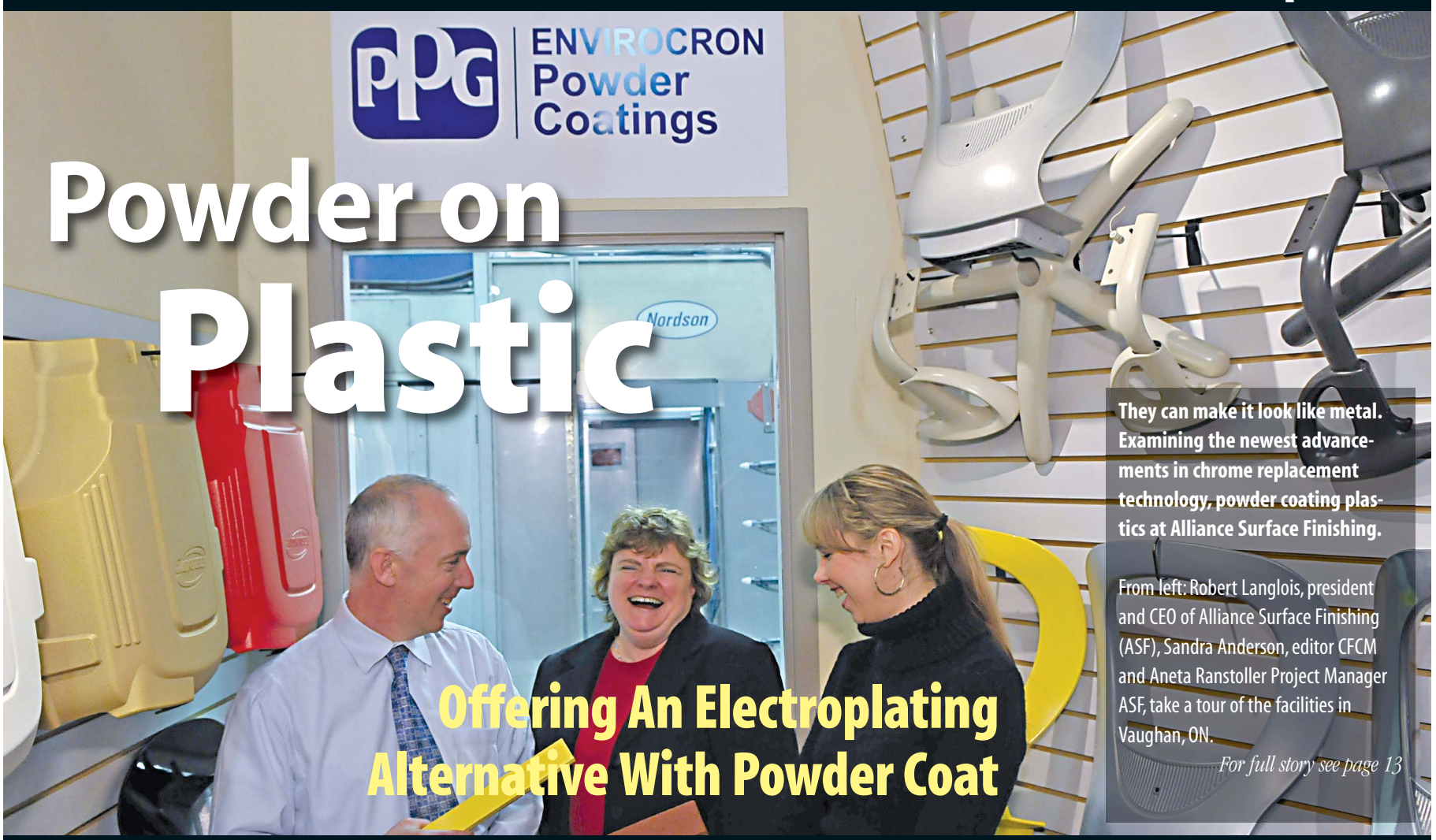
CFCM
CANADIAN FINISHING & COATINGS MANUFACTURING

$12.00 April 2008



Powder on Plastic

Offering An Electroplating Alternative With Powder Coat

They can make it look like metal. Examining the newest advancements in chrome replacement technology, powder coating plastics at Alliance Surface Finishing.

From left: Robert Langlois, president and CEO of Alliance Surface Finishing (ASF), Sandra Anderson, editor CFCM and Aneta Ranstoller Project Manager ASF, take a tour of the facilities in Vaughan, ON.

For full story see page 13

ALSO IN THIS ISSUE

SUR/FIN 2008, A New Attitude

SUR/FIN grows every year and 2008 is no exception. Last year 1200 visitors viewed 221 booths filled with the latest technology in surface finishing and organizers are expecting more in 2008.

The Technical Conference Program has a new pricing structure this year where you can register for the Full Conference or the following individually:

- Airline/Automotive Symposium
- Management Outlook Symposium

Topics cover Electroless Deoposition; Surface Finishing Research Surface Preparation & Treatment, Emerging Technologies and Fundamentals; Cadmium Coating Alternatives; and in Automotive Regional and Global Trends.

continued on page 29

American Coatings Show 2008 Premiere

The stage is set for the premiere of the American Coatings Show (ACS) and Conference in Charlotte, NC, June 2008. The trade show takes place from June 3-5 and the conference has been extended to June 2-4, 2008.

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IN THE NEWS

Company News

Dominion Colour Corporation sold to Management Buyout

Dominion Colour, based in Toronto, ON, is now under Canadian ownership. Toshio Kikuchi, President of Kikuchi Color & Chemicals Corporation (KCC), Japan and Mike Klein, President of DCC, are pleased to announce that they have successfully completed the sale of DCC, to a management buyout team led by Klein.

The transaction, effective March 25, 2008, encompasses DCC and all its subsidiary companies. The new owners, Mike Klein, Jack Nelligan, Bob Ralph and Mark Vincent, will continue in their current positions as senior executives of DCC.

Kikuchi and KCC fully appreciate the contribution DCC has made to the KCC organization over the last 18 years and the excellent, friendly and co-operative relationship KCC and DCC have enjoyed during KCC's ownership of DCC.

KCC and the MBO team have agreed that the timing is right for the executive team of DCC and its subsidiaries to implement its own vision of "providing colour to the world with a reputation for consistent quality excellence", with the support of, but independently of, KCC.

The change in ownership will have no adverse impact on future of DCC and its subsidiaries. All DCC operating divisions and subsidiaries will remain intact and there will be no changes in the organization as a result of the change in control. Purchases from suppliers will continue uninterrupted. It is business as usual.

The new owners of DCC thank all company employees, customers, distributors, agents, suppliers, alliance partners, business advisors and other business partners for past and future support in the ongoing success of Dominion Colour Corporation and its subsidiaries.

continued on page 4

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THE COLOUR OF SPRING

So in the front cover picture I am out standing in my field. This time we went to visit Alliance Surface Finishing (ASF) in Vaughan, ON. It really is fascinating what they are doing with the powder coating of plastics. I really admire people who are not afraid of a challenge. I am not sure what is making me laugh so hard in the picture. Our illustrious publisher who also doubles as official photographer must have said something funny. In the photo on this page we are in the company's boardroom and I am interviewing Robert Langlois, president and CEO of ASF.

Spring is here so I thought I would write about colour. I have just purchased a condo and am about to paint the entire interior, so colour is fresh in my mind. And Spring is the season of colour anyway. I'm going to switch here between the Canadian and American spelling of colour so bear with me. I have also just finished rereading a media release from Clariant, dated March 3, 2008, which deals with "Awareness of Global Connectedness and Environmental Responsibility Projected to Drive Consumer Color Preferences." Simply put, the document talks about ColorForward 2009, an annual publication put together by a team of colour specialists from North and South America, Europe and Asia, as a tool for designers and marketing professionals.

The ColorForward team explores global cultural influences and lifestyle trends to gauge their impact on color directions for future consumer products.

Trends in our Society that are considered include:

- Grow Your Own Future: recognizing people taking personal responsibility for environmental issues, making positive changes to improve the world.
- Global Repositioning: acknowledging the growing influence of Asian traditions
- Duality: developing from the way in which people today accept and even celebrate multiple facets of their own personality
- Mosaic: reflecting how strict global identities are loosening their hold on people.

The team of colour experts then goes on to figure out how all these ideas are played out in colour. I didn't know colour was so complicated.

Mosaic, for example, plays out in strong saturated hues including dark blue, Pumpkin orange and Leprechaun green.

Duality includes both brilliant, vibrant colors and contrasting light, neutral shades, like a very light blue/green that expresses a quiet state of mind, and a vibrant, glossy, somewhat ironic fuchsia. Other colours in this group include a mysterious blue/purple, and a neutral light blue/lilac.

The 2009 publication also includes special effects that incorporate non-color ingredients adding sparkle, reflectivity, depth and other qualities to enhance the base color, such as a pink pearlescent added to white.

I do like the names that paint manufacturers give their colours. I would rather have Maple Fudge, Chocolate Fondue or even Spiced Rum on my walls rather than on my hips for example. I am finding that after looking at colour swatches for a long period of time, I then look at the world around me with a completely different perspective. I see the colours, rather than just the objects.

I will be interested to see if any of this colour is reflected in industrial coatings.

Meanwhile, this CFCM is a show issue, so be sure to drop by our booths to say hi.

