based intumescent fire-resistive material, or IFRM, for architecturally exposed structural steel in interior and exterior applications with approved top coats. The product works for a wide range of beam sizes and ratings and offers glass fiber-free formulation, good wet-film thickness buildup (65 mils wet per pass), and reduced need for post-process sanding. The product has a four-hour fire rating.

Other major manufacturers of intumescent coatings and fireproofing products include Carboline, 3M, Hempel, PPG, and AkzoNobel.

Due to the critical properties that fireproofing imparts to steel structures, the proper application of intumescent

coatings is essential.

"With all of the benefits of intumescent coatings combined, it's our recommended method of fireproofing steel," US Coatings says. ■

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TO SOME, BIOCIDES, algacides and preservatives could be called the silent heroes of the paint business. They keep away mildew and microorganisms, while also reducing odors and unsightliness.

The problem is, anything that can inhibit or eliminate those life forms can also be potentially harmful. And in the world of substance regulation, sometimes matters of dosage and exposure can be poorly assessed and heroes become villains.

There has been a lot of movement on this issue recently, however.

In late October, the federal government's Pest Management Regulatory Agency (PMRA) reinstated the use of othilinone (OIT), a material preservative for paint and coatings and related products in Canada. It works by protecting the paint film, ensuring it will not flake in a few weeks or months. The ban was first announced in 2017 and came into effect on May 31, 2019.

The Canadian Paint and Coatings Association (CPCA) says the decision to reverse the ban will ensure that paint products and stains will have access to a biocide preservative commonly used by industry for many years, which is still used in other countries. It is a critical ingredient used for the preservation of paint and stains and integral to the transition from solvent to water-based coatings over the past several years. Therefore, it supports industry's ongoing efforts to produce paint products with much lower volatile organic compound (VOC) emissions during paint application and drying, CPCA says.

"This decision will support industry's ongoing innovation

efforts and will ensure consumers can continue to use paint products with the level of performance they have come to expect from strong, recognizable brands sold by CPCA members across Canada," says Gary LeRoux, CPCA's President and CEO. "It confirms the Canadian paint industry's commitment to the safety of its products and extended product stewardship in a circular economy."

CPCA had argued that further data be reviewed before the ban was issued and says it is pleased with the reversal.

"As a result of this recent announcement, OIT will be available to CPCA members and the entire paint manufacturing industry in Canada in the coming years," LeRoux says. "It will be aligned with the current status of OIT in the United States, Canada's largest trading partner. Greater alignment with the US EPA in two highly integrated economies is critical, and only heightened by the fact that there are increasingly fewer biocides available for in-can and dry-film preservation for paint and coatings and allied products in Canada."

PMRA has still restricted the use of several other biocidal preservatives used in paint, including the widely used CMIT/MIT. However, industry has repeatedly underscored that biocides are integral to the cost-effective performance of paint products while posing little to no risk when handled as directed. In addition, if water-based paints cannot be preserved, they are of little use to consumers and commercial operators who require them to extend the lifecycle of their assets.

The American Coatings Association (ACA) had joined CPCA in comments submitted to the U.S.-Canada Regulatory

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Cooperation Council (RCC), urging intervention to resolve issues related to regulation of biocides used in paint formulations. CPCA continues to stress the critical importance of streamlining Canadian regulations between Canada and the United States for biocides and many other substances.

While many antimicrobials are routinely reviewed on both sides of the border by the USEPA and PMRA, there are still differences between the two agencies with respect to their publication schedule and timing, risk assessment methodologies, re-evaluation decisions and use registrations. This has led to trade disruptions due to non-alignment and production issues with manufactured products and treated articles.

For example, the U.S. EPA recently published draft risk assessments for a class of antimicrobials called isothiazolinones (ITAs) and CPCA is concerned that the prospect of pending decisions by EPA would further limit critical uses of biocides, namely ITAs used in product formulations in the coatings sector. It is a big issue considering 50 percent of all coatings products sold in Canada are imported from the United States, and inconsistencies are a non-tariff barrier to trade and not in the spirit or intent of the recently signed United States-Mexico-Canada Agreement (USMCA), the ACA says.

