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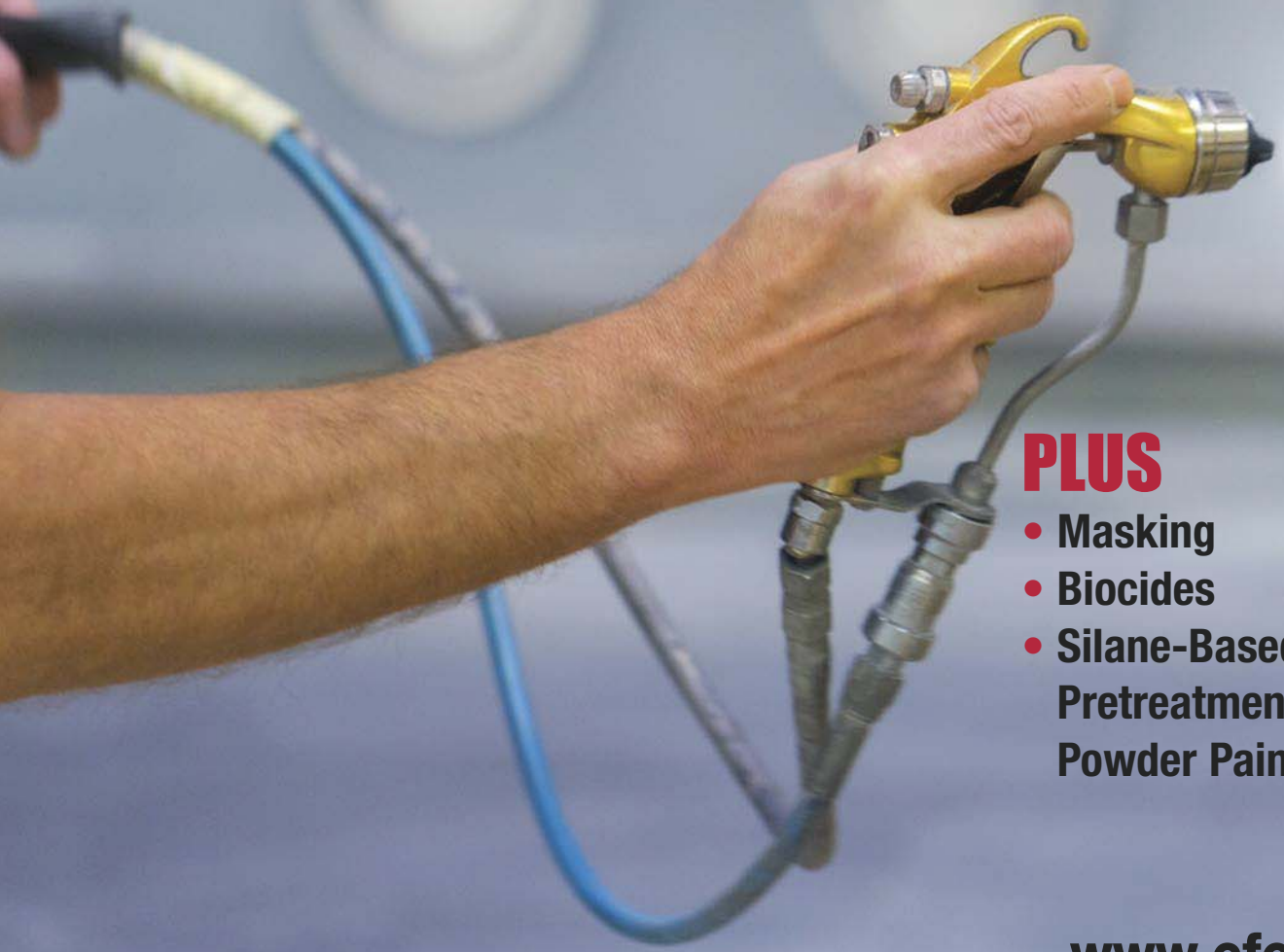
The Future of Wood Lacquers

How technology is responding to a changing marketplace



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Michael Harrison, President
Yorke Towne Supplies Limited

Louie Forestieri
Multiflex Custom Cabinet & Millwork Solutions

Sam Cesario, Sales Representative
Yorke Towne Supplies Limited

"With the current trend having moved from laminate to paint, accurate and consistent colour matching is more important than ever. Usually, our jobs begin by meeting with interior designers and reviewing the colour palette they've selected for a project. From there, we begin collaborating with our Chemcraft Distributor.

Their colour team works alongside myself and my colour finisher to recommend the substrates, products and finishing techniques that will bring the designer's colour vision to life. Our reputation depends on accurate colour matching, and our Chemcraft Distributor provides the products and support that helps us deliver the results our customers expect. It's a great partnership."

Louie Forestieri
Multiflex Custom Cabinet & Millwork Solutions
Toronto, ON

Founded in 1977, Multiflex Custom Cabinet & Millwork Solutions provides high-quality custom crafted cabinetry and millwork to the corporate, hospitality, retail and high-end custom home markets. Their Chemcraft distributor is Yorke Towne Supplies Limited in Richmond Hill, Ontario.

Visit chemcraft.com to locate your nearest distributor.

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Future Proof

Surviving in any business continually involves speed and flexibility with every process, from research, development and planning to production and logistics. Those most effectively delivering the right products to customers at the right time for the right price, win.

Indeed, an article from the World Economic Forum lists the "intelligent" factory along with utilizing virtual and augmented reality, 3D printing, and automation, as trends shaping the future of manufacturing.

Venjakob is one company in this issue (page 16) developing various tools to assist its customers in intelligent (i.e., data and IT-driven) and virtual ways.

Andrew Scott-Taggart, Technical Sales Manager, says the company wants to offer its customers the best support and in order to do that, Venjakob will add another in-house solution to its existing remote maintenance and connection solution.

A Service App, working in conjunction with a Smart Access Device (smart glasses, smartphone or tablet), will allow a Venjakob service technician to support the customer with troubleshooting, thereby reducing downtimes. The machine operator would dial in on the Venjakob server via the Service App. Using smart glasses or a smartphone, the machine operator can transmit pictures of the on-site situation. Machine-relevant data can also be displayed. The technician can provide hints to the operator by using pointers, fading in symbols or by entering texts. The entire call/video can be recorded for documentation purposes.

In the future, says Scott-Taggart, it should also be possible to use the machine data obtained during operation for Predictive Maintenance. Better planning of maintenance will reduce downtimes and sudden loss of production, allow predictive scheduling of maintenance, transform several smaller service assignments into a larger one, and identify influences leading to failure and a change of these influential factors.

Time is money so investigating how new technologies can help future-proof your business is always worthwhile.

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More Than 500 New Products Set to Debut at FABTECH 2019

FABTECH will bring a wealth of innovation and technology solutions to Chicago McCormick Place, November 11-14, 2019. More than 48,000 attendees and 1,700 exhibiting companies are expected to gather once again to celebrate metal manufacturing at its best. The event also provides educational sessions and expert-led presentations covering the latest trends and technology in the metal forming, fabricating, welding and finishing industries.

An interactive exhibit floor space gives attendees the unique opportunity to compare equipment side-by-side. See all the latest advancements in finishing and coating manufacturing in one place.

Visit the show website to search more than 500 new products and services by technology category and download the New Product Preview to see a sample of new products set to be unveiled in Chicago. Find descriptions and images of new machinery, new materials and new processes.
www.fabtechexpo.com

AIC Moves HQ to New Location

American International Chemical (AIC), a subsidiary of LBB Specialties, has relocated its headquarters to 2000 West Park Drive, Suite 300, Westborough, MA.

"AIC's relocation marks an important step in our growth strategy by providing the space to accommodate our growing staff and upgraded technology, along with improving our ability to service our specialty customers' needs," says Darren J. Birkelbach, President.

On September 26, 2019, AIC held a ribbon cutting ceremony, officially opening the new location which has more than 15,000 square-feet of space. There is a large, light-filled hub area for employees to take breaks, eat lunch and hold informal meetings.

The new space also includes two conference rooms and breakout areas for collaborative work. Enhanced telecommunications and an upgraded technology infrastructure will support more robust communications among AIC's suppliers, customers, and employees.

Birkelbach says the entire AIC management team and staff are enthusiastic about the move to this new location. "We continue to invest in resources to meet the needs of an ever-changing business environment that demands more from our employees. We are ready and willing to accommodate these needs to the fullest."
www.aicma.com

American International Chemical LLC (AIC) announces relocation to new headquarters.

AkzoNobel's Wood Coatings Business Hails New Dawn with 2020 Color of the Year

Tranquil Dawn has been unveiled as AkzoNobel's Color of the Year for 2020. The culmination of extensive trend research by experts around the world, the company says it's designed to "capture the essence of what makes us human" as the dawn of a new decade arrives.

A shade somewhere between green, blue and grey, Tranquil Dawn is used throughout the company's paints and coatings businesses "to inspire customers and make the task of choosing color easier."

Color experts from the company's Wood Coatings business were heavily involved and worked closely with AkzoNobel's global color and design team in order to develop on-trend selections for customers in various paints and coatings markets. One of the main areas of focus was translating the four related color palettes for wood customers to use with specific products. The four Wood Coatings palettes are called Upcycle, Hybrid, Classical and Evolve.

"A unified color and trend development process across AkzoNobel definitely helps us to successfully launch and leverage our own stories of trending color in the markets we serve," says Rob Haley, Color Trends Manager for the company's Wood Coatings business. "We are able to use the Color of the Year and the accompanying palettes across all the wood segments of furniture, flooring, cabinetry and building products."

Working with colors for wooden furniture, cabinets and flooring is an art which requires careful attention, AkzoNobel says. Unlike a wall paint – which usually involves applying color to a white surface to get a 100 percent match – a wood coating can also be applied to play and blend with its substrate. This is why the Wood Coatings business took the Color of the Year and its four accompanying palettes and carefully crafted different finishes for these different products.
www.akzonobel.com

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CMTS Enagages Profile Speakers and Innovators Jim Balsillie, Jean Charest and Ric Fulop

The future of Canadian manufacturing took center stage in early October at the Canadian Manufacturing Technology Show (CMTS).

CMTS says it is the country's largest and most comprehensive trade show and conference for advanced manufacturing technologies, cutting-edge equipment, best practices and industry connections.

The 2019 show – 10 per cent larger in both exhibitor and attendee numbers – attracted more than 9,000 manufacturing professionals from across the country and the world and featured more than 430 exhibits – with some 700 industry suppliers represented – more than 80 education sessions and four workshops. With an expanded conference taking place over three days and focused into three education tracks – Digital Transformations in Manufacturing, Advancements in Automation Technology and Additive Manufacturing – the event delivered some interesting insights.

Keynote presentations included:

Ric Fulop, CEO and co-founder of Desktop Metal, on "Additive Manufacturing as an Enabler of Industry 4.0"

Jim Balsillie, Chair of the Centre for International Governance Innovation and former chairman and co-CEO of Research In Motion, on "Strategies in the Era of Intangible Assets"

The Honorable Jean Charest, Partner, McCarthy Tétrault LLP, Quebec premier (2003-2012) and member of the Queen's Privy Council for Canada, on "Trade, Trends, Uncertainty and Canada"

"CMTS continues to evolve with the Canadian manufacturing landscape, delivering a program line-up that presents the latest technologies from global OEMs while also addressing the manufacturing revolution that is upon us," says Julie Pike, Director, Canadian events at SME, adding that there was more than three million pounds of manufacturing equipment on the show floor.

Calling CMTS a diverse and interactive experience, Pike says the event puts the capabilities of machine tools and tooling, metalworking and advanced manufacturing technology – including the latest in additive manufacturing – on display and explores the applications across multiple industries, including aerospace, automotive, energy, government, agriculture, food processing, construction, and more. "These technologies are challenging the status quo, from best practices throughout the business landscape to public policy," she says.

According to Pike, CMTS was strategically located in Canada's largest manufacturing hub, with Ontario and Quebec remaining the country's biggest manufacturing provinces. "Ontario is where 700+ parts suppliers and 500+ tool, die and mold-makers converge along a 400-kilometre automotive corridor, forming one of the most robust supply chains in the world," she says.

www.cmts.ca

Trade Fair for Industrial Coating Technologies Adjusting Painting Processes to New Requirements

Surface finishing is the decisive criterion for the success of products, and thus for a company's competitive edge. Consequently, industrial coating technologies make an essential contribution to value creation. Companies with in-house painting operations and coating job-shops are faced with changing and new requirements as a result, which necessitate corresponding process adjustments. PaintExpo will present the world's most comprehensive and future-oriented solutions at the Karlsruhe Exhibition Centre in April 2020. The exhibition covers everything from pretreatment to quality control and packaging.

Companies in all industry sectors are currently being confronted with a wide variety of trends and changes. These include new manufacturing technologies, the use of new and modified materials and material combinations, the realignment of entire industry sectors, shortened product lifecycles and smaller lot quantities, personalization of products, regulatory changes, the digital transformation and more rigorous goals with regard to energy efficiency and climate protection. Industrial coating technology is being impacted by this as well.

The competitiveness of coating operations, show operators say, will increasingly depend on how well and quickly they can respond to these changes. The great complexity of painting and coating processes with numerous interlinking work steps makes comprehensive information concerning trends, technologies, new developments and the suppliers throughout the entire process sequence indispensable. PaintExpo says it will present a corresponding cross-technology, cross-industry overview with more comprehensive and up-to-date offerings than anywhere else in the world at the Karlsruhe Exhibition Centre from April 21-24, 2020.