Also, please feel free to contact me with any concerns and especially if you think you might like to write an article for us, or if you want to let people know about a new product.

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FEATURES

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Volume 2 Number 2 April 2008

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CFCM Canadian Finishing & Coatings Manufacturing is published bi-monthly by Wilkinson Media Canada Inc. Subscriptions are free to qualified Canadian finishers and coatings manufacturers and their suppliers. Subscriptions (six issues): Canada $60.00 per year plus taxes (GST #858877210 RT0001). United States U.S. $57.00. Foreign U.S. $85.00. Single copy $12.00 CDN plus taxes.

Postal Information:
Printed in Canada. Publications Mail Agreement PM # 41515012
Return undeliverable Canadian addresses to CFCM Magazine, 250 The East Mall Suite 1103, Toronto ON M9B 6L3 .

WILKINSON MEDIA CANADA INC.
250 The East Mall Suite 1103
Toronto, Ontario,
Canada M9B 6L3
416-255-1808
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Home Hardware Receives IAPA Health And Safety Award

The Industrial Accident Prevention Association (IAPA) presented Home Hardware Stores Limited - Beauti-Tone Paint and Home Products of Burford, ON with a Level I Health & Safety Achievement Award, April 2, 2008. This is the first IAPA achievement award for the facility that produces paints, sealants, and cleaners.

The Burford facility has not had a lost-time injury (LTI) since 2003. It has achieved this positive result by demonstrating a commitment to health and safety. This dedication to creating an incident-free workplace has been made possible through initiatives such as having an active Joint Health and Safety Committee, sound workplace inspection processes, monthly safety meetings between supervisors and employees, and firm incentives for reaching health and safety milestones.

"This Level I award is in recognition of Home Hardware Stores Limited - Beauti-Tone Paint and Home Products commitment and continuing investment in its health and safety system," says John VanLenthe, IAPA Principal Consultant, who presented the company with the award. "It is clear when you walk into the facility that everyone shares the common goal of reducing and eliminating workplace incidents. You are on the right path towards achieving health and safety excellence."

"Our goal is to make sure our people go home at night as well as they arrived that morning," says Darrin Noble, General Manager, Home Hardware Stores Limited - Beauti-Tone Paint and Home Products. "The employees at this facility are to be highly commended for their diligence, hard work, and dedication to health and safety. Reducing and eliminating workplace accidents is only possible when we all work together."

Home Hardware Stores Limited - Beauti-Tone Paint and Home Products received the Level I Achievement Award after IAPA conducted an on-site verification on October 29, 2007. The company's health and safety management program met the criteria needed to be recognized for this award. In addition, Home Hardware Stores Limited - Beauti-Tone Paint and Home Products completed the self-assessment report and met IAPA award requirements, such as prevention methods, legislative compliance, management practices, and lost-time injury frequencies.

IAPA's three-level health and safety awards program was launched in 2002. The program is designed to celebrate an organization's journey towards achieving workplace health and safety excellence. Since the inception of the program, 41 companies have received the Level I Health and Safety Achievement Award.

BASF Corporation Names Dempsey as Distributor

Dempsey Corporation will market and sell BASF's resin products in Canada, as BASF Corporation recently announced that it has extended Canadian distributorship of its full line of resins to Dempsey. Headquartered in Toronto, Ontario, Dempsey has distributed a wide range of products throughout Canada and the United States since 1954.

"We very enthusiastically expand our relationship with Dempsey, and believe that they have the talent and expertise to drive sales of our resin products in the Canadian market," said Roger Haigh, North American distribution manager for the resins division of BASF.

Dempsey Corporation is authorized to market and sell JONCRYL; Basonat; Laroflex; Laromer; Laropal; Lucirin; Luhydran; Luron; Lutonal; Luwipal; and Plastopal products on behalf of BASF.

Dempsey Corporation Exclusive Canadian Distributor for Chitec

Dempsey Corporation has become the exclusive Canadian distributor for Chitec Technology Co., Ltd., which was founded in 1998 in Taiwan as a chemical company specialized in dealing with heat and ultra violet (UV) light.

Over the last 10 years, Chitec had successfully introduced five major product lines in to the plastic and coating markets, namely anti-

oxidants, UV absorbers, light stabilizers, flame retardants, and photo-initiators. It supplies more than 4 million pounds of product into North American market annually.

Chitec has five ISO 9000 and ISO 14000 certified plants and two research and development and technical labs located in Taiwan and China. Chitec is conscious about new global regulations and has paid special attention to FDA, RoHS, WEEE, EuP, and REACH.

Lately, Chitec has started to implement green chemistries into its product lines such as bio-plastics project and energy saving plans. Its company slogan is now "SUSTAINABILITY VIA CHEMISTRY".

The company introduces several new products annually. This year Chitec developed a halogen-free flame retardant called Zuran 484, designed specially for rubber and elastomeric based polymers such as TPE/TPO/TPV/EPDM which are hard to achieve UL 94 V-0 using non-halogen flame retardants. Zuran 484 can be used for wire & cable, foams, adhesive, and sheet/film with excellent weathering and heat stability. HYPERLINK "http://www.chitec.com" www.chitec.com.

Troy Corporation Announces New Manufacturers' Representative

Troy Corporation, a leading manufacturer of performance products for a wide array of markets, including paint & coatings, ink, adhesives, has made Chidley & Peto Company, Arlington Heights, IL, its new manufacturer's representative for specialty biocides and metal carboxylates in the Midwest region of the USA.

Dow Biocides to Increase Glutaraldehyde Capacity

Dow Biocides, one of the industry's largest suppliers of glutaraldehyde, a business unit of The Dow Chemical Co., will increase its US production capacity for glutaraldehyde by approximately 60 per cent, which is expected to be ready to go by January 2009.

Glutaraldehyde from Dow Biocides is sold under several trademarks including UCARCIDE, UCARSAN, AQUCAR, GLUTEX and as an industrial-use product called Glutaraldehyde 25 per cent and 50 per cent. Dow also offers the glutaraldehyde products under at least 100 sub-registrations as customer-branded products.

Vulcanium Approved Cessna supplier

Vulcanium Metals Incorporated, a global distributor of titanium mill products for aerospace and aviation, is pleased to announce that it has become a Cessna approved supplier, effective through June 2010. This endorsement is in addition to VMI's quality approvals from the US Department of Defense, Vought, Spirit Aerosystems, Augusta Westlands and Bombardier and its AS 9100 and ISO 9001 registrations.

Rohm and Haas Expands Capacity of Hydroxyalkyl

Rohm and Haas will continue to supply bulk and drum quantities of acrylate and methacrylate hydroxyalkyl monomers. Rohm and Haas is the sole manufacturer of these monomers in the Americas and has expanded capacity to meet the needs of the market, which includes customers manufacturing automotive coatings, paints, printing inks and adhesives. The company is also a captive user of these monomers in support of its acrylic binder and adhesive businesses. Rohm and Haas produces hydroxyethyl methacrylate (HEMA), hydroxypropyl methacrylate (HPMA), hydroxyethyl acrylate (HEA), and hydroxypropyl acrylate (HPA), all marketed under its Rocryl brand.

CALENDAR OF INDUSTRY EVENTS 2008

May 5: Toronto Society of Coatings Technology, TOSCOT Annual General Meeting, *meeting@toscot.org*

May 4-7: RadTech UV/EB Technology Conference & Expo 2008 Lakeside Center at McCormick Place, Chicago, Illinois, *www.uveb2008.com*

May 14-16: ELECTROCOAT 2008, Marriott Downtown, Indianapolis, IN. For more information on program topics or registration, please go to *www.electrocoat.org/conference* or call 800-950-8020.

June 2-5: American Coatings Show and Conference 2008, Charlotte, NC, *www.american-coatings-show.com*

June 10: TOSCOT Golf Tournament, Toronto, ON, *www.TOSCOT.org*

June 16-18: SUR/FIN 2008, Indiana Convention Center, Indianapolis, Indiana, *www.nasf.org*

September 13-16: CPCA 2008 Annual Convention, The Lord Elgin Hotel, Ottawa, ON, *www.cdnpaint.org*

September 23-25: Coating 2008, Indiana Convention Center, Indianapolis, IN. *www.thecoatingshow.com*

September 23–25: Canadian Manufacturing Week, co-located with Weld Expo Canada and Metal Finishing Expo Canada, International Centre, Toronto, ON. *www.smecanada.ca*

Environmental News

Ontario Approves New Diversion Plan for Municipal Hazardous or Special Waste

Environment Minister John Gerretsen has approved a new program that aims to double the amount of household hazardous or special waste that Ontario diverts from landfills and the environment over the next five years.

The Municipal Hazardous or Special Waste (MHSW) Program Plan developed by Stewardship Ontario for Waste Diversion Ontario is to be launched on July 1, 2008.

Phase One of the program includes paints and stains, paint thinners, strippers and other solvents, oil filters, lubricating oil containers, non-rechargeable batteries, engine coolant, pressurized containers such as propane tanks, fertilizers and pesticides.

Jim Quick, president of the Canadian Paint & Coatings Association, and chair of the Stewardship Ontario committee that developed the program for Waste Diversion Ontario feels that this new program means more opportunities to divert many of the products in homes out of the garbage. He says products like unused paint can be recycled, while others that can't will be disposed of responsibly.