CPCA has said the Canadian paint and coatings industry is already dealing with a severe lack of availability and numerous chemical incompatibility issues with the current, limited number of registered biocides for paint for in-can and dry-film preservation, which is more limited than in the United States.

Canadian paint manufacturers have been required to reformulate their products due to actions taken by the PMRA, leaving the industry with an insufficient number of registered biocides or possible alternatives for the foreseeable future.

"The remaining PMRA-registered biocides for paint and coatings are ei-

ther not chemically compatible, and/or alter other properties or performance of the mixtures, in some cases this renders them useless in prevention and the control of biofouling, and/or are not cost-effective and competitive," the ACA says. "This can also lead to health issues via biocontamination for those handling the products. This is undermining national paint manufacturing activities in Canada as it forces Canadian small and medium enterprises (SMEs) to discontinue key product lines and/or abandon critical supplies coming from the United States."

Without in-can biocide preservatives, leftover water-based paint recycling would not be possible due to product breakdown and microbial contamination.

In early November, CPCA engaged with PMRA officials and recommended striking a working group to work with the CPCA on all matters related to re-evaluation of biocides for paint and coatings. The PMRA agreed and CPCA worked with them on the terms of reference for the working group which will commence before year-end.

Clearly, preservatives play an important role in coating formulation and overall product performance, and like with any recipe, tinkering with one part affects all of the others. Currently, CPCA is fully engaged with the ongoing paint cluster re-evaluation comprising assessments of material preservative uses of sodium omadine, ziram, folpet, dazomet, chlorothalonil, and a special review of diodofon. Some of these will have restricted uses and possible bans. CPCA says it will continue to work with its members to provide relevant data to retain these ingredients for the paint industry.

"All the available data must be fully considered when making re-evaluation decisions on critical inputs for the coatings industry, which clearly has far-reaching consequences on product integrity, product selection and price, Canadian trade and manufacturing, and sustainability overall," LeRoux says. ■

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Will the Politics of **PLASTICS HURT INDUSTRY?**

BY GARY LEROUX

ON THE SURFACE, the recent federal ban on several single-use plastics is positive given that such products cannot be recycled and should not end up in landfill for the next 500 years. However, a previously published federal government report in the *Canada Gazette* called the “Science Assessment of Plastic Pollution” may not be as positive, including for the Canadian coatings industry. It goes too far with respect to macroplastics and microplastics vis-à-vis the environment and human health. It is widely believed that the report is not a realistic basis on which to take action under existing federal environmental legislation, that is, the *Canadian Environmental Protection Act* (CEPA). The report suggests the intention is to assess plastic products, resins, types of packaging and the related polymers implicated in such an assessment, many of which are used in paint and coatings as well as adhesives and sealants.

Prior to the report published by the federal government in July, microplastics had garnered significant interest with regulatory agencies worldwide, especially in the European Union. CPCA has been monitoring developments in the EU over the past several years in concert with the World Coatings Council. It is critically important that governments, including the Canadian government, establish a clear definition of these materials and recognize the absence of standardized methods and analytical techniques for their assessment, which thankfully the report acknowledges. Without such a clear definition, one cannot accurately quantify microplastics in the environment and thus governments cannot take evidence-based regulatory action, which the current Canadian government has always maintained is the foundation on which regulation must be based.

CPCA believes that a more thorough assessment of the related risks would also be necessary before the federal government can develop effective risk control measures for both macroplastics and microplastics pollution. The current societal risks associated with the use of macro- and microplastics do not warrant immediate regulatory action. There is no objective scientific evidence that indicators of environmental health such as air and water quality or biological diversity have been impacted by macro- or microplastics in a way that would necessitate the need for the report’s recommendations to be carried out as regulatory actions. Generally speaking, a much more robust scientific evaluation of the risks associated with plastic materials would be needed first. Risk assessment activities should directly target the underlying risks, if any, which would be required for cost-effective risk assessments and ultimately

risk management strategies, like a regulation, in support of any efforts to mitigate negative environmental impacts.