To date, more than 450 companies from 22 countries have booked booths. Exhibitors cover all process sequences for powder coating, liquid and UV painting and coil coating technologies. The spectrum of materials to be coated ranges from metals, plastics, wood, wooden materials, glass and ceramics, right on up to material combinations.

"This targeted concentration of suppliers and technologies makes it possible for job-shop coaters and visitors from companies with in-house painting operations to inform themselves efficiently and in a targeted fashion about solutions to their own individual tasks, and to arrive at appropriate investment decisions," says Jürgen Haußmann, Managing Director of FairFair GmbH and promoter of PaintExpo.

www.paintexpo.com

New Georgia-Pacific Chemicals Website Simplifies Product Selection

Georgia-Pacific Chemicals has announced a redesigned website, intended to simplify product selection in the numerous industries in which it

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participates. The site has been optimized for full mobile and desktop functionality.

The site also features new products and capabilities such as new ultra-low phenol and formaldehyde coatings resins, new products for the asphalt industry and custom tolling services.

"We have such an extensive product portfolio that we wanted to reconfigure our site to make it easier for customers to find products with the properties they are looking for," says Jim Arduino, Director of New Product Marketing and Commercial Development. "Of course, we also work closely with our customers to refine these products to meet their specific needs but the new site will give them a jumping off point to see how we can help them."

The challenge was incorporating the broad portfolio of practical product solutions, as well as the many industries which Georgia-Pacific Chemicals serves into the new site, according to Arduino. Georgia-Pacific Chemicals provides products for more than 20 distinct industries in hundreds of applications from agriculture to wood adhesives to coatings. Site users can find the products they need quickly searching by industry, product type, brand or keyword, with the ability to zero in by specific application.

In addition to encouraging collaborative product development, the site contains information on Georgia-Pacific Chemicals research and development capabilities, distribution services, global reach, news and upcoming events.
www.gp-chemicals.com

Huber's Fire Retardant Additives Plant Expansion Nears Completion

The Fire Retardant Additives (FRA) business unit, part of the Huber Engineered Materials (HEM) division of J.M. Huber Corp., announced its Fine Precipitated Hydrate (FPH) phase two capacity expansion project at the Martinswerk, Germany, plant, which was approved in March 2018, is scheduled for completion this year.

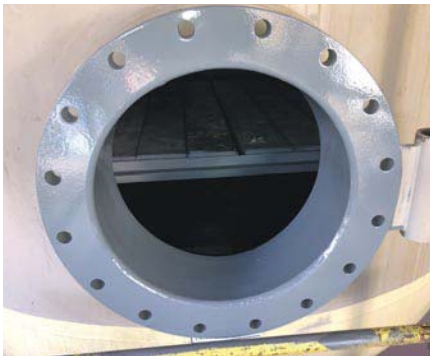
This investment increases FPH production capacity at Martinswerk for high quality MARTINAL LEO grades approximately 20 percent. The expansion project represents the single largest investment made over the last 40 years at Martinswerk and will also result in the delivery of several significant sustainability improvements (e.g., water reduction) in line with company objectives.

"This investment underlines the commitment toward our customers to support their growth and our strategy to grow and strengthen our global halogen-free fire retardant business. We are proud that our engineering and operations teams will complete such a large and complex project on time," says Martin Schulting, Managing Director of Huber's Martinswerk FRA business unit in Europe, Middle East and Africa (EMEA+I). "We continue to position ourselves as a reliable and trustworthy supplier of high quality products, which bring value to our customers."

The MARTINAL LEO fine precipitated alumina hydrate grades offer consistently superior processing properties and serve as the company's global product platform for its customers.

Huber has been a supplier of non-halogenated flame retardants and smoke suppressants for almost 40 years, manufacturing a large portfolio of value-added molybdate compounds for a variety of end-use applications, including reinforced polyester molding and pultrusion, engineering thermoplastics, roofing, silicone rubber, wire and cable, coatings and carpet backing. In addition, Huber produces MARTOXID calcined aluminium oxides, COMPALOX specialty oxides, and PERGOPAK carriers and matting agents.
www.hubermaterials.com

Internal Linings Saved by Corrosion-Resistant Coatings



The process of extracting and processing uranium can present many challenges. Machinery and equipment are exposed to environments during production, which over time can cause damage and lead to shutdowns.

If left untreated, corrosion can lead to major consequences for large assets, such as vessels, both on a financial and environmental level.

A uranium mine in Australia uses a unique extraction technology to produce high purity uranium. A planned upgrade revealed issues with the existing rubber lining of exchange vessels, critical to the extraction process. The lining failure had caused corrosion of the steel substrate (which had continued to go unnoticed behind the rubber) and now had the potential to severely impact production and ultimately shut it down completely.

The exchange vessels measure approximately 8.2ft in diameter and 16.4ft in height and are considered the lifeblood of the business. The process conditions meant that there was a strong chemical presence and high operating temperatures further contributing to the corrosion of the lining.

A solution had to be presented that could offer good chemical resistance and withstand high operating temperatures.

The existing rubber internal lining had to be removed using a high temperature, ultra-high-pressure jet water operating at 302 deg. F and 40,000 psi pressure. This stripped back the rubber lining, leaving a bare steel shell with only small amounts of rubber remaining. This was then whip blasted and any sharp angles, burrs and weld defects were identified and prepared to a minimum R5 radius suitable for coating.

Following on from the pre-surface preparation, the vessel was degreased using high-pressure water jetting at 6,000psi followed by a solvent wash using MEK before being blasted.

Before the new internal linings were applied, nozzle inserts were fitted with a stripe coat of Belzona 1391T to the circumferential welds and bracket details. Nozzle inserts manufactured using Belzona 1511 (Super HT-Metal) were initially dry fitted into the appropriate nozzle where they were then marked and cut to size before being bonded in place using Belzona 1391T. Small areas of pitting around the welds were filled at the same time and allowed to cure. After the required length of time and within the overcoat window of Belzona 1391T, the stripe coat was applied to the welds and large nozzles.

Spraying of the new internal linings began once the stripe coatings were cured. To provide a full turnkey solution without any delays, blasting of the second vessel began whilst the first vessel was being coated. The original coating was then left to cure overnight with a second coat to follow the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next day. Heat was applied to the vessels to assist in providing a fast cure time and return to service.

The overall application was completed very quickly, with each vessel taking a few days to finish. The vessels gained long-term protection against corrosion and a longer service life.
www.belzona.com

PPG Invests $15 Million in Singapore Aerospace Application Support Center

PPG recently announced a $15-million investment in a new 38,750 square-foot application support center (ASC) at the Seletar Aerospace Park near the Seletar Airport in Singapore. The project is the company's largest investment to date in Southeast Asia.

Scheduled for completion in the first quarter of 2020, the ASC will accommodate increased demand for aerospace sealants and coatings, chemical management services and the packaging of third-party products.

"This investment acknowledges the aerospace industry's strong growth in Southeast Asia," says Ranju Arya, PPG General Manager, Aerospace Products, Asia Pacific. "Having this state-of-the-art facility in Seletar will help increase collaboration and allow PPG to deliver efficient, value-added services to our customers locally."

PPG's global aerospace business offers coatings, sealants, transparencies, packaging and application systems, and transparent armor, as well as chemical management and other services.
www.ppgaerospace.com

People

Orion Engineered Carbons Announces Expanded Roles for Riveros, Niewiem, and Reers

Orion Engineered Carbons recently announced changes in its executive management team.

Pedro Riveros is appointed Senior Vice President Global Rubber Carbon Black and General Manager for the Americas. Riveros joined Orion in June 2019 and previously held the position of Senior Vice President and General Manager Americas. In his new role, Riveros will be responsible for the Global Rubber Carbon Black product line and all aspects of the Americas region. He will continue to report to CEO Corning Painter.

Sandra Niewiem is appointed Senior Vice President Global Specialty Carbon Black and General Manager for the EMEA Region. Niewiem joined Orion in December 2013 and previously held the position of Vice President Global Product Management and Business Development Specialty Carbon Black. In her new role, Niewiem will be responsible for the Global Specialty Carbon Black product line and all aspects of the EMEA region. She will continue to report to Corning Painter.


Pedro Riveros


Sandra Niewiem


Michael Reers

Michael Reers is appointed Chief Administration Officer. Reers joined Orion in September 2012 and previously held the position of Senior Vice President and Group Controller. In his new role, Reers will be globally responsible for Information Technology and Carbon Black Oil procurement. He will report to Corning Painter.

"These leaders have demonstrated excellent capabilities and a bias for action," says Painter. "In their new roles they can further expand their contributions to Orion and our valued customers."

Erik Thiry, formerly Senior Vice President Rubber Carbon Black, has left the company to pursue other business interests.
www.orioncarbons.com

Charkit Chemical Announces Promotion of Panos Yannopoulos to Evp, Sales

Charkit Chemical Company of Norwalk, CT, a subsidiary of LBB Specialties LLC, has promoted Panos Yannopoulos to the role of Executive Vice President, Sales. Yannopoulos will be responsible for leading Charkit's sales organization.

Jay Lang, President, says: "This will include setting direction and strategy, establishing the optimal structure and processes to facilitate Charkit's profitable growth, leading our initiative to develop relationships with new suppliers, spearheading Charkit's cross-selling activities with other LBB Specialties business units, and, most importantly, leading our people."

With more than 30 years of experience in the industrial specialty chemicals sector, Yannopoulos is widely regarded, Lang adds, as a thought leader within Charkit and the chemical industry as a whole. He joined Charkit in 2002, following 13 years with Aceto, where he was Group VP of Industrial Chemicals. He holds a BS in Chemistry from the University of Connecticut.

"Mr. Yannopoulos will continue to manage several of his current key accounts. He will also assume the role of mentor-coach as he works to develop our existing and future sales talent. In this way, both Charkit and our people will grow," Lang adds.
www.charkit.com


Panos Yannopoulos

CPCA CORNER

Targeted Regulatory Reform Long Overdue in Canada

By Gary LeRoux

In September, CPCA responded to the federal government's call for views on regulatory modernization in Canada. As in the past, CPCA remains most concerned about the need for regulatory modernization to address the increasing regulatory burden on industry.

This is an integral part of ensuring Canada is competitive by aligning regulations with that of other jurisdictions, especially those of the United States, our largest trading partner. This is critical for the coatings industry, and other sectors of course, as paint and coatings is still among the most heavily regulated industries in Canada. CPCA's comments focused on specifics such as the need for regulations to be more agile and more responsive, while continuing to protect health, safety and the environment.

Other areas emphasized the need for targeted regulatory reviews rather than ones that capture a wide spectrum of business activity; increased use of the Red Tape Reduction Act to alleviate regulatory burden in Canada; more options to make positive changes to regulatory mandates; and specific suggestions for the next annual Regulatory Modernization Bill before Parliament. Many industry sectors know that federal regulations, now numbering more than 132,000 and counting, are a drag on Canada's economy. Canada ranks 34th out of 35 OECD countries in terms of positive regulatory impact on the economy. This has to change.

CPCA believes chemical manufacturing must be considered in Round 2 of the federal government's regulatory modernization effort. Canada's coatings sector is very much in favor of a regulatory system that will facilitate clean technology innovation to enhance competitiveness. This can be done by limiting the number of restrictions and regulatory impediments to any process, product, or chemical that is unique to Canada. Clearly this would require increased alignment with our largest trading partner, the United States.

In the case of paint and coatings, as with many other sectors, a large volume of product is shipped to Canada from the United States and many of the companies doing business in the coatings sector are U.S.-owned companies with substantial intra-company movement of goods and people across the border. It's no secret that Canada's productivity lags that of the United States by approximately $10,000 per worker and new approaches are needed to close that persistent gap. However, those enhancements must be made in the new digital economy and they aren't, new wealth creation will be restricted in the foreseeable future as it relates to manufacturing and chemical manufacturing specifically.

Clean Technology: There are many examples of clean technology in paint and coatings products as follows:

- Products that significantly reduce volatile organic (VOC) emissions, which are precursors to fine particulates and ozone that in turn contribute to climate change.
- Marine products that prevent bio-contamination from causing "drag" on ocean-going ships that would otherwise consume more fossil fuel and emit more CO2 emissions.
- New and emerging products such as those preventing the development of bacteria and viruses in hospital and clinical environments, products that kill mosquitoes or can help eliminate atmospheric pollution.
- A growing number of smart coatings that prevent corrosion and/or degradation of structures and surfaces such as wind turbines, solar cell platforms, cell phones, etc.

Paint and coatings products are certainly common denominators for virtually all green technologies developed to enhance performance of various substrates, while at the same time reducing the overall environmental footprint of those companies. As such, paint and coatings manufacturing must be viewed as an enabler to environmental sustainability for all those industries using coatings to enhance or extend the lifecycle of their products/structures, reduce overall operating costs, and realize efficiencies and utility from such coatings products. As such, the coatings industry in Canada must be supported and sustained via the regulatory process over the long-term as part of efforts to enhance productivity through regulatory modernization.