Doug Reycraft, president of the Association of Municipalities of Ontario and Gemma Zecchini, chair of Waste Diversion Ontario's board of directors also praised the program.

The program will make it easier and more convenient for consumers to return these wastes for proper management. For rural and northern Ontarians where service often does not currently exist, this will mean the introduction of new collection events. For urban Ontarians with some level of existing service, this will mean extending depot hours and increasing the number of collection events.

Phase Two of the plan, soon under development, will include portable fire extinguishers, fluorescent lights, rechargeable batteries, pharmaceuticals, syringes and thermostats and other measuring devices containing mercury. *http://www.stewardshipontario.ca*

People

Bob Bastien, 1946 – 2008

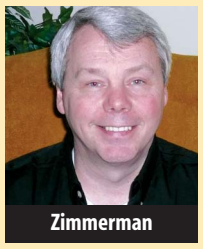
Robert (Bob) Bastien lost his long battle with cancer on Friday March 28, 2008. He was in his 62nd year. Bastien's employer Jean-Marc Pigeon, president of Inortech Chemie Inc., Terrebonne, QC, wrote the following:

The paint industry has lost one of its best people and pillars. After a long fight against cancer Mr. Bob Bastien died the night of March 28th 2008. Anyone that had any close or remote contact with Bob would know that he fought this deadly disease with energy and determination. We will all remember him for his undisputable in-depth knowledge and his unparallel service: "impossible" was not part of his vocabulary. He was always ready to help and explain the unexplainable to many of us. The Inortech team will remember him for all the good things he did for us on a personal basis and the flamboyant and undisputable influence he had on Inortech. We will all deeply miss him. We offer our condolences to his family.

L'industrie de la Peinture vient de perdre une des ses meilleures personnes et sans conteste un des ses piliers. Après une longue lutte contre le cancer M. Bob Bastien, c'est éteint dans la nuit du 28 mars 2008. Il s'est battu avec l'énergie et la détermination qui lui était caractéristique. Nous nous souviendrons de Bob comme un puits de savoir et un service hors du commun : impossible ne faisait pas partie de son vocabulaire. Toujours prêt à aider et à expliquer l'inexplicable pour plusieurs d'entre nous. L'équipe Inortech se souviendra de Bob pour le support qu'il a apporté à plusieurs d'entre nous et surtout pour l'influence flamboyante et indéniable qu'il a eue sur le cheminement d'Inortech. Il laisse un vide qui ne sera jamais vraiment comblé. Nos sincères condoléances a sa famille. »

The Montreal Gazette reported that R.H. (Bob) Bastien was born in 1946 to Georges and Evelyn. After a long courageous battle with cancer, he passed away peacefully on March 28, at Mount Sinai Palliative Hospital. He was a loving husband to Diane, caring father to Tania (Kevin), Adam (Natalie) and Ryan and a proud papa to Ashley, Zachary, Austin and grandpapa to Gillian and Kaylie. He will be sadly missed by his family, friends and co-workers of Inortech Chimie. Bob Bastien donated his body to science. A memorial service was held on April 12, 2008 from 1 to 3 p.m. at Collins Clarke MacGillivray White funeral home, 222 autoroute 20, Pointe-Claire. The family would like to thank the staff of the Lakeshore General Hospital in particular the Oncology dept for all their wonderful care and support over the last year as well as the Doctors and Nurses of 2 North and the caring staff at Mount Sinai where Bob spent his last four days. In lieu of flowers donations can be made in his name to the Lakeshore General Hospital fund, c/o the Oncology Dept.

People onthe Move



Zimmerman

Wagner announces new Liquid Equipment Specialist

Wagner Systems, Inc has hired Mark Zimmerman as Liquid Equipment Specialist. Zimmerman brings many years of experience to Wagner in the paint and powder coatings industry. As a specialist in Wagner wet application equipment and over 10 years experience in the wet paint industry, he will be responsible for developing relationships with new distributors as well as supporting liquid sales to end users. Zimmerman will also be responsible for training and demonstrations in the new liquid lab facility located at Wagner's USA headquarters in Elgin, Illinois.

New Appointments in BASF Canada's Automotive Refinish Division

Enzo Di Loreto has been appointed National Business Development Manager. Di Loreto's main responsibilities include managing the Canadian Regional Business Development Team, fostering and maintaining national business relationships while focusing on emerging markets and large key refinish accounts. Di Loreto brings to the position seven years of experience in the automobile refinish industry.

Esther Villeneuve has been appointed Canadian Project Manager, VOC Compliance. In this position, Villeneuve will assist distribution partners to successfully transition BASF Canada's current and future customers to VOC compliant technologies such as Glasurit 90-Line and R-M Onyx HD systems. Esther Villeneuve has been with BASF since September 2004 and has held various positions including Direct Sales Representative for Montreal and North Shore region as well as Quebec Business Development Specialist and Canadian Product Manager, always within the Automotive Refinish Divison.

"Both Enzo and Esther bring excellent capabilities for managing their respective areas," says Harry Dhanjal, Business Manager, Refinish Division, BASF Canada. "Their experiences within the industry make them valuable to our business."

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Please do it now right after you finish reading this. Closing deadline for listings is May 15,, 2008. Those who do not respond will be contacted, but it would make our life simpler if you do not wait for us to do that.

You will be able to update and make changes to your listing online throughout the year, pending confirmation by the publisher or editor. Categories include:

- Paint and Coating Raw Materials
- Paint and Coating Manufacturing Equipment
- Finishing Supplies
- Finishing Equipment
- Job shops and Custom Coaters and
- Associations

Job shops will receive their listing free of charge.

Our completed online Buyer's Guide will coincide with our printed version, to be published in June 2008, perfect bound in 8 ½by 11" format to fit better on your bookshelf and in your shop.

Suppliers to Canadian Manufacturers and Finishers cannot afford not to take advantage of this listing in the CFCM Buyers Guide.

Pricing Briefs

Wacker Polymers Increases Price for Airflex Dispersion Products

Effective April 15, 2008, Wacker Polymers, L.P. implemented a price increase of up to 5 per cent per wet pound on all prices for vinyl acetate ethylene copolymer and vinyl acetate vinyl chloride copolymer dispersions sold in the Americas region. These products are sold by the company under the Airflex trademarks.

Nuplex Resins Increases Price of Coating Resins

Nuplex Resins, Louisville, KY, has announced a price increase for coating resins sold in North America, effective April 21, 2008. The increase is approximately 3-8 per cent and will affect all solvent and water-borne products, including alkyds, acrylics, polyesters, emulsions and amino resins. Local Nuplex sales representatives will contact customers with more information.

OPC Polymers Announces Price Increases

OPC Polymers has announced a price increase across all product lines to be effective on shipments made after April 11, 2008. Customers will receive letters indicating the level of increase on their specific products of interest.

CCP Announces New Pricing For Coatings Resins

Cook Composites and Polymers (CCP) has implemented a minimum $.05 per pound price increase for all its liquid coatings resins effective on orders shipped on or after April 15, 2008, or as contracts allow.

IN THE NEWS

DSM NeoResins+ to Increase Prices in North America

DSM NeoResins+ has increased prices in April, in the North American region for waterborne, UV and solvent-borne resins by $0.06/lb., as existing contracts allow. The price increase affects all coating resins and graphic arts sectors.

Chris Farrell, Commercial Director Americas DSM NeoResins+, explained, "This price action is necessary due to the rapid increase in our raw material basket. These steadily escalating high costs for raw materials, transportation and energy have outpaced our internal cost reduction efforts and continuous improvement processes."

No short-term relief is expected as the situation in the global market for raw materials continues to escalate. Chris Farrell adds, "Further increases in raw materials and energy are expected in Q2 2008."

BASF Resumes Energy Surcharge on Sales of Kaolin

BASF has resumed an energy surcharge on all kaolin products that are manufactured at the BASF middle Georgia, USA, kaolin operation. The energy surcharge will be modified monthly based on closing prices for natural gas each month.

The company says this action is necessary because the March 2008 NYMEX settlement price of $US 8.93 per million British Thermal Units (BTUs) for natural gas exceeded the

$8.00 per million BTU threshold set by BASF in the existing kaolin energy surcharge program that was established in October of 2005.

Kaolin customers can determine the precise impact on their purchases by contacting their local BASF sales representative.

BASF kaolin products are sold into paper and specialty markets. The BASF paper kaolin business serves the global coated paper market focusing primarily on lightweight coated, specialty and coated free sheet grades. BASF specialty kaolin clays improve performance, lower costs, increase efficiency, and enhance the value of customer products and processes in the plastics, rubber, ink, cosmetics, ceramics, adhesives, paints, and many other industries.

Sun Chemical Performance Pigments Increases Global Pigment Prices

Sun Chemical Corp.'s Performance Pigments Division has increased global prices on pigments effective March 31, 2008. On average, the prices for the following pigment chemistry increased as follows:

- Classical Azo Reds by 4-6 per cent;
- Classical Azo Yellows by 5-7 per cent;
- Classical Phthalo by 5-8 per cent;
- High Performance by 3-6 per cent; Pearlescent by 5-7 percent; and
- Cosmetic Colors by 5-7 percent.

The price increase affects all forms including dry, preparations and flushes; it applies to all markets that purchase pigments including the ink, coating, plastic and cosmetics industries. The increase is necessary due to increases in raw materials, energy and transportation costs, along with the escalating value in foreign currency.