The report states that, “Plastics are often defined by their size, with macroplastics being larger than 5 mm and microplastics being less than or equal to 5 mm.” This Canadian definition of microplastics, extracted from various studies, appears to create an enormous scope for these materials, as it seems to include all polymer types and their dispersions which all fall under the 5 mm limit. The Canadian government may wish to consider the pitfalls of such a broad scope as evidenced by the EU experience. An initial ECHA working definition by the EU included solid and semi-solid particles and did not distinguish between synthetic (i.e. artificial), naturally occurring or modified naturally occurring polymers (e.g. cellulose) and between water soluble and water insoluble polymers. Clearly, naturally occurring polymers are inherently biodegradable in the environment and therefore the ECHA definition eventually evolved and those polymers were not considered as microplastics. Non-solid polymeric particles in liquid emulsions were also not considered microplastics. This points to the difficulty in finding a reasonable working definition that can be used in developing effective risk assessment approaches and eventual regulations in this area.

Furthermore, the government approach with respect to primary versus secondary microplastics pollution must be clearly delineated. It should have been clearly identified as a research priority in the report, but it was not. Primary microplastics are intentionally produced with a targeted consumer product or use in mind, while secondary microplastics are not produced intentionally, but are the result of the breakdown and fragmentation of larger plastic items. Numerous studies on the environmental prevalence and fate of secondary microplastics have been published. However, they differ widely in how they have been collected, characterized and quantified with respect to sources and pathways of secondary microplastic releases.

Accordingly, there is little consensus on which products are the most likely contributors to releases to the environment and their relative impact on secondary microplastic releases, if any, such as on marine ecosystems and sediments. The latter two endpoints were given prominence in the report, which also references many recent public reports of plastic waste in oceans. CPCA raised concerns here and cautioned that adequate risk assessment findings and mitigating factors must be fully considered in quantifying potential releases of primary microplastics

from particular products or class of products. The ultimate effect of a well-intentioned effort to protect oceans from plastic must not result in causing irreparable harm to Canadian manufacturing and trade due to mischaracterization of microplastics.

Paint products contain intentionally added polymeric forms with a size range of less than 5 mm, such as microbeads, pellets or microfibers, which provide certain desirable performance properties but have no possible pathways of release to the environment or inhalation because they are “embedded” in the applied coating. Once the paint is applied as a film and fully dried, the microplastics in the film are physically bound in a solid matrix.

Possible degradation of a paint film occurs due to a number of factors including weathering (UV light and humidity) and would only be significant when the paint is applied on an exterior surface. In the case of degradation, the paint film breaks down into flakes or dust, many of which are in the size range that would label them as secondary microplastics. However, the breakdown of individual ingredients in a film is extremely unlikely. Moreover, there is currently no reliable evidence that exterior coatings are a significant contributor to secondary microplastics.

It has been suggested that consumer paint products, with infrequent release of microplastics, may lead to down-the-drain releases, but these releases are estimated to be less than one percent. Furthermore, the vast majority of leftover paint is already recycled by waste recycling programs across Canada, which is paid for 100 percent by manufacturers as part of the industry’s commitment to responsible product stewardship. CPCA strongly supports further research to identify pathways and frequency of primary and secondary microplastic releases. Based on the foregoing challenges there is widespread industry disagreement with government references to paint and coatings as “one of the major contributors of microplastics.” There is no evidenced-based rationale for such an assertion. The primary reason for such a belief is the fact that substances or mixtures – and their physical properties – are permanently modified when the substance or mixture is used. At the time of use it no longer falls under the meaning of a microplastic and thus should be excluded from the scope of research on microplastics altogether.

The same can be said for food packaging. The federal government’s report maintains that there is no conclusive scientific evidence that food packaging materials, including food coating materials when used as intended, are a source of microplastics released in food or bottled water, which may lead to health effects of concern. It must also be noted that plastic additives are mostly not co-polymerized and thus less likely of being leached into the environment. The report also includes flame retardants and phthalates as part of these additives, some of which are found in paint and coatings. CPCA has cautioned the government and

reminded them of the fact that additives are usually incorporated at low concentration levels in products. And, in the case of paint and coatings they also remain embedded in mixtures, within a matrix, and in the applied paint film. This provides greater certainty with respect to the unlikely potential there will be releases and risks to human health and the environment.