CPCA has grave concerns with several legislative and regulatory initiatives being planned beyond 2020, which may act as disincentives to the expansion of clean technology in Canada, for coatings in particular. For example, the ongoing reform of the Canadian Environmental Protection

Act (CEPA Reform) will be implemented within the next several years by the federal government. These reforms will be based on many of the recommendations proposed by the Parliamentary Committee on the Environment and Sustainable Development. Some of these reforms will negatively impact productivity. The current federal government has largely endorsed all of these reforms. They include suggesting a European REACH approach to chemical assessment that places the burden of proof on industry for all substances of concern to enhance transparency, but reduce CBI protection in the process. This may indeed introduce undue regulatory pressure on smaller Canadian-based manufacturers who do not have the ability and resources needed for significant research and development or cannot ensure adequate protection of their trade secrets.

The Parliamentary Committee's recommendations have the potential to create insurmountable barriers to the manufacturing of competitive products in Canada. The recommendations could also restrict the availability of key chemicals needed to innovate in a wide range of highly performing paint and coatings mixtures, many of which are water-based. There appears to be a real disconnect between the environmental and health policy targets versus the Canadian government targets for economic growth. Clearly, the former now greatly hinders the latter. Therefore, the current regulatory review of clean technology initiatives must focus on the following:

- Enhance monitoring of all modifications to legislative requirements posing an impediment to development of clean coatings technologies.
- Intensify and expand collaboration among advanced manufacturing superclusters and smaller Canadian-based businesses to further accelerate the development of clean technology.
- Support the development of a talented workforce and leading-edge expertise in Canadian industry via diverse federal-provincial regulatory programs including universities and research centers.
- Facilitate financial access and support for clean technology start-ups and SMEs as well as related public-private partnerships and international financing sources, while closely monitoring these regulatory programs with respect to their orientation, targets, performance metrics, and timing.
- Prioritize the development of energy efficiency or clean energy and what are already viewed as

truly renewable, sustainable and smart technologies in the coatings sector as they have been overlooked to date.

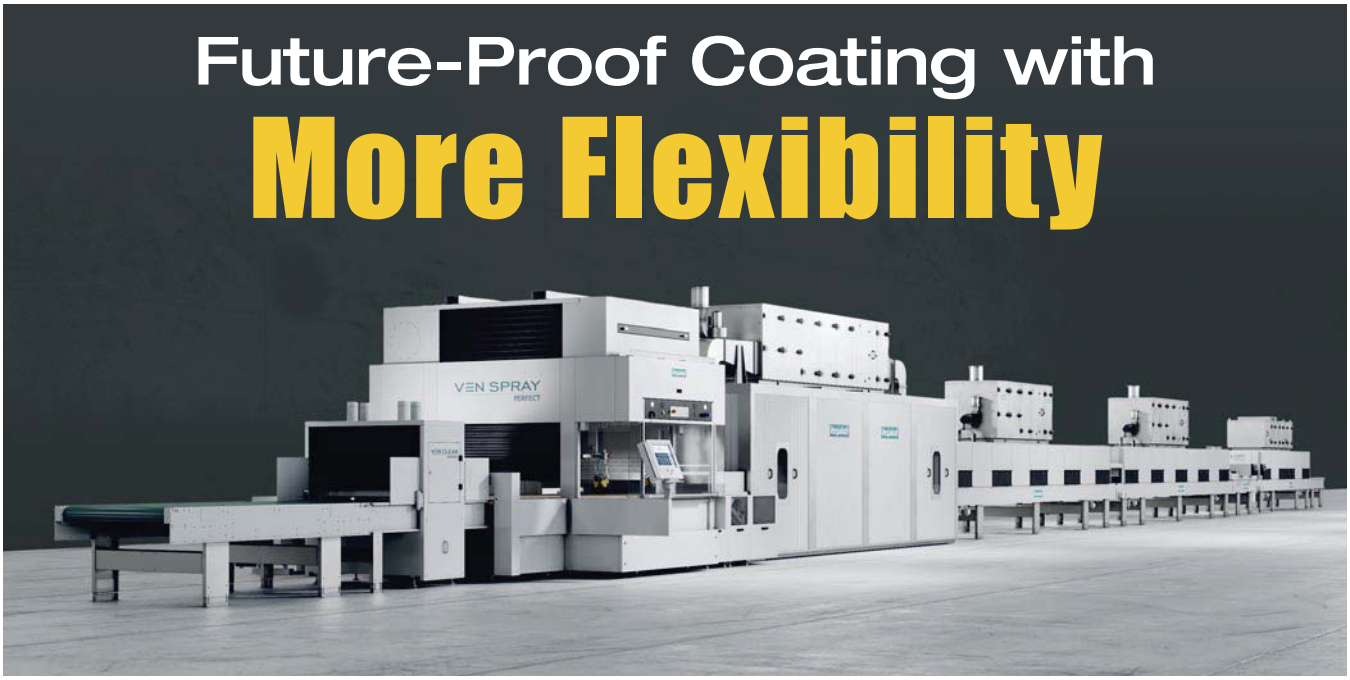
Digitalization and Technology Neutrality: CPCA and its members fully endorse a meaningful review of current legislation that would advance digitalization in the regulatory space. This would also include any tools that could be used to reduce administrative regulatory burden, enhance intellectual property rights and ensure business information protection. Through increased digitalization, the Canadian government will better assist businesses in adapting to increasing globalization and deal with the complexity across supply chains. This may be beneficial with respect to increasing information sharing for new and existing chemicals in commerce, including alternative chemicals and informed substitutions for those chemicals in coatings.

Recognizing the difficulties expressed by our members in fully grasping massive Canadian legislative and regulatory requirements, CPCA moved expeditiously and developed its own digital platform for the Canadian coatings industry, the Canada CoatingsHUB. This hub facilitates ongoing research on existing regulations and regulations being considered for the paint and coatings industry, and the approach promotes further compliance and risk mitigation in the coatings industry. It also helps CPCA gather critical data from industry to support the current use levels for many products now under chemical assessment by the federal government. More digitalization of the regulatory space will mean easy access to relevant content on various digital platforms by companies, all searchable on multiple platforms. Government must take a similar approach to the digitalization of its regulatory data points. Antiquated delivery systems and out-dated technology solutions must be addressed across a number of federal departments and agencies to address what has been a range of deficiencies in data dissemination and industry access to critical compliance data.

In the context of a global digital economy, all federal and provincial regulations aimed at enhancing access to information, while protecting confidential business information, will help reinforce competition law in Canada. However, Big Data projects and related analytical development in

continued on page 52

Future-Proof Coating with More Flexibility



The modular plant transports the workpieces from the material polishing station through pre-cleaning to the coating process in an automatic spray coating unit.

By Andrew Scott-Taggart

WHEN IT COMES to flatline finishing, many customers are looking for a tailor-made initial investment with options for future expansion.

Nowadays, a modern spray coating system is configured based on a combination of required process steps, a flexible design of the higher-ranking plant control systems and consideration of economic factors. The main focus of the planning phase is achieving the greatest possible versatility of use for the machines employed.

Venjakob's modular system for coating furniture, glass surfaces and special materials also has added digital functions that provide operating data to document and optimize processes.

MODULAR PLANT CONCEPT

The workpieces are placed in a flat position on a horizontal transport system, which transports them through the coating line. The plant is modular and transports the workpieces from the material preparation station through pre-cleaning to the coating process by the automatic spray coating unit.

The coating process is followed by a necessary pre-drying step for the coating materials using a laminar air flow, multi-level dryer with subsequent forced drying by means of turbulent air in a slotted nozzle tunnel. The drying temperatures can be adapted to the coating system in use.

In addition to slotted nozzle drying, which can be supplemented with an infrared radiator section, if required, the workpiece surfaces also undergo post-curing in a UV drying channel. In a final step, the workpieces are cooled down to a stackable base temperature in a cooling tunnel. The system is suitable for use of traditional water-based wood finishes or organic solvents. In addition, UV finishes can be used. The system is suitable for conven-

INDUSTRY ISSUES SNAPSHOT

with Andrew Scott-Taggert, Technical Sales Manager, Venjakob North America Inc.

What are the big issues for your company?

Engineering and manufacturing of individually, highly sophisticated finishing lines always designed to meet and exceed customer requirements.

Customers around the world trust in our qualified staff, passionately working on creative solutions. They rely on our fast customer service and wide range of spare parts in stock.

More specifically, what problems do customers ask you to solve?

They want flexible and variable production solutions with smallest possible batch sizes while handling fast color changes and expandability to react quickly to changing market requirements.

Customers also want high-performance, cost-effective solutions, low-downtime, reliable process and reproducible quality, easy-to-use independent to operator skills, and VOC regulation conformity.

What new products address these concerns?

Venjakob has taken into account most of the mentioned customer requirements. The modular designed construction of the machine technology makes the investment future-proof. Existing finishing solutions can be expanded or retrofitted according to changing customer specifications. Maximum productivity at minimum inspection and service time. Machines are designed based on all relevant commercial aspects (ROI/OEE).

The latest machine generation offers a quick color change management system and an optimized spray booth for perfect air circulation. Almost no solvents leave the machine.

Industry 4.0/networked machine line production is a big issue, too, but our machines have been operating that way for a long period of time. We want to generate maximum value for the customer. He should benefit more from his networked production line. To do this, Venjakob offers two dashboard systems which demonstrate how to make use of machine data to monitor the production process, to predict maintenance or to make analysis for management decisions. The Tapio ecosystem, well-known in the woodworking industry and is Cloud-based. We also have our proprietary dashboard analysis tool, VEN PROFIT. It stores the operating data independently on the local network and optionally in a Cloud. Access to the data takes place via defined interfaces, which are individually adaptable according to customer's wishes and given conditions.

In the future, Venjakob will focus on another in-house solution in addition to the remote maintenance and connection by the Tapio Service Board. A Service App, in conjunction with Smart Access Devices such as smart glasses, smartphones or tablet will allow a Venjakob service technician to troubleshoot, assist and reduce downtimes. Predictive maintenance will also be possible in the future.

tional two-component polyurethane systems or enamel coating materials used in glass coating. A modular base concept permits combination of the respective machines to create the overall plant.

The modular concept allows for customized equipment of individual machines based on a harmonized platform system. An integrated solution is comprised of machines with optimized individual equipment. A higher-ranking communication level ensures flexible coordination between individual components.

PREPARATION AND SPRAY COATING

The upstream workpiece cleaning system removes contamination from the workpiece surface with zero contact through the use of rotating air nozzles with optimized consumption. An efficient extraction system then removes suspended particles and transports them to the dust extraction system on site. After the cleaning step, the static charge of the workpiece surfaces is neutralized by an ionization system. The workpieces exit the pre-cleaning stage clean and neutralized.

The spray coating machine uses an enclosed conveyor belt system to make the workpieces pass under the spray-coating guns, which move at right angles to the running direction. The machine can be equipped with an automatic paint changing system to perform a quick color change. The material selection is from pre-determined recipes selected by the operator, RFID or scanned bar code. The paint change is automated and includes all required cleaning steps.

The spray system is equipped with an extraction system that is specially adapted to the specific material application, in conjunction with a sophisticated fresh air supply system, permits optimum extraction of any generated overspray. A workpiece scanner on the infeed side scans the workpieces. The machine control system then generates an optimized application pattern for each installed spray coating gun. Any remaining coating material accumulated in the workpiece edge offset area on the conveyor belt is removed and recovered by the belt cleaning system.

The cleaning system is designed so that simple alternation between different water- and solvent-based coating systems in the plant is possible. As an alternative, non-stop plant production is permitted by a second additional cleaning system which allows for ongoing production. Due to its modular design, the machine has high production availability. It also complies with stringent energy and environmental standards.

FLEXIBLE DRYING SYSTEM

The drying system consists of modules, which allow free configuration of process engineering variables such as air speed, temperature and, optionally, humidity. The usual drying phases are based on the specific coating systems in use. Multiple technologies from short evaporation to intense drying phases supported by infrared thermal radiation with subsequent UV curing are possible. In a final step, a controlled, conditioned cooling process ensures a reproducible and reliable total drying process.

HIGH PLANT AVAILABILITY

The individual machines are equipped with modern actuators and sensor systems for their wide variety of functions. An integrated communication system using state-of-the-art bus systems makes all relevant system parameters available at all times, allowing pre-selection and setting of these parameters on the central plant operating panel. If required, each product gets its own recipe. This data can be used to select all criteria from material to drying parameters. Material/paint can be prepared during ongoing production and activated within a very short period.

Finishing lines should have high availability to ensure that the investment pays for itself in a timely man-

ner. The division of the total shift time, into production and cleaning should be taken into account, as it defines the plant's efficiency and profitability. The modular platform gives operators the ability to turn their plant into a system that permits a practically continuous production process without interruptions. Time-consuming processes such as cleaning of the belt cleaning systems can be performed during active production.

EXTENSIVE MACHINE AND PROCESS DATA

The increasing importance of traceability of individual production steps and constant readiness for production has made modern plants dependent on available information within the systems. Venjakob coating lines are equipped with modern information processing technology and intelligent actuators. Status data is recorded centrally and specially adapted evaluation software provides the plant operator with all necessary data. Characteristic data is monitored to inform the service department of necessary wear-related work well before the plant has to be stopped due to a major failure, while the production management receives reliable data about productivity, allowing it to meet all specified targets.