Dow Reichhold Expects Increases in Specialty Latex Prices

Executives from Dow Reichhold Specialty Latex plan pricing adjustments for polymers worldwide due to high monomers and other hydrocarbon raw material and energy costs.

Dow Reichhold has increased prices on its specialty polymers twice in the past four months and expects a further adjustment to be effective on May 1, 2008.

Contract customers will continue to receive advance notice for price increases based on contract terms.

Dow Raises Prices of Oxygenated Solvents Products

The Dow Chemical Co. has raised list and off-list prices on a number of its oxygenated solvents products in North America effective April 1, 2008, or as contracts allow. The company says this increase is primarily driven by the continuous rise in raw material and energy costs.

Dow Coating Solutions Increases Prices for Acrylic Emulsion Products

Dow Coating Solutions, a market-facing business of The Dow Chemical Co., has increased the list and off-list prices of its acrylic emulsion products.

Effective April 1, 2008, for all North American customers, Dow increased the price by U.S. $0.04/wet pound for all UCAR™ acrylic, UCAR styrene acrylic and NEOCAR™ acrylic latexes.

The increase applies to all market segments, including architectural and industrial coatings, construction products, adhesives and sealants, and traffic coatings.

"This action is precipitated by escalating raw material prices, particularly oil, all of which significantly impact the manufacture of these latex products," says the company.

Local Dow Coating Solutions sales professionals will be contacting their customers to discuss the price increase.

Cytec Announces Price Increases

Cytec Industries Inc. has increased the prices of UV/EB-curable monomers, oligomers and photoinitiators, and VANCRYL® acrylic resins shipped in the Americas effective after April 15, 2008.

The price increases will be between 5 and 10 per cent, depending upon the product family, and as contracts allow.

Rohm and Haas Increases Price for Paint and Coatings/Packaging and Building Materials in North America

The Paint and Coatings Materials business of Rohm and Haas Co. announced price increases for all of its products sold in North America, including all acrylic and styrene-acrylic emulsions, solvent-borne polymers, vinyl-acetate-based emulsions, and additives sold to the architectural coatings, industrial coatings, traffic paint, floor care, construction and building products, and industrial nonwovens industries. The increases, of $.04 per lb. for emulsion polymers and additives and $.05-.08 per lb. for solvent-borne polymers, took effect on April 1, or as contracts allow.

Also, the company's Packaging and Building Materials business announced a list and off-list price increase for all acrylic, vinyl acrylic and styrene-acrylic-based emulsions and solution acrylic polymers sold to the North American pressure-sensitive adhesives, textile, nonwoven and construction adhesives industries. The increase of 6 to 8 per cent was effective April 1, 2008, or as contracts allow.

World News

Consumption of Coatings in Asia reaches US$1.5 Billion

Consumption of seven leading coating additives in Asia was 655 MM lb worth US$1.5 billion in 2008, according to the consulting firm of Kusumgar, Nerlfi & Growney, based I West Caldwell, NJ. This compares to U.S. consumption of $800 MM for the same additive types, which include: biocides, rheology modifiers, dispersants, foam control, wetting, and slip and rub materials. Coating additive growth in Asia is forecast to be 9 per cent per year through 2012, more than four times that of the U.S.

China is the largest consumer of coating additives in Asia at 37 per cent of the dollars. Continued growth in building and manufacturing activity will give coating additives a robust 13 per cent annual rate of growth in China. Japan is the second largest consumer of coating additives with 28 per cent of the dollars. Little growth is forecast for coating additives in Japan. South Korea is third in coating additive use in Asia with 14 per cent of the dollars. Growth is placed at a mature 3 per cent annual rate. India consumes only 7 per cent of the coating additives, but is the fastest growing country with a 14 per cent annual rate projected through 2012. India's housing industry is expanding, which is increasing the demand for architectural coatings. Industrial coating consumption is small in India, but growing rapidly.

Biocides are the largest type being consumed with 28 per cent of the additive value, mostly in marine antifouling coatings, with architectural in-can preservatives and dry film fungicides the other major outlets. Rheology modifiers are the second largest type with 23 per cent of the dollars. Cellulosics, WB synthetic, and oraganoclays, are among the numerous rheology modifier types. Dispersants are next in value with 13 per cent of the dollars. Dispersing titanium dioxide and fillers in architectural paints is a large volume outlet. More sophisticated dispersants are used for the specialized pigments found in industrial coatings.

www.kusumgar-nerlfi-growney.com.

NEW PRODUCTS & TECHNOLOGIES

Sherwin-Williams Expands Pro Industrial High Performance Coatings Line

Sherwin-Williams offers its Pro Industrial products with a variety of primers and topcoats including waterborne acrylics, alkyds and high-performance epoxies. These coatings are low VOC, easy to apply and offer the durability required to meet the aesthetic and maintenance needs of commercial and industrial buildings.

Pro-Cyrl Universal Primer is designed for areas prone to rust and corrosion. Pro Industrial 0 VOC Acrylic delivers a durable finish while meeting all environmental standards. Industrial Enamel 100 boasts twice the coverage per gallon and provides greater flexibility than other alkyds.

Pro Industrial Multi-Surface Acrylic offers high hide, excellent stain-blocking properties and can be applied to a variety of substrates.

High Performance Epoxy maintains a high-gloss finish in areas where a chemical- and abrasion-resistant epoxy is required. Pro Industrial Hi-Bild Waterbased Catalyzed Epoxy is formulated especially for the maintenance needs of institutional and commercial facilities.

www.sherwin-williams.com

New Regulator offers Extended Pressure Range

Plast-O-Matic has introduced Series PRHM, a thermoplastic pressure regulator capable of converting inlet pressures up to 150 psi to a predetermined maximum downstream pressure ranging from 5 to 125 psi settings.

Unique to these regulators is the rolling diaphragm seal, which isolates the spring chamber from the downstream pressure sensing liquid and assures sensitive, smooth, accurate performance

Series PRHM Pressure Regulators are available in ½ ¾and 1" pipe size, in Grade 1 Type 1 PVC.

www.plastomatic.com

HMX Handheld XRF Tool for Point of Process Metal Film Thickness and Composition Measurement

Matrix Metrologies, Inc., introduces a new XRF Film thickness measurement tool.

System HMX, is the world's first handheld XRF film thickness and composition analysis tool. It provides at-process measurement for QC, plating line, and analysis lab applications and at-sample analysis in the factory or in the field along with alloy sorting and alloy identification for substrate materials management.

www.matrixmetrologies.com

New Motoman robot

Motoman's new EC1700 robot is specifically designed for waterjet and dispensing applications that require a high degree of accuracy and precision, coupled with robust performance and reliable operation. The six-axis EC1700 has a 20 kg (44.1 lb) payload and features a 1,717 mm (67.6") reach with a 0.08 mm (0.003") repeatability. The EC1700 features high-performance gear reduction and improved absolute path accuracy (straight line and cornering capability). www.motoman.com.

Anti-Bacterial Dry Film Protection

Troy Corporation introduces a water based bactericide, Troysan 1050, designed to inhibit the growth of microorganisms on coated surfaces. It is a unique BIT-based dispersion product intended to be a cost effective alternative to silver-based compounds. It has no solvents, no VOC, and no formaldehydeand does not pose a risk of coating film discoloration.

www.TroyCorp.com

Association News

TOSCOT Symposium a Success

Organizers are pleased with the attendance to the Toronto Society of Coating Technology's (TOSCOT) Symposium held on April 7, 2008 at the Airport Marriott in Toronto, ON.

The day's activities began with registration followed by luncheon featuring speaker Cathy Campbell, Executive Director of the Canadian Association of Chemical Distributors (CACD).

The afternoon's topics included: Innovative Surfactant Solutions for Emulsion Polymerization with Ana Maria Fernandez, Loubna Jebbanema; Cognis Corporation-Ambler, PA. Fernandez spoke about how surfactants are critical additives extensively used in emulsion polymerization.

The next topic was INXEL Easily Dispersible Pigment Preparations by Daniel Goldberg. In the preparation of pigmented coating systems, powdered pigments are typically used.

A topic was also presented on Zero VOC Alkyd Latex - Surpassing VOC Requirements in Architectural Applications, with Carl J. Sullivan, Mihaela Coman Reichhold, Inc.

J. Douglas Booton of Eastman Chemical Company spoke about how Regulations, VOCs, consumer perceptions, healthier environments are the factors keeping paint formulators busy searching for alternatives.

TOSCOT looks forward to having more of these events.

Doug Booton Eastman Chemical discusses Solvent trends for low VOC formulations.

Daniel Goldberg Evonik Industries highlights the advantages of the new Inexel dust free pigment granules.

Cathy Campbell Executive Director Canadian Association of Chemical Distributors gives the keynote talk on the future challenges for Canadian chemical suppliers.

Carl Sullivan, Reichold Coating Resins, leads a discussion on Formulating for Zero VOC Alkyd Latex Architectural coatings.

Ana Maria Fernandez Cognis Corporation lectures on Surfactant Solutions for Emulsion Polymerization.