CONCLUSION AND RECOMMENDATIONS

CPCA’s main concerns and recommendations with respect to the federal government’s “Science Assessment of Plastic Pollution” can be summarized as follows:

- It is critically important that the federal government adheres to the long-established risk-based chemical assessment process (CMP) for macroplastics and microplastics, which has served Canada well over many years.
- Data gathering, risk identification and assessment, and appropriate risk management actions must be developed jointly with industry to accurately address specific areas of concern with respect to sources and pathways of concern microplastic releases.
- Much more consideration must be given to a proper definition of microplastics and the distinction between primary versus secondary releases.
- There has to be recognition of the fact that there is no scientific evidence that paint and coatings products present a significant source of microplastic release to the environment and further research is required in the area of film degradation and possible release of microplastics.
- For the overall research strategy supporting the government’s risk assessment/risk management of plastics, industry must be an integral part of the planning and scoping of projects for risk assessment especially with respect to alternative assessment and informed substitution.
- A multi-stakeholder expert advisory committee should be established to assess, evaluate, prioritize and direct any proposed research on plastic pollution with a clearly stated objective and scope.

The paint and coatings industry in Canada must stand on guard with respect to how this issue evolves. It is a politically charged subject related to plastic waste in our oceans that has somehow morphed into a potentially negative outcome for the chemical manufacturing sector, including paint and coatings, and this must be checked sooner than later. ■

Gary LeRoux is President and CEO of the Canadian Paint and Coatings Association www.campaint.com

UV Cured Wood Coatings Open Window of Opportunity for AkzoNobel



Window manufacturers can make their production process more efficient and sustainable with a new instant drying solution, says AkzoNobel.

The RUBBOL 100% UV cured range of Sikkens exterior wood coatings is the first of its kind, the company says. By cutting out up to 16 hours of drying time, the coating system is able to significantly save on production time and energy costs, while providing leading performance.

The product range produces zero emissions and requires no mixing.

“We know the benefits of transitioning to a UV production line have to add up because, while it’s an exciting prospect for many of our customers, it also represents a big investment,” says Simon Parker, Director of AkzoNobel’s Industrial Coatings business. “Our RUBBOL 100% UV range now offers compelling cost savings to go along with the excellent performance. So, there’s never been a better time to make the switch.”

The coating system consists of a putty, primer and topcoat for wood window frames and a topcoat for PVC window applications. The products offer very good adhesion, excellent durability and strong technical performance, the company adds.

The new product range is part of AkzoNobel’s global weathering program. With weathering test locations in Europe, North America and Asia-Pacific, AkzoNobel is able to evaluate more than 200,000 samples in a variety of climate conditions and monitor their long-term durability.

www.sikkens-wood-coatings.com

Dow Introduces New Silicone Additives for Waterborne Wood Coatings



Seek Together™

Dow introduced three new-generation performance additives based on silicone chemistry to support high durability, longer-lasting, more sustainable waterborne wood coatings.

“The most sustainable recoat is the one you don’t need,” says

Isabelle Riff, Marketing Manager for Silicone Coating Additives at Dow. “Today we introduce three silicone additives that help coating formulators combine key performances required to protect and preserve the aesthetics of wood over a longer time, while meeting increasingly stringent regulatory requirements. As consumers continue to vote in wood as a sustainable, comfortable and aesthetic material for construction, furniture and interiors, the demand for innovative, high-performance and sustainable wood coating formulations continues to grow around the world.”

DOWSIL 211S Additive is a low-cyclic, ultra-high molecular weight silicone delivered in a waterborne system that enhances mar resistance, slip and block resistance performance. It also offers high compatibility, solvent dilution, and performs at very low dosage, Dow says.

DOWSIL 107F Additive is a low-cyclic silicone foam control agent with reported high effectiveness in waterborne acrylic clear wood coating varnishes, and acrylic, styrene acrylic and VAE emulsion paint for architectural wall coatings. It reduces defects and microbubbles in the coating film, thereby enhancing the durability of the substrate protection provided by the coating. Dow says it also has an excellent environmental and health profile.

DOWSIL 402LS Additive is a silicone additive which reduces the coefficient of friction of wood coatings, and offers blocking resistance, while improving the flow and levelling properties for the formulation. It performs at very low levels and exhibits a favorable environmental and health profile with no solvent, benzene, toluene, or xylene.

www.dow.com/coatings

Datacolor Introduces ColorReader Spectro Color Matching Instrument

Datacolor launched ColorReader Spectro, an economical, Bluetooth-connected device designed to help paint retailers easily and accurately measure material colors.