Material flows and requirements planning become easier within the linked information network, as all requirements are detected early. Flexible planning of the entire supply and discharge logistics chain is possible, as users remain aware of the productivity level at all times. Capture and reproducibility of process data permits gap-free evaluation of the quality of production. ■

Andrew Scott-Taggart is Technical Sales Manager, Venjakob North America Inc.

A look into the spray coating plant.

The Future of Wood Lacquers

How Technology is Responding to a Changing Marketplace

By Rob Penfold

LACQUERS have been used to finish, beautify and protect woodwork for 150 years.

The first nitrocellulose lacquers appeared in the 19th century and provided a fast-drying, relatively durable finishing solution. What is a lacquer? Technically speaking, a lacquer is a thermoplastic resin in a fast-evaporating solvent blend that makes for easy spray application. These lacquers are easily softened by those same solvents and are very susceptible to yellowing from UV exposure. Due to these less than desirable traits, there have been vast improvements in lacquer technology. Today, the term lacquer is used as more of a colloquial umbrella term that covers most acid-cured wood coatings including acrylic lacquers, pre-catalyzed and post-catalyzed lacquers and conversion varnishes, all of which vastly out-perform nitrocellulose lacquers.

Solvent-based, acid-cured coatings or lacquers continue to dominate the North American interior factory wood finishing market because they exhibit the best balance of health, safety and environmental priorities, performance and cost. They feature ease of application and perform well under most ambient shop conditions while yielding durable final film properties and aesthetics. Thirty years ago, lacquers made up almost the entirety of the coatings used in industrial wood finishing in North America. However, large wood products manufacturers have started moving to UV-cured coatings as a way to increase production volumes. UV, waterborne UV and 100 percent solids UV coatings are widely used on many flat-line applications.

As far back as the early 90s, coatings manufacturers were being asked by customers, "When are we going to have to switch to waterborne coatings?" It is a question that is still being asked today. Waterborne is always a popular topic of discussion at trade shows or industry events. What is the state of waterborne today? It is estimated that waterborne makes up around 10 percent of all the wood coatings used in North America. That is higher than it has ever been, but certainly not where everyone thought it would be by now. It was thought that the industry would be forced to go waterborne once the "nasty" solvent-based coatings were regulated out of use. There is a great deal of interest in waterborne wood coatings and much less resistance to trying them than in

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the past. Waterborne no longer suffers from the stigma of being an inferior product.

Waterborne technology has made incredible strides over the last two decades, to the point that the overall film properties and visual appearance of waterborne are virtually indistinguishable from solvent-based finishes. Why then hasn't the marketplace fully embraced waterborne wood coatings, especially given the societal pressures to be more environmentally responsible?

The main reason is that there is definitely a learning curve with respect to application of waterborne finishes. The demands of production leave little room for experimenting with new finishing procedures. Another factor to consider is that waterborne products are more expensive than solvent-based. Shops are always looking at ways to minimize costs, not raise them. So today, waterborne has taken a piece of the traditional lacquer market share but not nearly what was expected by this time. It is likely that the adoption rate of waterborne wood coatings will continue gradually unless governments regulate out solvent-based finishes.

The other emerging market trend affecting solvent-based lacquers is the increasing presence of European polyurethane wood coatings. Polyurethane technology

is dramatically different than North American lacquer technology. European polyurethanes tend to offer noticeable performance gains (i.e. abrasion resistance) and ease of application (i.e. easier to achieve high gloss finishes). While substantially more expansive than lacquers, the advantages of polyurethanes make the

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Lacquers continue to be the dominant technology in industrial wood finishing.

increased price justifiable in the eyes of many wood product manufacturers. Estimates place the polyurethane market share at around 10 percent and growing rapidly. Rather than North American producers of wood coatings making polyurethanes, there has been an influx of European manufacturers setting up North American distribution to service what was an untapped market.

As traditional lacquers have to share market space with UV-cured products, waterborne finishes and European polyurethanes, what does the future hold for this tried and true technology? Manufacturers of traditional lacquers, or acid-cured wood coatings, have the advantage that the majority of end users are familiar with lacquer products and have designed their processes around how these products work. Despite this product familiarity, coatings manufacturers are finding ways to improve and innovate lacquer technology. Formulators are looking to improve the quality and performance of lacquers and to engineer solvent-based products that are better for the environment by lowering VOCs (volatile organic compounds), lowering HAPs (Hazardous Air Pollutants) and lowering or eliminating formaldehyde.

Coatings manufacturers are always striving to make better performing finishes. Pre-catalyzed lacquers were an improvement on nitrocellulose technology. Post-catalyzed lacquers offered more build and better resistance than pre-catalyzed lacquers. Conversion varnishes were the next step in the evolution by being even more durable and non-yellowing. New and improved takes on the existing technology hit the market frequently as manufacturers strive to offer application improvements (i.e. fast dry times, better flow and levelling, easier sanding, etc.) and improved film properties (i.e. higher build, better mar, scratch- and chemical-resistance).

There is also exciting research and development into a new futuristic category of coatings, nanotechnology. These coatings have the ability to sense and respond to environmental and other external stimuli. This is a fascinating new type of coating specialization that encompasses areas such as self-healing, self-cleaning, and color shifting coatings. Formulators will continue to improve and innovate conventional solvent-based coatings until such time as the industry is regulated toward waterborne.

Concurrently with the development of waterborne wood coatings, lacquer manufacturers were regulated in many areas to lower VOCs and HAPs. With traditional solvent based coatings, VOCs and HAPs are released into the air during the refining process of the solvents, the manufacturing process of the coating, and the final application process. These chemicals have been scientifically proven to play a role in the depletion of the ozone layer. They have also been proven to cause health problems in humans with prolonged exposure.

As a result, some state and provincial governments have enacted various emissions regulations that limit VOCs. Typical lacquers are 680 g/l. The strictest regulation is California's SCAQMD Rule 1113 which limits wood coatings to 275 g/l. In addition to the government regulations, there are several environmental programs that architects and builders participate in such as LEED and Greenguard which require greener coatings. Because there is a market need, makers of wood coatings typically offer their various lacquer technologies in low VOC and HAPs-free variants.

As mentioned previously, there is considerable end user interest in waterborne wood coatings but the adoption rate is quite slow. In response, coatings manufacturers are formulating "greener" solvent-based finishes, and among them are formaldehyde-free lacquers. Formaldehyde is traditionally used in wood coatings in the form of melamine-formaldehyde and urea-formaldehyde. They function as effective crosslinking agents for backbone polymer resins. Formaldehyde is a suspected cancer-causing agent. It emits a strong smell that can cause eye, nose, throat, and lung irritation.

Formaldehyde-free coatings are not only safer for the applicators and plant workers but also better from home owners who often complain of strong odors from freshly finished cabinets and furniture. The formaldehyde-free coatings that are now available provide the same aesthetics and performance characteristics of conventional wood coatings. Formaldehyde free lacquers provide an excellent green alternative for end users not ready to make the jump to waterborne.

The story of lacquers for wood finishing is one of change, evolution, adaptation and technology advancement. Despite the increasing interest in waterborne wood coatings and the growing presence of European polyurethanes, lacquers continue to be the dominant technology in industrial wood finishing. Coatings manufacturers continue to innovate by improving the performance of conventional lacquers and provide more environmentally responsible solvent-based solutions by reducing VOCs, HAPs and eliminating formaldehyde. Until such time as governmental regulations force and industry wide shift to waterborne, lacquers will continue to adapt to meet the demands of the marketplace. ■

Rob Penfold is Sales & Marketing Manager, Katilac Coatings Inc., Burlington ON.

Parts Masking:

The Key to a Successful Finish

SOMETIMES WHEN SURFACE FINISHING an object, you don't want the entire exterior coated. The solution is the precision process of part masking. Masking for surface finishing presents many challenges. Solving these challenges means choosing the right type and method for your mask as well as developing an understanding of the most common masking issues and their solutions.

Masking parts for painting and coating is a simple job in principle, yet intricate in practice. There is no room for error to achieve a pristine final product. Precision in masking is critical to product quality.

Nearly every product to be painted or coated is going to be unique, which means the masking needs will be, too. In many cases, off-the-shelf products will prevent coatings from going where they shouldn't. In as many other cases, custom designs and creative combinations of plugs and masking are required.

When masking metal parts to be electroplated, Sharrett's Plating Company (SPC) says maintaining that object's integrity and function is of the utmost importance. "Masking ensures the finishing material goes exactly where you want it to and nowhere else," the company says.

One major decision is deciding whether the mask you use will be temporary or permanent.

Temporary masks, which are disposed of after the project's completion, can be made of waxes, tapes or lacquers. Other types of temporary masks exist as well, such as magnetic masks or UV-curable masking resins, says SPC. "These masks offer versatility, but they must also be created for each project."

Permanent masks, which are more expensive and often custom-created, presen another alternative.

Chaos of masking by hand.

Permanent masks are often made of rubber or silicone and are designed to withstand harsh chemicals and high temperatures.

Permanent masks make sense for large jobs or when doing the same shape on the same part on a regular basis or when an off-the-shelf-shape will do. Eventually, says SPC, "new technology such as 3D printers may open an avenue for creating custom permanent masks at a much lower price point. So far, however, masks created on 3D printers have been unable to withstand the extreme temperatures required by most finishing applications."

Masking tapes and die cuts are extremely effective when masking a flat surface, says Caplugs. Both can be quickly applied and cleanly removed, leaving no adhesive residue. Caplugs sells a line of products it says is easy to work with as it offers greater stiffness, doesn't tear and can be removed in one piece. Masking tapes and die cuts can be used in a wide variety of applications to withstand abrasion, chemical solvent baths and extreme temperatures.

Die cut kits are useful, says Echo Engineering and Production Supplies Inc., "because they can be custom made to mask components that have multiple surfaces of different sizes

and shapes." Kits reduce the amount of time spent looking for the right die cut piece. They also ensure that no surface in need of masking is forgotten as each kit can be made to the exact amount of die cut pieces per component you are coating.

Powder coating has its own specific requirements, since the application process is different than traditional paint. Since the coatings need to be baked on, the masking has to be suited to the high-temperature application.

Echo sells a Green Poly, with a 3.5 mil thickness that will handle temperatures up to 400 F. It is an industry favorite for general-purpose powder coating applications, the company adds. A 2.5 Blue Poly is recommended for uneven or curved surfaces.

For high temperature coatings, Echo offers polyimide tape which can handle heat up to 500 F. Applications include extended high temperature paint cures, baking between plating cycles, or masking on PC. The tape removes cleanly and does not leave a residue. The company also supplies other products for the intermediate temperature range.

Brampton, ON-based Caps'n Plugs manufactures and distributes a vast array of plastic injection moulded parts, rubber compression moulded parts, vinyl dip moulded parts and tape products. If the company doesn't have it off the shelf, custom design is also available.

It has a new line of Push-In Bevel Plugs. These silicone plugs are designed to be pushed into place with a tool such as a Robertson screwdriver or T-bar Allen key into common metric threaded holes as high temperature painting masks. These plugs will keep the lead in bevel and the threads clear of paint and are easily remove by pulling the "E" dimension pull tab.

Mighty Hook Magnetic Discs.

Caps'n Plugs also has a new Multi-Level Thread Plug. The SMFP series is designed to plug two or more internal metric threads including the bevel as a paint mask. These plugs are

Leading and exit plugs.

made in high temperature silicone for powder coating applications.

A couple of years ago, the company expanded inventory levels at its Brampton warehouse, to help manage out of stock issues. It also added a high-speed tape slitter which enabled turnaround times as short as same-day.

Though 3D-printed masks may not be functional yet, companies like Caps'n Plugs employ them as prototypes for fit and functionality testing before the actual masks are made.

While it's best known for hooks and racks, Mighty Hook provides an extensive range of masking caps and plugs, as well as special molded masking products. The company says it specializes in challenging designs.

Magnetic Discs are the "most innovative masking product on the market today," says Mighty Hook. The re-usable high temperature silicone discs combined with a high temperature magnet can be used to mask ferrous products and can withstand temperatures up to 500 F.

"Its advanced design seals around edges to ensure quality masking, a tight seal, and no marks," Mighty Hook says adding what sets these discs apart from standard green discs are the re-usability and the fact they are easier to place and remove. Plus, you get two different diameters in one disc.

Mighty Hook also produces silicone masking tubing, for masking threads, pins and tubing where a longer masking length is required. The tubing is flexible but sturdy enough for use in masking threaded, non-threaded or slotted holes, and is easily cut for desired length. Its silicone foam cord can form a tight seal in threaded and non-threaded slots, grooves, irregular-shaped cavities, and through holes.

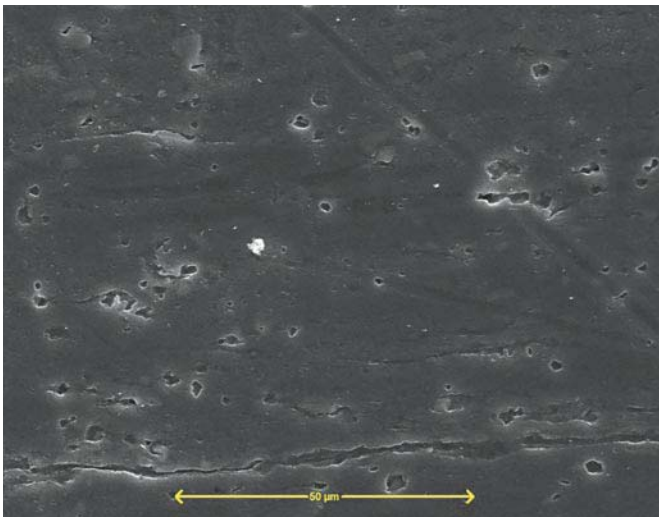
Matching masking to specific needs will probably always require experienced skill. But as that experience builds, and suppliers adopt more creative and flexible solutions for plugs and masks, the precision and efficiency of what is available is only going to increase.