Below: 2008 Graduates of TOSCOT's Coatings Technology Course received their diploma's during the Symposium. (L to R): Walter Fibinger TOSCOT (Instructor); Ankir Shah, Tristar Coatings; Shu Pei Li, Valspar Inc.; Marie-Claude Beaudoin, Cognis Corporation; Arvin Valenciano, Industrial Colors and Chemicals; Mamatz Khan, Sherwin Williams; Kamlaish Mudhar TOSCOT President. Absent: Jennifer Lambert, Korzite Coatings; Prashant Khandekar, Satin Finish Hardwood Flooring.

Where are these "green" no VOC solvents?

By Dave Saucier

This article is dedicated to the memory of Robert H. (Bob) Bastien, New Technologies Manager of Inortech Chimie Inc., Terrebonne, QC, who passed away Friday March 28, 2008, after a long and difficult battle with bone cancer. Bob was eminently more qualified to produce this article than I am, however, the old cliché is appropriate and the "show must go on".

Despite the fact that as of this date there are still no VOC regulations published, we know they are on their way and we know in general terms what to expect with regards to the permitted levels of volatiles formulators can use.

> **"Water, the most obvious choice is not always the best choice and in many cases will be the worst choice."**

THE CHOICES

Water, the most obvious choice is not always the best choice in and many cases will be the worst choice. Some of the common other "exempt" solvents are Acetone and tert-Butyl Acetate (t-BAC), both providing excellent solvency, but they come with their own formulating challenges. Throw in the requirement "GREEN" and this presents further challenges. I googled the following as part of the research for this article "green solvent" + VOC + coating.

I was not surprised to see only 128 hits.

The first reference was familiar, as my employer is the Canadian distributor for one of the main producers in the world. The product is Ethyl Hexyl Lactate (EHL), which is not classified as a VOC, meets the definition of "green" and is readily available. It is more expensive than traditional hydrocarbon solvents, but has yet to be used or accepted by the coatings industry.

Supercritical Carbon Dioxide (SCD) was the second hit. There are some projects underway on the polymer side of the formula where using SCD shows promising results in providing narrow particle size distribution that can equate to a significant reduction of the need for VOCs. These technologies being studied use the solubility of the supercritical carbon dioxide in a polymer. Again not widely used in our industry as yet.

Next in the hit list was a reference to a couple of papers or presentations made as follows: 1) "A Zero VOC Coating Process" Milliken Corp., Spartanburg, SC, dated August 26, 1998 (with Charles Liotta) and 2) The "Low VOC Coating" 222nd ACS National Meeting, Chicago, IL August 26-30, 2001 (with Zhenguo Liu, Fengua Deng, Charles L. Liotta, Henry G. Paris, Robert E. Schwerzel, and David Bush). (Both references are from www.chbe.gatech.edu/fac_staff/faculty/eckert-liotta/invited-CAE.html - 27k). I could find no further reference to either of these during a separate google search. So, why were they so pertinent in 1998 and 2001 and not now?

Number 4 on my search result report is "The Presidential Green Chemistry Challenge Awards Program – Summary of 1996 Award Entries and Recipients" published by the US EPA. The bottom of the title page format proudly proclaimed "printed on paper that contains at least 20 per cent post-consumer fiber." I think it was missing "appearing on your screen without using 80 per cent virgin paper", but then again PDF file format was not widely used back a decade ago. Noteworthy, however, was that Rohm and Haas won an award for Sea Nine® antifoulant as an alternative to organotin formulations. Both the EPA and the US Navy were ordered to remove organotin compounds from ships coatings in 1988. Much to my amazement when I googled "Sea Nine®" + antifoulant the list was 1,590 hits versus the 228 reported at the outset of this article to research this topic.

Finally, a possible hit on my google search result of 228. At number 5, a web site link entitled "Green Solvents" led to a web site with a cover page in nice bold green proclaiming "Green Chemistry" by Jemma Vickery of the University of Bristol, dating back to 2004. Another reference to lactate esters was cited, this time Ethyl Lactate – I thought maybe we are onto something here and it also included a cross reference to supercritical carbon dioxide, previously mentioned with a brand new clue to a new possibility called Ionic Liquids. I felt like I won a lottery until I clicked on the link and my laptop started making funny noises and after refreshing the screen finally some promising information…until the bottom of the page. "Extracting the chemical product from the ionic liquid in pure form can pose a problem" – no wonder we don't hear much about this alternative in our industry.

Some further references to citrus-based green solvents were cited and of course when you add up all the original words in my original google query you guessed it…"Krylon Quik-Mark Inverted APWA Green Solvent Paint, 17 oz.... Lowest VOC version available of the original rust preventative coating ..." – Maybe I should refine my search parameters?

The bottom line is that I was quickly frustrated by the lack of information out there in the etherworld. In the recent past I would be able to call a guy like Bob Bastien and say "hey Bob, what do you think would work to help a formulator meet "green" plus "low VOC" and "have a coating that will actually work"? If I made the mistake of mentioning lactate esters he would have gone off on a tangent about how they are really VOC's and what was I smoking to think of them in the first place (I would wisely not mention this research tidbit).

What would have probably happened is that an hour later I would have been snoring while Bob was still bending some molecules together. I would have awoken at some point later thanking the heavens that there was no one around from the purchasing department of the customer, and to see if the formulator was still conscious, or if they had that glazed eye look, or was a coffee or resuscitation necessary.

I don't know about you, but I'm going to miss Bob and if we are not careful and don't encourage our youth to embrace the sciences, we will have nobody to look to when we have these important and pertinent questions that challenge us. ■

Dave Saucier is the Business Manager, Industrial Specialties for MultiChem Inc.

Editor's Note: Bob Bastien has written articles for the Canadian Industrial Coatings industry in the past. Indeed he will be missed. We at CFCM magazine express our deepest condolences to Mr. Bastien's family, employer Inortech and friends.

Fielding Questions...(#1)

Q: How can I save on my waste removal charges?

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Silicones in Paint and Coatings

from Defoamers to Additives to Reactants

By Rick Vrckovnik

Silicones have been used in the Paints and Coatings industry for many years, but have come a long way from their initial use as defoamers. Formulators of coatings used to think of silicones as an ingredient that could be detrimental to their system and cause defects such as fish eyes. This is no longer the case. By using organically modified silicones, they can be used as defoamers that will not cause surface defects, but can also be used as additives to increase flow, leveling, mar and stain resistance, slip, gloss and act as dispersing and wetting aids.

Due to more recent advances, silicones can also be used as co-reactants or monomers to actually react within the coating system to help improve the flexibility, heat, ultra violet (UV) and scuff resistance of the coating in a more permanent manner.

Some of silicone's properties include low surface tension, high lubricity, enhanced softness, low toxicity and non-stick properties. The Si-O backbone provides flexibility and freedom of rotation that enables the molecules to adopt the lowest energy configuration at interfaces, providing a surface tension that is substantially lower than most organic based products. The strength of the Si-O bond not only provides thermal stability, but also chemical inertia, making it highly resistant to oxidizing and to ultraviolet, radiation, ozone and electrical discharges.

The structure of a silicone polymer can be summarized as follows:

Or R can be a long chain alkyl, aryl, fluoro, acrylate, carbinol or other functional groups.

From the diagram above it can be seen that the silicone copolymer can be either a branched or "multi functional" with R groups hanging off the backbone; or it can be linear or "difunctional" with the R groups at the terminal end; or it can be both, having functional groups at terminal ends and hanging off the backbone.

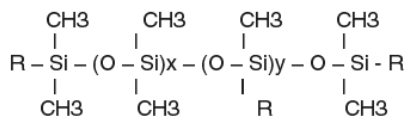
Silicones can also be thought of as Lego blocks, so one can attach a combination of organic groups on the backbone to give the silicone better compatibility to specific formulations. For instance, one can make an alkyl polyether, alkyl fluoro, or fluoro polyether silicone.

The applications where silicones can be used can be broken down into three categories; Defoamers, Additives and Reactants.

DEFOAMERS:

This is probably the best known application for silicones. Silicones are advantageous since they have low surface tension for effective foam control, are long lasting, and can act as both defoamers and antifoams.

Standard silicone fluids, where the R groups in Figure 1 are all methyl, usually incorporated with silica, are the standard products used for defoaming. They are very hydrophobic and can be emulsified for use in water-based systems. The problem with these types of defoamers is that in certain applications they can cause surface defects such as fish eyes and orange peel



Where R = CH3

or R is polyether group = -(CH2)3 –O-(CH2CH2O)a-(CHCH2O)b-OH
CH3

Or R can be a long chain alkyl, aryl, fluoro, acrylate, carbinol or other functional groups.

Figure 1

due to the incompatibility of the silicone fluid.

Silicone polyethers have been used more recently as defoaming agents. Their advantage is that they are 100 per cent active for lower use levels, and do not contain any silica that can separate and cause defects. They are also self-emulsifying for easier incorporation into aqueous or polar coatings.

By varying the ratio of the hydrophobic silicone and the hydrophilic polyether, one can alter the compatibility of the silicone to help increase the defoaming for the specific formulation without making it so incompatible that it will cause surface defects. Increasing the x portion in Figure 1 will make the product more hydrophobic while increasing the y or polyether portion will make the silicone more hydrophilic. The ratio of a and b can also be changed. The higher the ratio of a:b, (i.e. EO:PO) the more hydrophilic the polyether portion will be. Usually there is more PO than EO when these products are used as defoamers.

Fluoro and alkyl aryl silicones are also used as defoamers in solvent and nonsolvent based coatings and more recent advances include using acrylate-based silicones as defoamers.