ColorReader Spectro is recommended for paint and hardware stores looking for a cost-effective color measurement solution allowing them to provide custom color matching services to professional contractors, says Datacolor, adding the instrument will sell for a fraction of the cost of a traditional bench-top spectrophotometer.

“We see so many dealers in the retail paint market relying only on fan decks or lookup devices, or in some cases nothing at all, because they can’t justify current price points of the current color matching systems,” says Jason Loehr, Product Manager, Datacolor. “That’s why we set out to develop ColorReader Spectro. With the introduction of this device, we are expanding accessibility in the market by offering more economical solutions to all.”

ColorReader Spectro is also beneficial for those interested in adding a handheld device to their existing lineup of color measurement instruments for added flexibility in



measuring large, cumbersome samples that a traditional benchtop spectrophotometer is unable to handle, the company says. ColorReader Spectro can be easily integrated with a customer's existing software or Datacolor's Paint software.

www.datacolor.com

Chemcraft Releases Smooth New Surfacing Product



Chemcraft Industrial Wood Coatings launched OmniBuild Pro, a new primer surfacer designed for challenging substrate variations, while building a thick and smooth foundation for topcoating.

OmniBuild Pro, a Conversion Varnish Primer, has a high-solids formulation that provides superior build, sag resistance and hide, Chemcraft says. It's easy to apply, sands quickly and has a fast stack time.

"Our goal was to develop the ultimate primer surfacer for even the most challenging substrates like routed MDF - one that, with a single coat, provides the ultimate surface for topcoating," says Ron Cooper, AkzoNobel Segment Manager, Chemcraft, North America. "We're very excited to bring this leading-edge technology to our distributors and end users."

Field testing for the product was handled by Chemcraft Distributor Wurth Louis. "OmniBuild Pro is user-friendly, has excellent vertical hang and is fast-drying," says Adam Egbert, Coatings Sales Specialist, Wurth Louis. "It has a 24-hour pot life and works with all spray systems and flat line machinery."

www.chemcraft.com

PPG Debuts Envirocron HTE Max Extreme Corrosion Polyester Powder Topcoat

PPG recently announced the introduction of its Envirocron HTE Max extreme corrosion polyester powder topcoat. It features high transfer efficiency in a single coat to protect large truck wheels and agricultural, heavy-duty and industrial equipment, the company says.

PPG says the coating delivers first-pass transfer efficiency rates of 85 percent or better and is designed for applications where ease, durability and performance on complex metal parts and surfaces are paramount. The coating offers up to three times the corrosion resistance of traditional single-coat powders, PPG adds.



"PPG Envirocron HTE Max coating also generates significantly less waste than traditional powder coatings due to its exceptional first-pass transfer efficiency rates, helping customers increase the sustainability of their operations and products," says Jamie White, PPG TRUEFINISH segment specialist. "It also offers excellent color and gloss retention, which helps parts look better and last longer."

www.ppgtruefinish.com

Asterion Introduces TECHNIBRITE SN 200 Bright Tin Plating System

The TECHNIBRITE SN 200 tin plating system was recently introduced by Asterion, LLC. The system is suited for both barrel and rack applications to impart lustrous, bright tin deposits.

- Asterion says TECHNIBRITE SN 200 requires only two proprietary chemical processes. System components include:
- TECHNIBRITE SN 200 Make Up provides the proper concentration of wetter, coupler, ductilizers, and low current density brightener.
- Stannous Tin (used in make-up) provides the desired metal concentration.
- TECHNIBRITE SN 200 Maintenance is the brightener component that can be added on an ampere hour basis.

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TECHNIBRITE SN 200 tin process provides lustrous, bright tin deposits.
Photo Credit: Industrial Plating, Inc.

- High purity tin anodes maintain the concentration of tin in the plating bath.
- Sulfuric acid provides conductivity and allows the tin anodes to dissolve.