The masking industry is never going to cover all of these off the shelf, but today's suppliers have learned how to provide for new needs with fast turnaround. ■

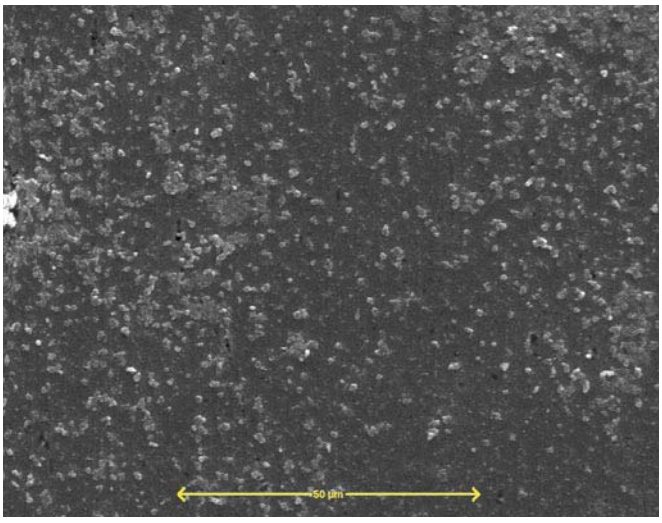
Silane-Based Multi-Metal Pretreatments for Powder Painting

By Stewart Tymchuk

POWDER PAINTING is a widely used method for corrosion protection and decorative purposes in various industries; however, corrosion is still a major problem for all of them. Prior to powder painting, different surface pretreatments are being applied for better corrosion resistance and better paint adhesion properties.



Dynaprep PFL pretreated aluminum SEM (SE) image, 20 keV, 1000x.



Dynaprep PFL pretreated steel SEM (SE) image, 20 keV, 1000x.

Phosphate conversion coatings are often used for this aim. However, industries continue to abandon using these coatings due to regulations relating to health and environmental concerns. Environmentally friendly pretreatment alternatives have been the subject of research in this area for many reasons.

The environmental pollution caused by phosphorus, particularly in aquatic environments, has increased the interest in this element for several decades. It is considered to be the main chemical element responsible for the eutrophication process. The term eutrophication refers to the consequence of hyper-fertilization of water with nutrients (phosphorus and nitrogen), the ultimate point of which is dystrophication (ecological imbalance). Eutrophication manifests itself in an increase in algal biomass and deoxygenation of the water column Eutrophication affects rivers,

lakes and coastal areas.

Pretreatments have to provide strong adhesion to metals and topcoats in applications, and simultaneously act as a strong corrosion barrier for the metal substrate. New generation pretreatments continue to be developed by Dynamix Inc. and they are providing advantages such as lower energy consumption, lower material consumption, lower process cost, lower sludge production, no heavy metals and better worker safety. They are advantageous both economically and environmentally. These pretreatments are based on silane technology.

Silanes are monomeric chemicals, often used as coupling agents and were first discovered in the 1940s. Silanes are classified both according to their structures and also their hydrophobicity. According to the chemical structure, silanes are divided as monosilylfunctional and bis-silylfunctional (the number of silicon atoms per molecule). Mono-silanes only contain one silicon atom per molecule, while bis-silanes have two silicon atoms per molecule.

Since bis-silanes have functional groups at both ends, they provide higher crosslink density inside the coating and more surface bonding at the metal-coating interface. Therefore, bis-silanes generally show better anti-corrosion performance when compared to monosilanes because they have more hydrolysable groups per molecule, which leads to denser films. They can also enhance adhesion between dissimilar materials because of their low surface tension which ensures good surface wetting. Because of the silanes' functionality, they are known to provide great benefits as an adhesion promoter and corrosion resistant layer. Hot dip galvanized, electrogalvanized, aluminum, low carbon steel, castings, magnesium, and zinc alloy substrates are all of interest for silane pretreatments.

Silanes go through different reactions during preparation and application of pretreatment, specifically, hydrolysis and condensation reactions. These reactions are crucial and they result in a siloxane (Si-O-Si) network structure.

There are many theories as to how the silane coating is bonded to the metal substrate. Silanes are known as coupling agents, which are defined as compounds that provide a chemical bond between two dissimilar materials, usually an inorganic and an organic. Organofunctional silanes

Pretreatments have to provide strong adhesion to metals and topcoats in applications, and simultaneously act as a strong corrosion barrier for the metal substrate.

have a functional group on one end and a hydrolyzable Si ester group on the other end.

Once hydrolysis is complete, condensation to oligomers occurs. Once the metal substrate is submerged in the hydrolyzed silane solution, the oligomers form a hydrogen bond with the OH groups of the substrate. Then during the curing process, water is removed and a covalent linkage is formed with the substrate. Although the steps are described sequentially, these reactions can all occur simultaneously after the initial hydrolysis step. It is assumed that the metallosiloxane (Me-O-Si) and siloxane (Si-O-Si) covalent bonds are responsible for the bonding of the silane to the metal substrate. One of the most important features of the silane and when it bonds to its substrate, is that it assembles a very dense self-assembled silicon and oxygen rich network. This film is homogenous, hydrophobic and resists water uptake and has chemical stability. This allows for great corrosion resistance. The thickness of the siloxane layer is determined by the concentration of the siloxane solution, hydrolysis pH and silane type. For many of the silanes used for pretreatment purposes, the process time is found to have the least significant effect on the coating characteristics.

For a successful pretreatment application, the first essential step is metal substrate cleaning to obtain a wettable surface prior to silane coating. Without this step, contaminants can affect Si-OH adsorption during coating application. The metal surface has to be chemically activated to supply a basis for strong covalent interaction of Si-O-Si groups of coating on top. This step also helps the coating to build a uniform homogeneous distribution Higher pH values for cleaning solutions reveal more homogeneous and finer surface morphology.

A typical procedure of silane surface pretreatment begins with degreasing the metal surface by alkaline degreasing, followed by water rinsing, sealing (optional) and finally drying. Many silane pretreatments incorporate a detergency package in with the pretreatment to simultaneously clean and coat the metal substrates. Silanes are applied from dilute water solutions onto the metal substrates mostly by immersion or spray processes; however, there are also studies using electrodeposition as well.

The use of silane mixtures, along with certain inhibitors, wetting agents and inorganic compounds enhance coating properties and their morphologies.

Apart from additives used for better corrosion protection properties, there has become an increasing need for coloring silane films for various purposes. The demand for adding color that reacts with the Si-OH groups so that they cannot be leached out is presently in the development stage at Dynamix. This can be a useful and robust way of in-line quality control of silane pretreatment application processes in industry.

The development requirements set for the coloring compounds to be incorporated into the silane films are: (a) they should be water soluble; (b) they should not react

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with the silane or destabilize it; (c) they should become part of the silane network and should not diffuse out; and (d) with different colorants, their homogeneous dispersion into the silane matrix and their effect on the overall paint system properties needs to be studied in order for these materials to be used in industry.

Easy monitoring of the coating in a continuous conveyor line would be valuable since other new generation pretreatment alternatives like hexafluorozirconic (zirconium) acid-based pretreatments cannot provide this type of traceability. Zirconium coatings are also prone to flash rusting ferrous metals as a result of formulary inadequacies and poor bath control; iron buildup in the bath is a common reaction and by-product of zirconium process, thereby reducing salt spray performance and increasing chemical consumption; high coating weights greater than 30 mg/ft2 can result if the bath's concentration is too high or the dwell time in the coating stage is too long; and alkaline drag-in may occur if there is not sufficient rinsing between the alkaline cleaner stage and the zirconium coating stage. Unlike iron phosphate coatings, zirconium coatings are very sensitive to alkaline contamination Simultaneous (one-step) cleaning and coating is not possible using zirconium processes.

To summarize, there are many reasons that Dynamix's silane pretreatments, mainly Dynaprep PFL and Dynaprep PFH can be considered an excellent replacement for phosphates, including:

- They can coat most any metal.
- They are environmentally friendly.
- They are operator-friendly.
- They are mildly alkaline, making them equipment-friendly.
- They operate at moderate temperatures.
- They produce virtually no sludge.
- They are phosphate-free.
- They are heavy metal-free.
- They are nonylphenol-free.
- They are fluoride-free.
- They outperform iron phosphates in adhesion and salt spray testing.
- Their operational costs are lower.
- They can be easily implemented in existing conventional phosphate processes.
- They can be used in both 3 and 5 stage process washers.
- They are adaptable for steam, spray and immersion applications. ■

Stewart Tymchuk, C.E.T., DYNAMIX Inc.

Testing for Maximum Results

THERE IS A QUOTE THAT SAYS, "Quality is free, but only to those who are willing to pay heavily for it."

Nowhere is it more true than in the world of coatings. The coating process requires inspection at every stage to ensure everything is meeting the specifications. From the preparation of the surface to be coated, through climatic condition monitoring to the dry film thickness evaluation, visual assessment and gauge-based testing will ensure process control and maximum results.

For its part, Elcometer offers a host of inspection devices, no matter what the requirements are. Many of them are digital which makes readings quick, easily stored and recalled, and accurate. From steel surface preparation to coating thickness to post coating assessment of adhesion and porosity, the company offers a full range of detectors.

The Elcometer 500 Coating Thickness Gauge is new and accurately measures the thickness of coatings on concrete and other similar substrates, non-destructively.

Fast and accurate, Elcometer says the 500 Coating Thickness Gauge takes repeatable and reproducible dry film thickness measurements of coatings on concrete up to 10mm thick – without damaging the coating.

Taking more than 60 readings per minute in standard mode and more than 140 readings per minute in scan mode, the Elcometer 500 Coating Thickness Gauge allows users to inspect more coatings in less time. There is a choice of

BYK Field Kit.

probes designed for continuous use and field-replaceable probe tips.

The built-in signal strength indicator prevents false or incorrect readings, as the gauge only displays the coating thickness measurement if the signal strength indicator goes green.

Also new, the Elcometer 415 Paint and Powder Coating Thickness Gauge provides a simple, accurate and reliable way to measure coatings on all smooth metal surfaces.

The gauge auto-switches to read on either ferrous or non-ferrous substrates. This is ideal for measuring paint or powder on both steel and aluminum surfaces such as car body panels or in a powder shop.

Elcometer recommends this gauge for industrial paint and powder coating thickness, flat or curved surfaces, smooth and thin substrates, situations where users may need to automatically switch between ferrous and non-ferrous substrates.

For users who love or must collect data, the gauge is compatible with ElcoMaster software and the ElcoMaster Mobile App so individual paint thickness readings can be transferred via USB or Bluetooth to a PC or a mobile device for analysis and instant report generation.

BYK also offers a wide variety of testing devices for film application, color and appearance measurement, dry and liquid coatings testing, and more.

Elcometer 500.

Like Elcometer, it also has new products. Its new Protective Coatings Field Kit can measure dry film thickness, relative humidity, air and surface temperature, dew point, and wind speed.

BYK says the kit is a "Complete solution to evaluate the environmental conditions prior to painting." The kit contains the BYK byko-test Fe/NFe Dry Film Thickness Gauge, BYK a200 Thermo-anemometer, BYK m200 Moisture Meter, BYK t200 IR Thermometer, and carrying case.

The BYK byko-test Fe/NFe measures dry film thickness, air temperature, relative humidity, and dew point, complies with SSPC PA-2 and ASTM D7091 for the measurement of coating thickness, and has a large, rotating color display that is readable in high or low light conditions.

The BYK a200 Thermo-anemometer measures air temperature, air velocity, and relative humidity. It is ideal for indoor applications to check walk-in drying ovens, spray booths or an ambient air-drying room.

For serious jobs, this device "can also be used outdoors to calculate dew point to help determine the right painting conditions," BYK says.

The BYK m200 Moisture Meter verifies moisture content and readiness for coating and is used to determine correct drying/curing of raw materials. It works with most hygroscopic building materials, such as wood, plaster, masonry, gypsum, and concrete.

The BYK t200 IR Thermometer is a non-contact temperature measurement device for a wide variety of indoor and outdoor surface applications. Its laser-targeting feature shows precisely the location of the temperature measurement and backlit display allows for use in poor lighting conditions.

The byko-test Fe/NFe is also available on its own, outside of the field kit. This gauge offers a unique solution to monitor environmental conditions while measuring dry film thickness. Air temperature and humidity sensors are built into the gauge. The dew point temperature is displayed to determine if the conditions are right for painting. Combining three measurements in one gauge offers unsurpassed value.

BYK says the byko-test complies with SSPC PA-2 and ASTM D7091 for the measurement of coating thickness. There is an SSPC mode to assist the operator on measurement protocols and calibration.

A large, rotating color display is readable in high or low light conditions. The display's content is user-selectable and large operating buttons are ideal if the user is wearing gloves. Also important for this type of device is a compact design for one-hand operation, automatic substrate recognition, and a strong, wear-resistant ruby probe tip. A flip screen color display is easy to read and measurements can be easily switched between mils, microns, inches, millimeters.