ADDITIVES:

Silicones are used in paints and coatings as additives to help increase slip, mar and stain resistance, flow, leveling, act as pigment dispersants and can also improve gloss. They are used in waterborne, solvent and solventless based systems. Because of low intermolecular forces, the silicone is able to migrate to the air/surface interface and provide slip, mar resistance, leveling and wetting. These performance attributes are related to the surface tension of the silicone surfactant. The lower the surface tension, the better the wetting capabilities. In silicones, because one can alter the ratio of x and y in Figure 1, the best wetting can be achieved when the value of x, y, a and b are small. Silicone superwetters are silicone polyethers where x = 0 and y = 1 and a and b are anywhere from 2-10 units long. The molecular weight of the polyether portion can be varied to make the molecule more hydrophobic or hydrophilic. Silicone superwetters can have a surface tension as low as 21 dynes/cm. Chart 1 gives a brief comparison of the wetting of various silicone polyethers compared to standard surfactants.

Because of their low surface tension, the use of silicone surfactants can help replace solvents for use as flow and leveling agents.

In coatings, surface defects are usually the result of little or too much flow, which is directly related to wetting. Too much flow or wetting can result in sagging, running or curtailing and too little flow can result in fish eyes, craters and uneven leveling. By adding a silicone with the proper ratio of silicone to organic groups and as well having the proper molecular weight one can provide a silicone additive that will give optimal wetting characteristics to prevent any defects.

Usually the larger percentage silicone in the molecule the better slip, mar resistance and anti-blocking. The greater the amount of organic moiety, the better the recoatability and compatibility of the silicone in the formulation. It is a matter of finding the delicate balance between all of these to get the best performance from the silicone. Usually linear silicone polymers will provide better slip and mar resistance due to the uninterrupted silicone chain that can orient itself to the air/interface surface. Alkyl, aryl, and fluoro silicones and any of the combinations of those groups are also used to increase organic compatibility and help with recoatability.

Recent advances in silicone additives include the use of silicone quats to improve slip and mar and water resistance and also improve anti-stat and anti-bacterial properties.

SILICONES AS REACTANTS IN COATINGS:

Perhaps the most interesting use of silicones is the incorporation of silicone into the polymer matrix in UV, electron beam and other types of coatings to help increase slip, mar resistance, UV resistance, water resistance and also to help increase water permeability. In this case the silicone is not just an additive, but reacted right into the polymer so it becomes a permanent part of the coating.

The linear silicones when incorporated into the polymer matrix will act as chain extenders and usually result in a more flexible coating system whereas the branched silicones will provide more crosslinking.

For electron beam and UV curing systems, acrylate functional silicone

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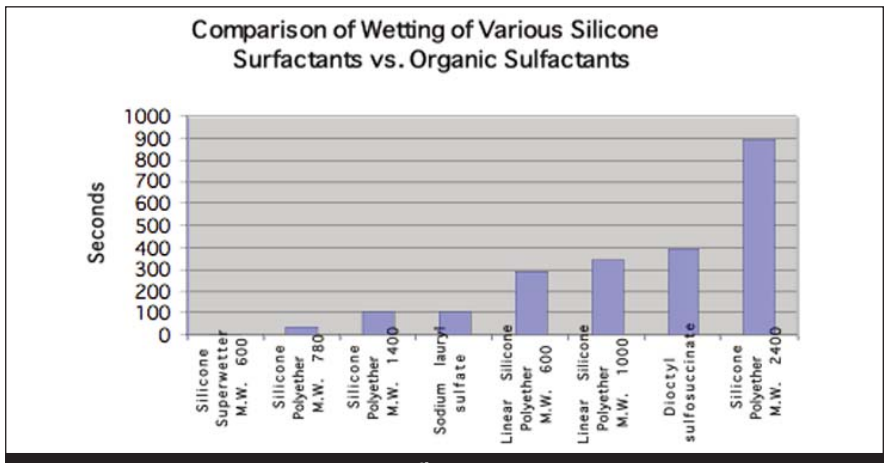

Chart 1

ORGANIZERS HAVE HIGH EXPECTATIONS FOR THE EVENT.

Three technical sessions will be held during the conference, covering: Automotive coatings (OEM and refinish); Industrial coatings; Architectural coatings (interior and exterior); Wood coatings; Coatings on plastics; Protective coatings (marine and heavy corrosion protection); Functional coatings systems; Specialty coatings; Coatings production technology and Measurement and testing.

Opening hours are 9 a.m. to 5 p.m. with the last day being 9 a.m. to 3 p.m.

CANADIAN LUNCH

Due to the short notice about the cancellation of the International Coatings Expo (ICE), there will not be a Canadian Luncheon at ACS.

THE CONFERENCE

The American Coatings Conference promises a forum for the exchange of information and views from high-level scientific experts.

"The involvement of the coating raw materials industry in the conference program is overwhelming," says a delighted Esther Schwencke, Head of Events Division, Vincentz Network. Due to more than 170 top-grade and innovative papers submitted, the event – originally designed for 54 scientific presentations – has been increased to 72 presentations, which resulted in the extension of an additional half day. The conference also offers five pre-tutorials, one and a half hours each, as an introduction to the special topics of "Polyurethanes", "Radiation Curing", "Corrosion Protection", "Anti-microbial Surfaces", and "Easy-to-Clean Coatings". There will also be poster presentations on coatings research and development work to contribute to a dynamic exchange of views among the experts and inspire the industry to take the step to the "Next Level". Information about the conference program can be obtained from Friederike Plasswich at Vincentz Network, conference@american-coatings-show.com

EXHIBITORS LIST

This was the exhibitors list at presstime. Please refer to the official web site www.american-coatings-show.com for any recent changes.

3M Energy & Advanced Materials	1745
Aakash Chemicals	1957
ACC Solvents Industry Group	918
Acme-Hardesty	1211
ACT Test Panels LLC	1128
Acti-Chem Specialties, Inc.	1963
AGC Chemicals Americas	520
Air Power Inc.	611
Air Products and Chemicals, Inc.	1439
Alberdingk Boley Inc.	1557
Alnor Oil Co., Inc.	811
AMCEC	1104
Anton Paar USA	1030
Arch Chemicals, Inc.	1739
Arizona Instrument LLC	941
Arkema Inc.	310
Aros Group	905
Ascott Analytical Equipment Ltd	829
AVEKA Inc.	947
Bajaj Exports (India)	1965
BASF Corporation	1421
Baxenden Chemicals Ltd	1623
Bayer Material Science LCC	1545
Benda-Lutz Corporation	1411
Bio Reaction Industries	748
Bitoner International Corp.	324
Blackmer	945
Borchers	1749
Borica Co.	1705
Brenntag North America	1756
Brenntag Specialties, Inc.	1756
Brookfield Engineering	723
Buckman Laboratories Inc.	1415
Buhler Inc.	947
Burgess Pigment Co.	1966
BWAY Corporation	841
BYK USA Inc.	1507
BYK-Gardner	1507
Cabot Corp.	1766
CPCA	712
Cardolite	313
Cargill, Inc.	919
CAS-MI Laboratories	930
CB Mills	1028
CCPIT Sub-Council of Chemical Ind.	239
Celanese	1710
CEM Corporation	711
Central Can Company	731
CFCM	839
ChemFine International Co.	608
Chemguard, Inc.	1866
Chemical Marketing Concepts	1039
Chemsfield Co., Ltd,	213
Chori America, Inc.	608
Cilas Particle Size	929
CINIC Chemicals America, LLC	1860
Clariant Corp. Pigments & Additives	1721
Clariant Corp. Functional Chemicals	1721
Cleveland Steel Container	1044
The CMM Group, LLC	1045
COATEX Inc.	1021
Coatings/Ink World Magazine	647
Cognis Corporation	1519
Collano Inc.	1733
Colorwen International Corp.	911
Columbia Machine Inc.	300
Columbian Chemicals	1000
Cook Composites & Polymers	1810
CPS Color Equipment, Inc.	1038
Cristal Global	900
Croda Inc.	1113
CSM Instruments	824
Custom Milling & Consulting,	633
Custom-Pak Products	621
Cytec Industries, Inc.	1529
CZNACHEM Group	307
Datacolor	1241
Deacom, Inc.	1036
Degen Oil & Chemical Co.	401
Delta Colours	821
DEUREX AG	1510
Disti Kleen, Inc.	1804
DKSH North America, Inc	1954
DMG World Media Ltd.	933
Dominion Colour Corporation	1848
Dow Coating Solutions	1153
Dow Corning Corporation	610
Draiswerke, Inc.	822
DSM NeoResins	1355
DuPont Weathering Systems	1101
DuPont Zonyl Fluorosurfactants	347
Dura Chemicals, Inc.	420
Eastman Chemical Company	1445
Ebonex Corporation	704
ECKART GMBH	1521
EGE Kimya San ve Tic A.S.	1854
Eiger Machinery, Inc.	242
Elcometer Inc.	637
ElektroPhysik USA, Inc.	932
Elementis Specialties	405
Eliokem	1828
EMD Chemicals Inc.	1325
Emerald Performance Materials	421
Engineered Polymer Solutions (EPS)	705
Essential Industries	314
Ethox Chemicals, LLC	1220
Everlight USA Inc.	1004
Evonik Degussa Corporation	528
EXAKT Technologies, Inc.	831
Excalibar Minerals, Inc.	1111
Fenchem Enterprises Ltd.	316
Ferro Corporation	1947
FETTER	617
FlackTek, Inc	1031
Formulator & ColorTec Software	1100
Fortune International Technology	1055
FSCT	623
Fuji Silysia Chemical, Ltd.	1221
Paul N. Gardner Co., Inc.	1047
Gelest Inc.	1915
Gellner Industrial, LLC	509
GEO Specialty Chemicals	1949

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BUSINESS PROFILE: ALLIANCE SURFACE FINISHING

Robert Langlois

By Sandy Anderson

Robert Langlois loves a challenge, which is why in 2003 as president, CEO and founder of Alliance Surface Finishing (ASF) he took on the task of commercializing powder coating plastic. He worked and reworked formulas and through plenty of trial and error, is now quite confident that his company "can powder coat anything."