<https://asterionstc.com/2020/04/why-you-should-include-tin-in-your-finishes-portfolio>

Cortec Unveils New Fast-Dry Version of Water-Based Micro Corrosion Inhibiting Coating

Cortec recently expanded its portfolio of water-based anti-corrosion coatings with a new fast-dry version called EcoShield 386 FD. It combines the environmental advantages of a water-based coating with the performance of EcoShield 386 micro corrosion inhibiting technology in a topcoat that will force-dry in five to 10 minutes.



Cortec says the coating is ideal for manufacturers of pipes, tubes, and other metal components without enough time to cool and dry the coated parts before continuing the production process. The faster drying time of EcoShield 386 FD makes it easier to handle

components that need to be processed and stacked or packed right away, reducing or eliminating the problem of hot coated parts sticking to each other only to be pulled apart and cause coating failure and corrosion later.

EcoShield 386 FD is a water-based acrylic one coat system (top-coat) that can be applied DTM at 1.5-3.0 mils (37.5-75 μ m) DFT (dry film thickness) to provide protection in harsh, outdoor, unsheltered applications. It contains 0.6 pounds of VOCs per gallon (72 g/L) and is an alternative to solvent-based and zinc-rich paints. It relies on a mixture of non-hazardous “nano” sized corrosion inhibitors to provide a continuous layer of corrosion protection in micro-cavities where traditional inhibitors may leave gaps due to their larger rela-

tive particle size.

EcoShield 386 FD can be applied clear or matched to most custom colors for minimal change in surface appearance.
www.corteccoatings.com

BASF Launches Waterborne Basecoat Line for Body Shops of the Future



BASF's Coatings division recently launched a new refinish product line. By increasing product efficiency and significantly lowering the environmental impact, the products meet the high expectations of modern body shops, BASF says.

During the development of the waterborne basecoat line, the focus was put on sustainability. The formulation optimizes processing properties for fast and efficient application and enables spray painters to produce efficient, environmentally friendly refinishing results.

Aside from reducing CO₂ emissions due to shorter process times in the body shop, the value of volatile organic compounds (VOCs) is consistently below 250g/l, the lowest on the market, BASF says.

“Innovation is a key pillar of BASF's growth,” says Dirk Bremm, President of BASF Coatings division. “The Coatings division has always been committed to exciting the market with the best surface solutions. With the development of our new refinish product line, we have anticipated the challenges of the changing refinish market and support our customers when it comes to cutting emissions and becoming more efficient and sustainable.”

The line is the result of intense research and development by cross-functional teams as well as customer feedback.

“The customers are in the center of everything we do and we rely on their feedback to provide the best solutions possible,” says Fabien Boschetti, Director, Global Marketing, BASF Automotive Refinish Coatings Solutions. “Together, we tested the products under real-life conditions and got the confirmation that the paint system is capable of reproducing millions of colors on the market under all climate conditions. When comparing with existing basecoat lines in the market, on average, customers can expect savings of up to 35 percent in overall process times through faster application and shorter flash-off cycles. Another 20 percent savings can be made as material consumption is reduced.”

BASF says the new waterborne basecoat line is not only about

paints; it is a complete set of solutions for the body shops of the future. Customers can benefit from new, ergonomic mixing stations that can be tailored to their individual needs. An additional web-based reporting tool helps body shop managers keep tabs on business operations. To make customers, insurance companies, fleets, car manufacturers and other stakeholders aware of the quality and sustainability standards of the body shop, a certified auditing program has also been established.

The new line, including all additional services, will be rolled out under BASF's refinish brands Glasurit and R-M globally beginning in Q3 2020 in selected countries.

www.basf.com

Mobile Bag Dump Station Allows Bulk Material Transfer Throughout a Plant



A new mobile Bag Dump Station with flexible screw conveyor and bag compactor allows bulk material transfer from handheld sacks, pails and boxes into elevated process equipment and storage vessels throughout the plant.

Mounted on a mobile frame with locking casters and fold-down step, the dust-free system features a bag disposal chute through the sidewall of the hopper hood, allowing the operator to pass empty bags directly into the bag compactor. Dust generated from bag dumping, empty bag pass-through, and bag compaction is drawn away from the operator, onto the system's two cartridge filters. Automatic reverse-pulse air nozzles release short blasts of compressed air inside the filters at timed intervals causing dust build-up on the outer surfaces to fall into the hopper, conserving useable product. Filters are readily accessed by removing the interior baffle, and replaced using quick-disconnect fittings.