The new Fischer MMS Inspection Series of three devices was developed by anti-corrosion experts and aim to

Fischer MMS Inspection Series.

"impress with robustness, usability and performance," Fischer says. All required measurement tasks in heavy corrosion protection are solved quickly and reliably.

The DFT is the company's handheld device for simple layer thickness measurement on steel and non-ferrous metals. The DPM with integrated measuring probe is used to measure and record all climate parameters relevant for coating processes. The SPG checks the surface profile in the blink of an eye. All devices are available in a corrosion kit.

A popular device from Fischer is the Phascope Paint. It is meant to be a handy, pen-like device, ideal for fast and easy thickness measurement of paint layers on ferrous and non-ferrous metals. It offers a broad measuring range of up to 2500 µm, and is well-suited for very thick coatings, Fischer says. Statistical evaluation of the readings is carried out on a smartphone using the intuitive Fischer app. Reports can then be sent quickly and easily as PDFs.

The battery lasts for 4.5 hours and the device is recommended for a variety of uses including construction and auto manufacture.

Whether layer thickness, material analysis or material testing, testing device makers are constantly improving and expanding their product ranges with the user in mind. With most devices now compact enough and wired to be used on the go, there is no excuse not to meet the coating requirements, of whatever the job entails. ■

PUMPS AND FILTERS
Handle the Dirty Work

IN EVERY COMPANY, in every association, there are always the unsung heroes. Those who perform the grunt work but receive none of the glory.

Pumps and filters are these unsung heroes in the metals finishing field. They are workhorses and critical components in any well-devised production line.

The two components are complementary. Without protection against stray, abrasive particulates, or against the type that agglomerate and clog pipes and valves, pumps are at constant risk.

The variety of pumps now available is broad. These workhorses have a lot of jobs to perform.

There is ever-increasing emphasis on what leaves the plant – wastewater – and its treatment, as regulatory authorities impose stricter rules on emissions.

Pumps must also ensure things are running smoothly within the plant. There must be proper, unobstructed circulation of water and other fluids into the main plating or anodizing system or the job is not getting done. There are different configurations of pumps available to manage both of these requirements.

Filter Pump Industries' vertical sealless pumps are corrosion-resistant CPVC, polypropylene or PVDF construction.

These vertical sealless pumps have applications for sump pumping and draining, transfer pumping, recirculation pumping, plating, wet fume scrubbing, waste treatment, wet processing, etching and filtering. They are compact, portable, and self-priming when immersed. Simple in design and efficient in performance, each pump has only one moving part.

Constructed completely of CPVC, polypropylene, or PVDF where in contact with the solution, each pump is suitable for pumping, agitating, filtering, or circulating acid and alkaline solutions (pH 0-14), abrasive fluids, and other corrosive solutions. Maximum temperature ratings are as follows: CPVC-180 F, polypropylene to 150 F, and PVDF to 260 F.

PVDF is recommended for use in high purity deionized water, HF, and liquids that must remain contamination free. The Penguin vertical pump has a rigid, solid stainless steel, one-piece rotor drive shaft covered with a two-piece sleeve and impeller.

Filter Pump Industries' newest filters include stainless steel and resin filters.

The stainless steel filter systems offer durability and corrosion resistance across a wide variety of industrial and commercial applications.

Penguin Series PX Extended Sealless Vertical Pumps.

Constructed from 304SS or 316SS, the housings can either accept cartridge or bag filters as needed for varying specifications.

Filter Pump SS Filter Systems feature a band clamp closure that makes cartridge/bag change-outs quick and easy.

The vertical sealless pump series PSS is offered along with horizontal centrifugal pump with single seals or optional "HK" Double Seal arranged with a thermal transfer oil-filled seal chamber where oil lubricates and cools

the mechanical seals. The "HK" feature eliminates continual flush water from entering the waste stream.

The pumps' Seal Expansion Chamber provides a cavity with an air space to expand into during the pump operation. Available with silicon carbide stationary seats for improved hardness, wear resistance, and superior thermal properties over the older ceramic components.

The latest resin offering, FPMBC series filters, are graded density melt blown type depth filters made from KYNAR-PVDF resin fibers over a molded PVDF core. The filters are optionally available on other cores (such as SS) or coreless. These all-fluoropolymer filters provide fine filtration from 0.50 micron to 25 microns and offer improved compatibility with difficult fluids that the company says would cause many other common filter materials to degrade or swell.

Standard graded density cartridges are available along with custom-gradient configurations. Cartridges are available in lengths to 50 inches and various diameters to six inches. The filters have a "high dirt-holding capacity" as a fixed pore structure retains trapped debris, the company adds.

With broad chemical compatibility, typical applications for the FPMBC filter series PVDF filter include nitric, sulfuric, and formic acids, as well as acidic plating chemicals, etchants, ozonated water, bleach, hydrogen peroxide, bromine solution, gasoline, diesel, jet, biodiesel fuels, oils, and organic solvents.

Also on the filter side, Canadian Finishing Systems 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.

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

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, 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.

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; in-tank carbon treatment for the removal of organic impurities, such as brightener breakdown products; the versatility to be used stationary in one tank or moved from tank to tank as a utility pump; less costly than out-of-tank filter systems; models for small and large tanks; CPVC, polypropylene, PVDF (Kynar), and stainless steel construction; can be used with Flo King's reusable filter cartridges or with disposables; and out of the box installation.

Filter Pump Industries Stainless Steel Filter.

Many Flo King products are available to ship in one or two days from the Florida factory.

A Brite offers Finish Thompson motors in its drum pumps, which can connect to the drum pump without any tools, because of a quick connect feature. There is a downdraft cooling system and double wall housing. These motors offer continuous duty and variable speed.

A Brite also offers its EnviroBrite UF/Nano filtration systems, designed for wastewater treatment, recovery and reuse. These filters can also be used to minimize waste haul-off of various solutions.

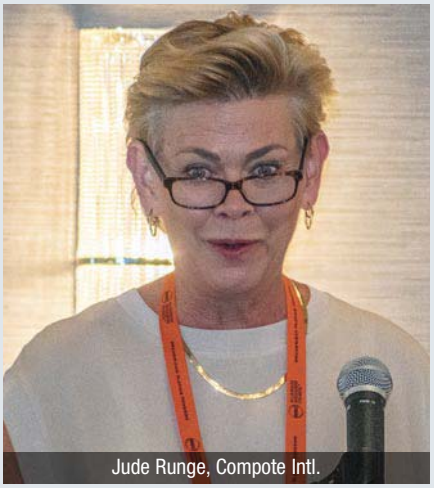
According to the company, its filtration systems are an example of green technology that provide good return on investment while minimizing overall environmental footprint. ■

Mikkel Venge above left

AAC
Annual Anodizing Conference & Expo

Industry recently gathered in Houston, TX, for the 28th AAC Annual Anodizing Conference & Expo, designed to address the specific needs and concerns of aluminum anodizing professionals. Members of the Aluminum Anodizers Council (AAC) were able to reconnect with friends and fellow industry leaders, while brushing up on skills for operating, maintaining and promoting the anodizing process.

Photos: Theresa Rogers



Jude Runge, Compote Intl.

Todd Hamilton, Southern Aluminum Finishing

Bill Zahner, A. Zahner Co.

Kirk Zeigler, University of Florida.

Jurgen Hirsch, Hydro Aluminum.

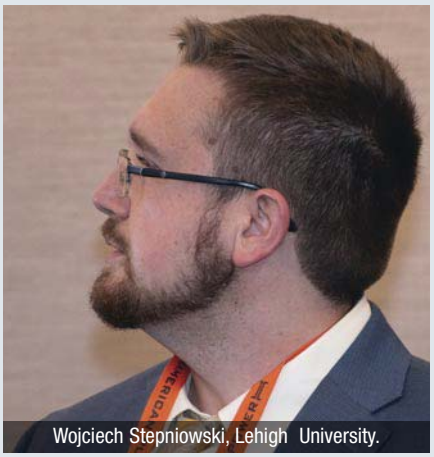
Kevin Hewett, NAR North American Rectifiers.

AAC Annual Anodizing Conference & Expo

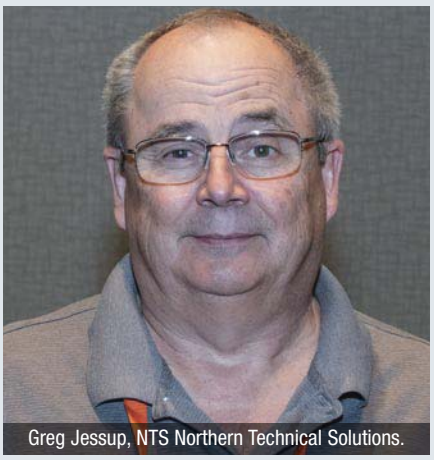

Rafal Bulgarski, Joe Jackman, Marco Cardoso, Steven Saroli, Dependable Anodizing, Markham ON.


Pinaken Patel, Techevon.


Chris Ebbrecht, Get Colored Inc.


Wojciech Stepniowski, Lehigh University.


Can Akyil, Coventya.


Greg Jessup, NTS Northern Technical Solutions.


Aaron Walz, BASF/Chemetall.


Mihai Vlasceanu and Chris Forfar, Spectra Anodizing, Woodbridge ON.

SURVIVAL OF THE FITTEST

Biocides Proliferate

IT'S SURVIVAL OF THE FITTEST in life and in business, but neither you nor your customers want nasty bacteria or fungi growing and breaking through any paints or coatings.

And some surfaces themselves become antimicrobial, whereby a coating containing a chemical compound which is toxic to a microorganism may be applied to a surface.

Research shows a growing focus on hygiene, stringent environmental regulations and focus on clean water is foreseen to boost the demand for these products in the coming years.

A report released last year entitled, "Global Biocides Market – Segmented by Type, Application, and Geography – Growth, Trends, and Forecast (2018–2023)" from Research and Markets, says the biocides market is expected to register a CAGR of approximately 5.22 percent from 2018 to 2023. Paint and coatings were cited as the fastest-growing application.

Additional marketshare is being driven by the increasing number of water treatment plants worldwide, along with the increasing demand from the food and beverage industry. However, the market is restrained by regulations on chlorine-based chemistries.

Though water treatment is the dominant application, accounting for approximately 30 percent of the market-share, the paints and coatings application is expected to be the fastest-growing. This is in direct response to the growing construction industry globally, which is expected to drive the market.

North America accounted for the largest share of biocides use in 2017, with the United States being the largest market in this region. Like elsewhere in the world, growth in water treatment, paints and coatings, and food and beverage, are expected to drive the market during the forecast period.

The demand for paints and coatings has increased in the construction industry, with increasing construction-related expenditure in the non-residential sector.

A report published by Global Market Insights similarly found that growth in water and wastewater treatment applications from industrial and residential sectors is likely to drive biocides market size growth through 2022. The biocides market as a whole is expected to be valued at over $12 billion USD by then, with estimated gains at more than 5.1 percent.

"North America, driven by the U.S. biocides market share, dominated demand with valuation exceeding $3.2 billion in 2014. The U.S. accounted for over 75 percent of the revenue share in North America. The US government has allotted significant amount of funds to infrastructural development in recent past which is likely to increase

paints and coatings demand in the region and thereby promoting biocides growth," the report says.

"Asia Pacific, dominated by China biocides market share, accounted for over 28 percent of the revenue share and is likely to grow at higher rates up to 2022. Growth of end-use industries such as construction, healthcare, pharmaceuticals, and food and beverages is likely to drive demand over the forecast period. The Middle East and Africa, mainly driven by Saudi Arabia, occupies a small portion of the total revenue share and is likely to grow at above average growth rates up to 2022. This region is likely to grow owing to increasing paints and coatings demand due to increasing construction spending by regional governments."

Biocides are also experiencing heightened demand from the energy sector which is complemented by the increase in the use of hydraulic fracturing techniques. Biocides are used as well stimulation fluids in hydraulic fracturing to prevent corrosion and other production issues.

For its part, Chemroy offers 12 biocides from Lonza Group and DuPont, in a variety of formulations from liquids to powders to flakes.

Lonza's Materials Protection business supplies specialty biocides and antimicrobial actives and additives for paints, coatings, building materials, plastics, emulsions, textiles and metalworking fluids.

Lonza says the changing regulatory and formulation environment has increased the requirement for innovative protection from microorganisms as part of formulations and finished products. It offers a wide range of active chemistries and delivery forms that can be formulated in many different ways to meet customers' needs.

Lonza's Building Products portfolio includes specialty biocides for in-can preservation, dry-film protection and plant hygiene.

In plastics and textiles, where microbial degradation of plastics and textiles can lead to unpleasant odors, discoloration, cracking and aesthetic deterioration of finished products, Lonza's antimicrobial products provide protection in a wide range of polymers, textiles, plastics, and foam components.

Its Omadine and Vanquish Antimicrobials product lines offer long-term protection, easy incorporation to formulations, and UV stability, for plastics.

In metalworking, where soluble oils, synthetic fluids, and semi-synthetic fluids help create smooth processes and consistent end products, they also enable a multitude of bacteria, yeast, and fungi to grow. These microorganisms can cause reduced fluid life, more frequent fluid dumps, higher disposal costs, clogged filters, and decreased production. Lonza's specialty biocides for metalworking fluid applications features include broad-spectrum activity, formaldehyde-free options and formulation compatibility.