"We've come a long way," says Langlois. "Everybody said it couldn't be done"

ASF holds a patent for a process and apparatus for powder coating non-conductive substrates. They specialize in plastics, but can also coat metal components. Langlois is not a chemist, but has degrees in business.

The biggest buzz in the works at ASF is powder coated chrome on plastic as an alternative to electroplating. The company's chrome replacement technology includes bright and tinted chromes with the look and durability of the real thing.

ASF has perfected a process, after a year of testing that is commercially ready and meets General Motors specifications. It can even be done on nylon. "We are right on the cusp of this new technology," says Langlois. Negotiations are still ongoing, but the contract ASF is hoping for is a non-conductive substrate for body panels for a third party manufacturer of vehicles, looking at production of 80,000 vehicles. The first production run is speculated for 2012.

"It is a green alternative with cost advantages and performance," he says. "Our product exceeds liquid expectations."

Langlois says the cost reduction in testing has been as much as 34 per cent, but it depends on the product being coated.

ASF is a "job shop", but Langlois says that they tend to focus on large contracts with a minimum 18 month run. Their largest jobs since inception have been manufacturers of appliances and office furniture. The company would like to get more automotive business, but has also done work in agricultural, recreational and electronics.

Alliance's facility in Vaughan is 16,000 sq feet with 35 employees working two shifts. Only 6000 sq ft of that is manufacturing, the rest is offices and boardroom.

"We would like to go to three shifts so we could be operating 24 hours a day five days a week," says Langlois.

Although most of the Alliance's customers are U.S. based, Langlois says, "We are proud to be a Canadian company."

Langlois is a firm believer in the LEAN philosophy. "We need our suppliers within 6 hours," he says. "We do everything in one facility." They order weekly and ship weekly.

WHY ALLIANCE?

The name Alliance was chosen for a reason. As the company's literature states: "The corporate name 'Alliance' forms a fundamental cornerstone of our corporate philosophy of success and growth through the relationships we form with our customers, and the value of our strategic partners." ASF uses proven leading suppliers such as BASF, PPG and Dupont and stocks 400 different powder technologies under one roof, as well as styles and textures to meet all industry specifications. They work with customers to develop new colours and applications.

They specialize in solid colours, textures, metallic, anti-graffiti, anti-microbial, ultra-durables, low friction coatings and much more. "We use traditional powders that are tried, true and proven," says Langlois. "The process and apparatus are what's different."

In the shop, the paint line system was custom designed to suit ASF's needs. They use Torrid Oven on their line. ASF also uses the Nordson iControl system. There is no hand spraying.

RESEARCH AND DEVELOPMENT

Research and Development (R&D) is key to ASF's success and is ongoing. Langlois says the company is always trying new things such as coating glass, acrylics or carbon. They have looked into powder coatings as a replacement for film and argon gas. They research reflective coatings that can absorb IR radiation or are UV resistant and colour that won't fade.

"We do an awful lot (of R &D)," says Langlois. "We're not your typical powder coating shop."

A significant portion of the company's operating budget goes toward furthering the development of its core technology…powder coating on plastic. In addition to its own technology, ASF works closely with customers and its strategic partners and is always looking at new opportunities.

LICENSING PLATFORM

A large percentage of ASF's focus is on licensing projects. They currently have a dozen customers with more in negotiation. The company will develop product, design equipment, train, and teach an entire turnkey system from start to finish.

"Whatever the customer needs," says Langlois.

Alliance will develop a licensing agreement to meet the specific needs of the Licensee, incorporating relevant Alliance patents, patents pending, IP or trade secrets. Licenses are granted with or for territories, specific industries, application technologies, products or exclusivity (product, industry, territory, time-limit).

ASF offers pre-production sampling and production support.

Langlois sees the future as bright as some of the colours in his plant for ASF. " A lot of people know who we, just haven't been able to use our technology." He says the company's goal is to "keep the facility full, demonstrate our technology and have customers come in to view the process first hand." ■

A Look At Equipment

There has been a lot of talk within the industry about high solids, water based chemicals and powder, to keep the volatile organic compounds (VOC) levels within reasonable levels, while not compromising on the finish, compatibility and stability of these chemicals.

Today, every wood shop is looking at savings and a good quality finish.This can be achieved in the following ways:

By working with the chemical manufacturers, who will supply the best process while keeping the VOC's in mind and the finish required by the end user.

By working with the equipment suppliers who will supply the best equipment in order to give high transfer efficiency without compromising quality.

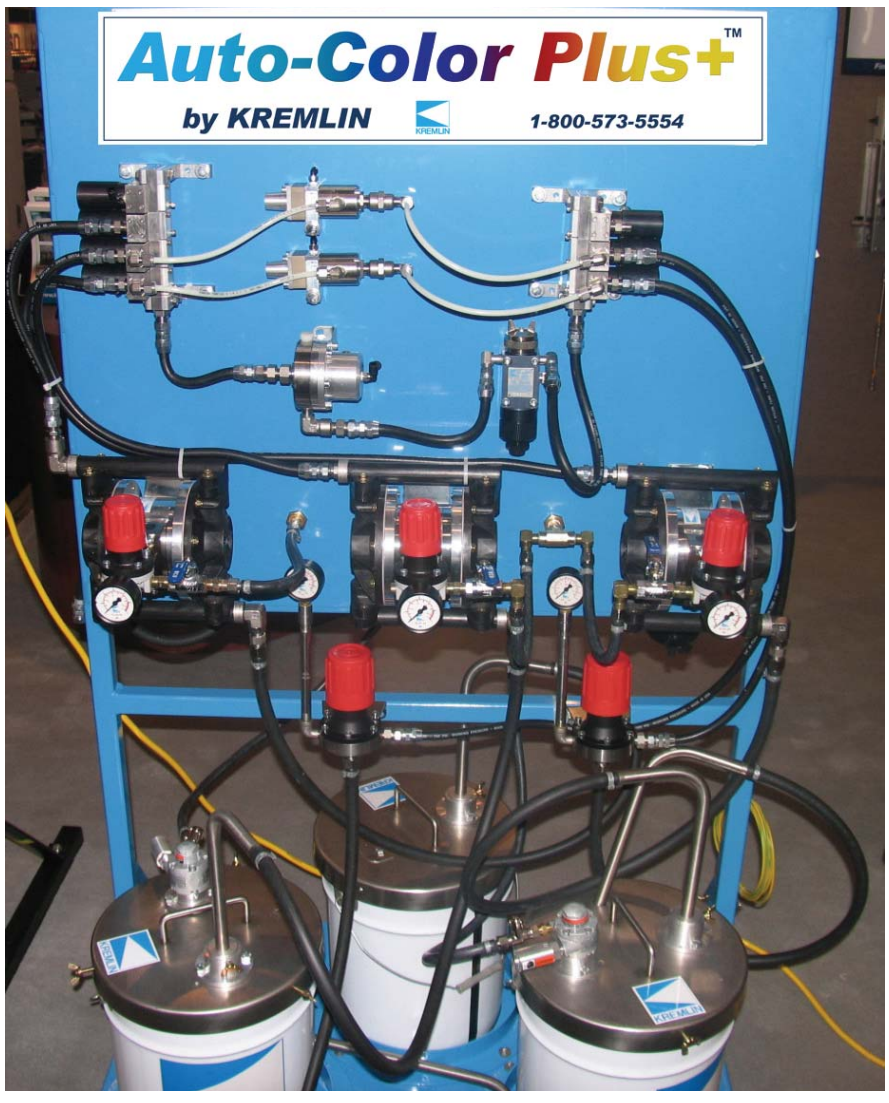
If a small wood shop spraying with conventional spray guns and guns connected to pressure tanks, were to change to an air assisted airless system for sealers and lacquers, they would see transfer efficiency increases, an enhanced finish quality and greater speed. Connect a high volume low pressure (HVLP) gun to a pressure pot to spray stains, and become compliant while saving on the products being sprayed. When dealing with lower volumes, for shading, toning or glazing, use high efficiency cup guns with cups on top, and save time, solvent, products and contamination.