The compactor employs a pneumatic air cylinder capable of compressing up to 80 bags into a removable bin. The compactor's main door and flapper door within the bag disposal chute are equipped with safety interlocks that prevent operation of the compactor unless both doors are closed.

The hopper discharges into an enclosed flexible screw conveyor,

www.cfcem.ca

capable of moving free- and non-free-flowing bulk materials from large pellets to sub-micron powders, including products that pack, cake, seize, smear, fluidize, break apart or separate, with no separation of blended products.

Ready to plug-in-and-run, the mobile system is equipped with a NEMA-4 control panel and user-friendly HMI interface, allowing the operator to vary operation of the dust collection system and conveyor to serve varied processes, and then roll the system to a cleaning station or storage area between uses.

The unit is constructed of carbon steel with durable industrial finish, and available with stainless steel contact surfaces or in all-stainless models.

www.flexicon.com

Evonik Launches New Bio-Defoamer



Evonik has launched a new bio-defoamer with EcoLabel for architectural paints.

TEGO Foamex 18 and adds a unique property profile to the company's coatings additives line, Evonik says. The new defoamer consists of 98 percent vegetable oil, a renewable raw material. It is also the first bio-based defoamer from Evonik specifically developed for the architectural market. "

"Our additives for water-based formulations have been in use for decades," says Nadia Lenhardt, Head of Market Segment Decorative Coatings, EMEA "The new bio-based additive is a consistent next step in our efforts to enable sustainable formulations for bio-based paints."

TEGO Foamex 18 is easy to process and suitable for both grind and let-down stages, Evonik says, and suitable for a wide range of formulations. The additive also meets the requirements of all relevant Eco-Labels such as the Blue Angel and EU Ecolabel.

"By continuously expanding the existing defoamer portfolio not only in the architectural sector, but also for industrial, automotive, and printing ink applications, Evonik Coating Additives offers the best possible solution for almost any desired formulation," the company says.

www.coating-additives.com



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Industrial finishing: **FLATLINE FINISHING SYSTEMS**

Flatlining Finishing can Increase Productivity and Quality



FINISHING CAN BE CHALLENGING. At minimum, it requires the right equipment, the right set-up and the right employees, especially when done manually.

A great-looking finish means maintaining color and quality consistency not only for one employee, but among all sprayers in the department. Despite highly advanced spray guns, everyone sprays differently. One employee can even spray differently throughout the day.

"Spraying parts one at a time, carrying pieces in and out of a booth, and even dry time can all create bottlenecks which add up to lower productivity.

Automation can increase production and result in a more consistent and uniform finish.

"If finishing kitchen cabinets, for example, 300 parts would take three workers more than three days to finish by hand. But those same three workers could complete the job in just four hours with a machine, says Doug Mours, Finishing Product Specialist at Siles in a presentation on flatline finishing.

It isn't hard to make the case if your shop is running any kind of volume.

Flatline finishing technology has been around for decades and offers finishers increased throughput and efficiency when finishing flat objects, such as doors and panels, under a spray.

Turnkey or bespoke, systems can be tailored specifically to a shop's need whether to load, blow off dust, spray, UV cure, or unload. The workpiece – glass, plastic, fiber, cement, composite, or metal – doesn't matter either.

Based in Italy but with customers worldwide, Giardina Finishing manufactures machinery and complete plants for coats of wood, glass, plastics, and metal. The production range includes complete finishing lines by roller and curtain coating, spraying, automated and robotic systems with hot air drying, UV or microwave, and spray booths.

In terms of flatline spray finishing systems, Giardina's



spray coating machines include respirators, rotary spray machines and robots. The company says all of its spray systems are available in varying sizes and operational speeds. Many machines can be supplied with a paper belt version for low maintenance and quick changeover times, or a synthetic belt with classic, product recovery and belt cleaning for coating recovery. Machines can be equipped with a DualFast quick-change system so operators can change colors quickly without cross-contamination.

Superfici also supplies, designs, develops, and manufactures complete industrial finishing systems.

Starting with equipment for wood finishing, the company



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