DuPont believes biocides are necessary for protecting the integrity and functionality of water-based formulations from microbial contamination.

"As a global leader in microbial control, our broad portfolio, technical and regulatory expertise, unmatched testing, and laboratory capabilities provide solutions to help prevent contamination of the formulation not only in its wet state but in the dry film after application," the company says.

Its offerings are in architectural dry film, architectural in can, latex, marine, plant hygiene, and specialty coatings such as oil and gas.

Products such as Bioban 200 offer a broad spectrum of protection against surface fungi, molds and algae, helping prevent microbial defacement and preserve strong and vibrant coatings, while also not contributing to VOCs.

In-can preservatives such as Kathon LX 1.5%, offer cost-effective, long-term protection for a full range of architectural paint and coatings formulations, says DuPont, without contributing VOCs or formaldehyde.

These types of products are important as the Global Market Insights report cautions that the market growth of traditional biocides might be limited by the formulation of stringent norms against their use due to some of the perceived harmful effects. However, concerns about the negative impacts of biocides have directed focus toward development of alternative biocides which is still expected to provide overall growth prospects to the global biocides market.

Environmental and regulatory concerns with regards to use of halogenated compounds such as bromine and chlorine may also affect the biocides market price trend, the report states. The EU introduced and implemented the Biocidal Products Regulation (BPR, Regulation (EU) 528/2012) regarding biocides market use.

In Canada, biocides have also come under close scrutiny. The Canadian Paint and Coatings Association (CPCA) has written about it critically in these pages saying decisions by the federal government on bans or restrictions of use levels for biocides in paint preservatives in Canada will do little other than harm Canadian paint manufacturers.

Gary LeRoux, President, CPCA, says the association will continue to work to ensure that paint formulation leads to safe products across the entire supply chain.

"CPCA will continue to raise objections to the current flawed process for re-evaluation of biocides for paint to ensure actual engagement with manufacturers and greater reliance on evidence-based analysis," he says.

As formulators continue to look for more sustainable product solutions to solve their microbial control challenges, manufacturers of biocides, algaecides and preservatives are answering the call. ■

Now serving you better with a stronger, broader product portfolio.

With the acquisition of Chemroy, we proudly take our place as the #1 Canadian distributor of specialty chemicals and food ingredients.

Azelis Canada has been a market leader, founded on technical and marketing excellence in the Personal Care, Pharmaceutical, CASE, and Essential Chemicals segments. We are pleased to build on that foundation by adding the products, capabilities and expertise of Chemroy; including our three application labs (CASE, Pharma and Food). We will now be able to provide more solutions and product selection for our customers in the CASE, Food, Pharma, Lubes, and Nutraceutical industries.

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FILLERS
Affect Coating Performance

Mineral fillers affect coatings properties such as durability, scrub resistance, substrate and intercoat adhesion, weathering and corrosion resistance, and more.

THERE SEEMS to be a misconception among some that fillers/extenders are useless additives put into a formulation to take up space and reduce the cost of the coating. They can replace more expensive prime pigments in some cases, however, and mineral fillers play an important role of creating the coatings' skeletal material, thereby influencing their mechanical properties.

They are mainly used for primers, patching compounds, putties, body fillers and primer surfacers and as a gloss modifier for topcoats. For high build membrane coatings, mineral fillers are used to modify the mechanical properties and permeability of the films. Fillers can influence their hardness and enhance their cohesion. The embedding of reinforcing materials significantly improves tensile and breaking strength and impact resistance.

Mineral fillers affect many coatings properties such as dry hide, durability and flexibility, scrub resistance, color uniformity, substrate and intercoat adhesion, weathering resistance and tint retention, abrasion resistance, gloss control, tannin blocking, stain resistance, and corrosion resistance.

Like everything, the right filler for the right job is critical to effectiveness. The fillers' chemistry, crystal structure, Moh's hardness, oil absorption, pH, brightness, chemical inertness, refractive index, purity, soluble salts, particle size, particle size distribution, particle shape and aspect ratio, are all considerations says ParexGroup, a building materials company owned by chemical company, Sika.

Looking deeper at some of these properties, a mineral can't be defined simply by its chemical formula, says Vanderbilt Minerals of Norwalk, CT. The crystal structure must also be considered. For example, there are many aluminum silicates but they are unique minerals in terms of their differing crystal structures and properties.

The pH is a function of the metallic ions in the structure. Aluminum in the structure makes the mineral acidic while calcium, potassium, barium or sodium makes the mineral alkaline. Some minerals, such as calcite or serpentine are soluble in acids and can't be used in coatings that have pH.

Mohs hardness, the measure of abrasivity or abrasion resistance of the mineral, is critical, Vanderbilt says. Harder minerals will have better scrub resistance and better burnish resistance, but they could also be more damaging to process equipment than softer minerals.

The oil absorption of a mineral is both a function of the mineral itself as well as how finely it is ground. Basically, the denser the mineral, the lower the oil absorption. The oil absorption relates to how much of the resin the mineral will absorb, which affects the viscosity of the paint and the gloss.

Water-soluble salts in certain minerals can adversely affect corrosion resistance and exacerbate blistering.

Exterior paint frosting and chalking are a result of soluble salts. Dry brightness and color-in-oil of a mineral will affect how the mineral appears in a coating. A mineral can have excellent dry brightness but change when added into a resin. Color-in-oil can vary from cream to gray or even green depending on the mineral. This is often the result of minor impurities, so sourcing is important.

The particle size, shape (sphere, cube, flake, needle, fiber, block) and aspect ratio (the overall shape of the particle - length to diameter ratio, face to thickness ratio, etc.) also affect how well the chemistry plays together.

Vanderbilt manufactures VANSIL Wollastonite, PYRAX and VEECOTE Pyrophyllite, DIXIE CLAY, PEERLESS and BILT-PLATES Kaolin Clay.

VANSIL Wollastonite is a needle-like calcium silicate. It has low oil absorption. Vanderbilt's Wollastonite is mined and processed in the Gouverneur, NY, area. Uses include corrosion resistance for waterborne DTM primers, tint retention for exterior latex paints and scrub resistance for interior flat paints. Fine ground products are used in powder coatings. Products are available in both powder and acicular grades.

PYRAX B Pyrophyllite is a medium fineness pyrophyllite produced from mines in North Carolina. It has a mica type structure that gives good reinforcement properties in high build coatings like texture paints and block fillers, joint compounds and adhesives.

PYRAX WA Pyrophyllite is a coarser grade pyrophyllite than PYRAX B. PYRAX WA has a mica type structure and gives good reinforcement properties in high build coatings like texture paints and block fillers and adhesives where fineness is not a major requirement, Vanderbilt says.

Clariant's Colanyl Extender MS 531 is an aqueous binder-free pigment preparation based on a colorless inorganic extender and manufactured without using alkyl phenol ethoxylated (APEO) additives. This aqueous pigment preparation is compatible with water-based low VOC and VOC-free formulations. It is suited for manual and automatic dispensing equipment with main applications being emulsion paints, synthetic resin bound renderings, acrylic and polyester casting resins, waterborne wood stains, and water-resistant drawing inks.

Another popular product, its Hostatint Extender CC 500, is an aqueous, binder-free pigment preparation also manufactured without APEO additives. This multipurpose

pigment preparation is compatible with water-based and solvent-based decorative coatings. Clariant says it offers high pigment loading and good rheological properties, and excellent accuracy when poured or pumped in automatic and/or manual dispenser. Narrow tolerances of shade and color strength for exact color reproduction.

These manufacturers know a lot can go wrong when adding fillers. ParexGroup warns large or poorly bound fillers will act as flaws and initiate or propagate cracks in the coating.

Pigmentation can also have a significant effect on film permeability. Increased pigment loading up to the critical pigment volume concentration (CPVC) will result in reduced permeability by physically blocking the passage of liquids and gases (occlusion). Pigment levels above the CPVC will result in voids in the coating and permeability will increase. For multi-coat systems, the pigmentation level of a primer, or basecoat, can also impact topcoat permeability. Film properties change rapidly near the CPVC where film density, tensile strength, and adhesion tend to reach a maximum. At high pigment volume concentration (PVC), there is not enough binder to completely fill the voids between the pigment particles thus making the coating film more permeable, with a resulting reduction in scrub resistance, stain resistance, elasticity, and resistance to blistering.

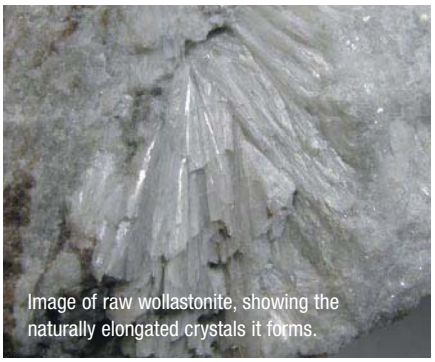


Image of raw wollastonite, showing the naturally elongated crystals it forms.

The primary role of a coating is to serve as a barrier between the environment and the object to be protected. The effectiveness of a coating's barrier performance is impacted by its permeability, which, in turn, is a function of its hydrophobicity, porosity and occlusive properties.

Coating films contain microscopic defects, such as pinholes, creating porosity in which moisture, water, and other elements can penetrate into the membrane coating resulting to substrate deterioration like corrosion.

Obviously, there is a lot of chemistry and artistry in achieving a formulation. Mineral fillers cannot be substituted for each other without testing to determine if the performance properties will change when the substitution is made. Blending of two or more minerals may yield the best properties of each and minimize their deficiencies. ■

PPG Machine-applied Coatings on Display at 2019 NAWLA Traders Market

PPG featured a broad range of machine-applied primers, finishes and stains at the 2019 North American Wholesale Lumber Association's Traders Market, held in San Antonio, TX, in October.

The company highlighted PPG MACHINECOAT exterior finish coatings for wood substrates and PPG DURACOLOR exterior finish coatings for fiber cement and composite substrates. The company says these exterior finishes create a comprehensive coatings system for factory-manufactured building products when used with PPG MACHINEPURE, PPG MACHINEPRO, PPG SEAL GRIP MC and PPG's molding and millwork primers.

Available as solid colors or semi-transparent coatings, PPG MachineCoat and PPG MachineCoat Plus exterior finishes are claimed to offer excellent color retention and strong adhesion. PPG Duracolor coatings are specifically engineered for machine applicators to protect against harsh exterior exposure and ultraviolet degradation. They provide excellent adhesion, color retention and film flexibility.

PPG machine-applied coatings offer several advantages over field-applied coatings, including the ability to coat every edge, angle and groove of a substrate to promote long-lasting performance.

www.ppgmachineappliedcoatings.com

Acucote Expands Line of Pressure-Sensitive Adhesives

Acucote, a pressure-sensitive adhesive coating manufacturer, has expanded its portfolio with nine new removable adhesives, bringing the total portfolio to 18 removable adhesives. The new removable adhesives have a range of tack performance which meet varying application requirements and energy surfaces. Included in the portfolio are adhesives which meet FDA 175.105 regulations and that are California Proposition 65 compliant. There are also options for rigid facestocks and hard-to-label textile fabric materials. All of the adhesives are latex-free and two of the new products are also acid-free.

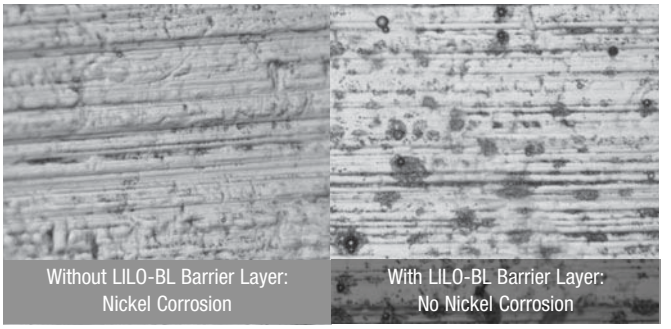
In addition to converted blank labels for office applications, printed removable labels are used in a wide variety of applications including wall graphics, oil change stickers, food labels with a blank date on the package, cup labels, decorative boxes, and rubber containers with labels that wrap around the lip.

According to Earl Curran, Vice President Business Development, "We're very pleased to add these nine new adhesives to our existing portfolio. These new products will help North American converters increase sales and enter into new markets as they support their end customers with increased brand recognition, promotions or event and product labeling."

Acucote provides stock inventory programs and custom capabilities that offer a diverse selection of adhesives, facestocks and silicone release systems. Acucote provides pattern coating; toll coating and slitting; silicone coatings; and more.

www.acucote.com

LiloTree's Barrier Layer Prevents Nickel Corrosion



LILO-BL is a patent-pending corrosion inhibitor barrier layer which is nanoengineered to help prevent corrosion on nickel surfaces. The company says the barrier layer chemistry passivates and protects the nickel plating, increasing corrosion resistance by 10 times. With more corrosion resistance, the shelf life of nickel surfaces increases dramatically.

The product also offers longer shelf life for nickel surfaces; high resistance to pitting and flaking; improved protection from high temperatures; resistance to mechanical wear; and protection for underlying metals.

To prove LILO-BL protects the nickel-plated surface, two nickel-plated samples were photographed after ASTM B117 salt spray testing for 96 hours, with an extra 48 hours of immersion in salt solution. The image on the left shows corroded, pitted nickel plating as a result of the exposure to chlorine in the salt spray. However, the sample with LILO-BL on the right shows a clear surface, despite experiencing the intensely corrosive environment for almost a week.

www.lilotree.com

Tri-Mer Fume Scrubbers Elminate Fumes

Tri-Mer's Fume Scrubbers offer a fan/separator design that is non-mechanical and chemical-free. The company says the solution is more than 99 percent efficient on many common contaminants.

Tri-Mer's fan/separator is a two-stage system, with dynamic scrubbing as the first stage and impingement as the second stage. The scrubbing liquid wets the contaminant as it enters the fan, allowing it to be centrifugally spun out of the fan scroll through dynamic mixing. The centrifugal action, using the fan wheel as part of the scrubbing process, eliminates airstream contaminants. Impingement causes the air to change direction as it passes across Tri-Mer rigid packing media, which also functions as a mist eliminator. The benefits, according to the company, include:

Fan/separator is 99 percent effective in eliminating corrosive contaminants, even when loading is high or variable.

Fan/separator scrubs corrosive fumes at 1/10th the water required by traditional wet scrubbers, and operates with 20 percent less brake horsepower.

Total energy consumption is, on average, 15 to 20 percent less than comparable wet scrubbers. The system is positively pressured, working the reverse of conventional "negative air" scrubbers. Air is pushed, rather than pulled, through the system.

The Tri-Mer fume scrubber was engineered for simple installation, so start-up costs are low. Internals are designed to prevent the accumulation of solids, keeping maintenance costs low as well. Separator section has clear view-ports for inspection during operation.

Systems are fabricated from PVC, polypropylene, fiberglass overlaid PVC, 316 and 304 stainless steel, and mild steel. Capacities are available up to 100,000 cfm.

www.tri-mer.com

AGC Chemicals Americas Showcases latest Fluoropolymer Material Science Solutions for Automotive Surfaces

AGC Chemicals showcased its new materials at the ITB Group's Smart Automotive Surfaces Conference and Exhibition, early October in, Livonia, MI. The event is the only U.S. automotive conference focused on the latest trends and engineering solutions for interior and exterior automotive surfaces. Fluon+ PFA EA-2000 is a printed circuit board (PCB) coating for copper clad laminate (CCL) that improves inter-car communication speeds across 5G networks. Fluon+ EA-2000 is designed for use in autonomous vehicles, which process massive amounts of sensor data from the interior and exterior of the vehicle. It is a perfluoropolymer with a built-in functional adhesive group that enhances electrical characteristics and exhibits superior performance over conventional PFA, PTFE, polyimide and epoxy materials traditionally used in autonomous vehicle applications. Fluon ETFE film protects automotive hoods from road damage such as insects and stones and prevents oxidation of topcoats and paints. The film also can be incorporated into sunroofs as a protective, flexible film for lightweight photovoltaic (PV) modules. AsahiGuard E-Series high-performance repellents for nonwoven automotive interiors enable fabrics to resist oil, water, solvents, dry soil and stains. They are designed for components like seating fabrics, floor mats, door panels and trunk linings, as well as under-the-hood noise-dampening and thermal insulation fabrics. These repellents reduce the environmental impact by 30 percent and provide lightweighting advantages. LUMIFLON FEVE resins are used to create ultra-durable automotive coatings in a wide range of colors and glosses. LUMIFLON is ideal for exterior coating systems used on bodies, doors, weather stripping, door handles, bumper fascia, wheel emblems, letter-

Calendar of Industry Events

October 31-November 2, 2019: WMS Woodworking Machinery & Supply Conference and Expo, International Centre, Mississauga, ON. www.woodworkingnetwork.com

November 11-14, 2019: Fabtech 2019, Chicago, IL. www.fabtechexpo.com

November 13, 2019: Canadian Association for Surface Finishing Conference, Hilton Garden Inn, Vaughan, ON. www.casf.ca

Feb. 17-20, 2020: Powder Coating 2020, Orlando, FL. https://conference.powdercoating.org

March 9-11, 2020: BIG IDEAS for UV+EB Technology Conference, Orlando, FL. www.radtech.org

March 31-April 1, 2020: American Coatings Show, Indianapolis, IN. www.american-coatings-show.com

April 23-25, 2020: Salon Industriel du Bois Ouvre' (SIBO), Drummondville, QC. www.siboexpo.ca

May 6-8, 2020: Women in Finishing FORUM, Embassy Suites South Bend at Notre Dame, South Bend, IN. www.ccaiweb.com/page/WiF

May 20-21, 2020: Canadian Paint and Coatings Association 107th Annual Conference & AGM, Quebec City, QC. www.canpaint.com

June 15-17, 2020: SUR/FIN, Atlanta, GA. www.nasfsurfin.com

June 16-18, 2020: Fabtech Canada, Toronto, ON. www.canada.fabtechexpo.com

Sept. 15-17, 2020: AAC Aluminum Anodizers Council Conference, Nashville, TN. www.anodizing.org

October 22-23, 2020: Canada Woodworking East, Espace St-Hyacinthe, St-Hyacinthe, QC. www.canadawoodworkingeast.ca

November 18-21, 2020: Fabtech 2020. Las Vegas, NV. www.fabtechexpo.com

ing and logos, taillight lenses and aluminum wheels. LUMIFLON resin-based topcoats have been shown to yield over five times the lifespan of acrylic urethane coatings typically used in the automotive industry.SURECO AF is a surface treatment agent for glass touch panels used as an anti-fouling and anti-fingerprint coating that can be applied by wet coating such as spray, dip and spin coatings.

www.agcchem.com

AkzoNobel Launches Recycled Paint to Help Close Loop on Waste

AkzoNobel says it has become the first major manufacturer to launch recycled paint thanks to a partnership in the UK with resource management experts Veolia.

Developed by the company's Dulux Trade brand, the Evolve matt emulsion is made from the waste of other people's paint tins in a bid to reduce the amount that goes to landfill.

Once any leftover white paint has been reclaimed, it is sorted, filtered and refined by Veolia. It's then re-engineered with new paint by AkzoNobel and tested extensively to ensure that every tin meets the high standards expected from Dulux Trade. The final product contains 35 percent recycled paint.

"We're always looking for new ways to drive sustainable innovation, cut down on waste and create a circular economy for paint – while offering our customers fresh solutions that don't compromise on quality," says AkzoNobel's Chief Operating Officer, Ruud Joosten. "By introducing Evolve, we will reduce the carbon footprint of our Dulux Trade products, and help our customers reach their own sustainability goals."

Adds Rinske van Heiningen, AkzoNobel's Director of Sustainability: "Sustainability is at the heart of our business. That's why we focus on developing products and technologies with the biggest positive impact. We're also well aware that people expect more than just a product from a brand, so we're always striving to deliver the most sustainable – and meaningful – solutions."

Akzo says Evolve was created after years of investment, hard work and commitment to

improving the company's sustainable offering, adding each liter of Evolve paint produced has a carbon footprint 10 percent less than compared with standard vinyl matt.

The product underwent rigorous testing by research and development experts and was blind tested by decorators and painting contractors. A number of small scale trials were also conducted.

"The launch of this new paint is just the latest step on a journey AkzoNobel is taking towards meeting its sustainability targets and helping to close the loop on paint waste," says Joosten. "It's another example of how we're setting the pace as the leader in sustainability in the paints and coatings industry."

www.duluxtrade.co.uk/evolve

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this area can inadvertently hurt national and global competitiveness and innovation. While embracing new digitalization, business neutrality must rule the day and regulators must refrain from pushing the market toward a particular structure and not pick technological winners and losers in a dynamic digitalized market. It is critical that the federal government participate in international forums with respect to developing harmonized digitalization, including of course, the United States.

International Standards: The incorporation of international standards must be facilitated in the regulations without necessarily having to go through an extensive and lengthy consultation process, prior to any changes taking effect. Such an approach would certainly help save time and money while reducing barriers to international trade. However, there should be sufficient time allowed for fully consulting industry prior to fast-tracking new standards, with a fulsome cost-benefit impact analysis completed to ensure there is capacity in Canadian industry sectors to easily transition to those standards. This should be done without disrupting existing technology and capital investment. Flexibility is critical in adopting new international standards in Canadian regulations.

Recognizing the need for a standardized framework by which manufacturers can evaluate lifecycle impacts of their products, the paint and coatings industry has also developed its own standards such as several Product Category Rules for architectural coatings (some jointly with NSF), which facilitate Environmental Product Declarations (EPD) by companies for the benefit of the public and the environment. CPCA and ACA (American Coatings Association) have collaborated in the development and adoption of these international standards and continue to consider further actions in this area via the World Coatings Council. There are also various company performance and ecological standards such as ISO standards that are commonly adopted by CPCA members, as well as various national or international certification programs.

Regulatory Support: Without necessarily including existing standards, which undergo their own independent reviews, government must understand their existence and/or prevalence in certain industries when considering new regulations or new risk management measures such as codes of practice and pollution prevention plans. Standard management practices contribute to the overall reduction of industrial releases and wastes. Along those lines, many CCME standards developed in the past would need to be updated and further adapted to existing international standards. The government should also support the adoption of low-carbon equipment and sustainable processes in various industries by crafting a specific ''innovation standard model" that could be applied across industry sectors.

Administrative Burden: Back in 2012, the One-for-One Rule was one of six systemic reforms under the Red Tape Reduction Act meant to reduce regulatory burden. Canada was the first country in the world to legislate the One-for-One Rule to control regulatory red tape.

All regulations have a significant cost for government and thus the taxpayer. In practice, the number of requirements for businesses has steadily increased between 2014 and 2017, while the government has exempted 76 regulations from the One-for-One Rule thereby adding regulatory burden, despite having eliminated 131 regulations. The actual experience in the paint industry since 2014 related to economic impact analysis of regulations rarely identified a significant socio-economic impact on the coatings industry, even if there actually was. As a result, there has never been one chemical regulation removed when a new regulation or additional mandatory restriction was created.

On the contrary, the paint industry has instead experienced an increasing number of regulations; use restrictions for substances, increased risk management measures, and many mandatory industry surveys in that process. Also during that time, industry had to comply with several major regulatory mandates (i.e. WHMIS 2015 implementation) and multiple decisions and restrictions have been implemented using mandatory and non-mandatory risk management tools (i.e. hundreds of SNAcs – Significant New Activities) after many voluntary or mandatory surveys.

The Chemicals Management Program (CMP) was an ambitious program covering the assessment of 4,300 substances in a five-year period. By comparison, many more substances in Canada were assessed than were actually covered by REACH in Europe, and over a shorter period of time than Europe. It is also being done hundreds of times faster than the US TSCA chemical reform. TSCA has advanced at a snail's pace by comparison with the risk evaluation of 10 substances over a two-year period (2017-2019) (risk management step to follow) and the 10 per year prioritization step, which led to the identification of 40 more substances in 2019. This illustrates that since 2006, the Canadian industry has been aggressively moving forward on hundreds of chemical assessments, which require massive amounts of industry data and time, which comes at a great cost and increased regulatory burden.

Improved Consideration of Regulatory Burden and Better Accounting Methods: In previous industry-government stakeholder forums, CPCA chemical supplier members stressed that they must review a long checklist of hundreds of different Canadian regulations and restrictions before deciding whether or not they would import a chemical for sale in Canada. And, 95 percent of the time they had

to pass on the business opportunities offered by the chemical because it would be too complex, highly bureaucratic and onerous for their companies to pursue the opportunity. These regulatory barriers include various import restrictions, permits and licences (i.e. for storage, tankage, etc.) and various acts such as the Transportation of Dangerous Goods Act and regulations, preparedness for the Environmental Emergency Regulations, CEPA (existing DSL controls, limits of use of some chemicals or bans, possible NSN filing of any new substances with pre-consultation (minerals and metals imports, etc.), HPA (GHS hazard classification and OEL limits), Pest Control Products Act (authorized pesticides/biocides only), Import/Export Lists and tariffs, etc. Not to mention 10 times more provincial and territorial laws and regulations to consider.

There must be alternative mechanisms created to alleviate the cumulative effect of regulatory burden in Canada. These must be focused on simplifying the import/export process through digitalization in the regulatory space. The bombardment from CEPA-related and HPA-related regulatory requirements alone has tempered the enthusiasm for new chemicals in commerce, some of which are better for both health and the environment.

Virtually all CMP regulations and risk management decisions published in Canada have had significant business impact on companies operating here. This has led to the loss of high selling product lines, increasing the need for more studies, requirement for more R&D and reformulation, increased process enhancements, increased data collection for government, extensive testing and retesting, etc. All these costs have reduced business' enthusiasm to innovate and adapt to international standards. Regulations and risk management measures should only address 'proven' risks that are unacceptable and not assessments made under the precautionary principle focusing on 'possible' risks, not real risks. Moreover, the Post-2020 federal Chemicals Management Plan will likely address larger groups of domestic and non-domestic substances than it has in the past. It has noted that it may also go back and review substances that were already assessed in the initial days of the CMP.

There is much more to CPCA's comments on the need for regulatory reform in Canada and available to members on the CoatingsHub. While Canada knows it is over-regulated, the recent actions noted above reinforce the fact that knowing what hurts Canada's competitiveness is much easier than addressing that ailment. That said, something must be done to effect real regulatory modernization in Canada, once and for all. There is no time like the present! ■

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

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