If a medium wood shop is using pumps for spraying lacquers and sealers and pressure pots for stains, a paint kitchen is what is in order. By dedicating a system, he is looking at minimizing wastes, reducing VOC's and increasing operator comfort, while keeping his spray area clean. Putting the pumps in an isolated area, close to the spray area and dedicating the pumps accomplish this. The recirculation of fluid avoids sedimentation and gives consistent spray. For maintaining consistent viscosity, install heaters. Today, flow-through heaters are available where recirculation is not possible. Heaters replace the manual addition of solvent for adjusting viscosities. Manual addition of solvent leads to sags, low coverage and rework. There are situations when these wood shops would not like to dedicate systems, but instead would explore the possibility of putting

Exel's new series of S3 guns

manifolds at the suction of pumps and manifolds on the delivery side of pumps. This is done to handle two or three different types of products being sprayed in two or three booths at the same time. A great deal of emphasis is paid to agitate products and in getting the chemicals in 45/55 gallon drums. With these sizes it is less labor intensive with elevators. By installing elevators the operator's needs are met. The medium size shops have also started exploring the possibility of using the electronic two component mixing machines.

Large wood shops are definitely looking at flat lines, overhead conveyor lines or floor conveyors. Flat lines are becoming increasingly popular. They could be the reciprocating, carousel or the robotic type. These are beneficial when a large number of flat pieces need to be sprayed. Flat lines have become very versatile with a greater number of circuits, better controls and easy colour changes. Large wood shops are also incorporating two-component mixing machines. These machines can be mechanical or electronic with PLC controls, accurately mixing the base and the catalyst within + or – 1 per cent. There is a better gloss retention when mixed fresh and sprayed. These machines have a tremendous ROI and large wood shops save on waste, solvents and rejects. With a lot of solvent being used to flush guns and wash belts, it is important for the wood shops to look at solvent recovery units. These units are compact and either air-cooled or water-cooled, depending on size. They distill the waste to get clean solvent and by doing so, the consumption of solvent is reduced drastically, resulting in tremendous savings in waste disposal. Floor conveyor systems work well in case goods manufacturing plants, where the items are heavy. Overhead conveyors are used to spray doors where the conveyors move at 20-25 feet



Auto colour changer plus

Cyclomix Micro

per minute or more.

Wood Shops, today, are seriously looking at colour changers for flat lines. An example is the flat line for handling stains. Suppose there are 10 stains attached to ten pumps that are used constantly, a pump for an odd colour and a pump for solvent. The pumps would force the stains into a colour changer and then head to the guns, return to the colour changer and back to the pumps. A PLC panel would have a touch screen where you could change colors within seconds or minutes. These systems are provided with air purges. When changing colours the waste is minimal for the stains & solvents and very quick. Production demands are easily met and quality is unmatched.

Shops are looking at pumps with very low maintenance. Bellow design pumps are being used in most cases for medium and high pressures. These pumps are easy on fluids, have no pulsation and the fluid is not exposed to air, hence no crystallization in certain cases. These pumps are made of stainless steel making them easily adaptable to water based as technology changes. The quality of the stainless steel is very important when handling acid cure post catalyzed coatings. Diaphragm or small hydraulic piston pumps handle stains. Proper selection of filters and fluid regulators become paramount. Careful selection results in un-interrupted and consistent spraying.

Guns, whether automatic or manual, are now being designed to keep the weight low. The dead pockets inside the gun are minimized assisting in easy cleaning and no contamination. The sealers and

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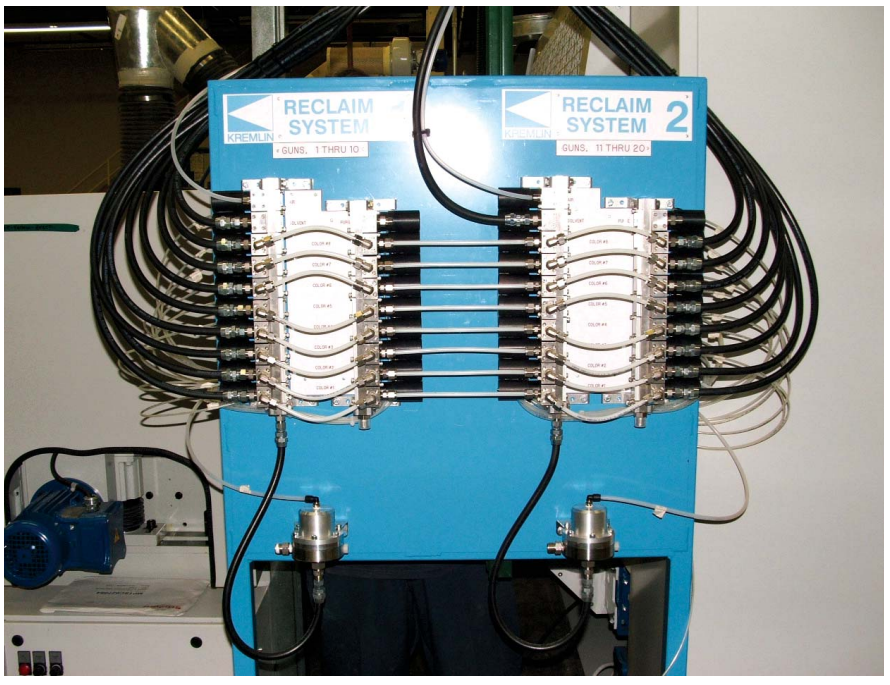


Reclaim System

lacquers are sprayed by the air assisted airless guns, as are the wiping and spray stains. Some of the spray stains and NGR's are sprayed by the high volume low-pressure guns.

When it comes to booths, small manufacturers are trying to isolate the sanding areas from finishing areas. The medium sized companies isolate the paint booths and where possible, have air make up units installed to create positive pressure in the spraying areas. With large companies air make up units are imperative and the spray areas are always isolated. The booths are generally of the closed type. To save on booth filter changes, baffles are installed before the filters.

Small manufacturers are paying more attention to diameter of hoses. On the air assisted airless systems 3mm fluid hoses are recommended instead of the 5mm or ¼" hoses and ergonomic hose kits are available from manufacturers. By using the 3mm fluid hoses, waste is minimized; there is less consumption of solvent and less overspray in the atmosphere, making the sprayer's job easier.

The end users are more demanding today. It is very important for the equipment manufacturers to work closely with the wood shops and the coatings manufacturers and suggest, as well as implement, equipment that improves the finishing operation. The result is the installation of automatic systems; electronic two-component machines, solvent recovery units and paint kitchens, as well as introducing water based chemicals or high solids wherever applicable and economical. ■

This article was supplied by Exel Industrial.

Ergo hose kit with MVX Gun

Masking 102:

The Case for Custom Molded Masks

Asking the right questions is the key to helping you decide when to turn to custom molded masks.

SHERCON'S FIRST HAND LOOK AT SOLVING MASKING PROBLEMS

E-coat, powder coat and wet paint are not smart. These finishes deposit on every available surface, including places they are not wanted. Removing unwanted finish takes time, labor, and bogs production lines.

"Coating shops often become bottlenecks on a production line," says Ruben Dominguez, a Senior Design Engineer with Shercon, a manufacturer of masking products. "Not because it's difficult to apply a finish, but because it's hard to take it off where you don't want it."

Masking products are hardly new. There are die-cut tape masks, which are typically suited to masking flat surfaces where alignment is not critical. For more difficult applications – such as non-flat surfaces, apertures or in situations where ease of insertion and removal are needed to meet the demands of high-volume production – molded masks are a logical step.

"Any time I see operators performing secondary operations after a finish step – like removing finish from threaded studs or other surfaces," says Dominguez, "I've found a situation where a custom molded mask would make a huge impact on productivity. It's all about asking the question, 'Why are you doing this?'"

He recalls watching operators manually removing e-coat and powder coat from the inside of several bores on heavy equipment, an operation that was consuming significant time. They had tried constructing their own home-brewed masks using tape, but application was slow and the results with their multi-step e-coat and powder coat lines were mixed at best.

Dominguez, an expert in the design of tape and custom molded masks in his own right, designed a tapered molded plug with a flanged handle for easy insertion and removal. He eliminated the expense of a post-coating machining step and did away with a production bottleneck. The client was very pleased.

"The ergonomic handle allowed workers to quickly insert the mask, the tapered plug completely protected the bore from their coating process, and it removed with a single tug, leaving a razor-sharp finish line," says Dominguez.

He adds, "Instead of using two operators to perform a time-consuming extra machining step, they just plugged in a fix. That mask paid for itself very quickly."

Because of the engineering costs, custom molded masks are not always the best solution, but they can resolve difficult coating issues like poor finish quality, poor consistency, slow mask application and removal, and poor production line productivity.

THE CASE FOR CUSTOM MOLDED RUBBER MASKS

Custom molded masks make sense in a wide variety of situations. They can protect unusual surfaces and openings, and do so while providing excellent results in very hostile finishing environments. They differ from die-cut tape masks in several key ways:

- They protect unusual shapes, bores, apertures and curved surfaces in hostile finishing environments
- They install and remove quickly
- They are reusable

Let's look at these characteristics:

EXCELLENT PROTECTION IN DIFFICULT ENVIRONMENTS

Custom molded masks can mask almost any surface, aperture, or combination of the two. No application is really beyond them, and even simple applications, which would normally be fodder for a standard mask, are often handled more efficiently by a custom molded mask.

Oscar Puluc, a Shercon Design Engineer, helped a client who was masking threaded holes with a simple tapered plug, but was forced to tap out the first three threads of each hole because the tapered plug offered incomplete protection. Puluc's solution was a threaded mask that could be rapidly inserted with an air gun and provided 100 per cent protection. The expense of the mask was minimal compared to the labor costs and productivity losses involved with re-tapping each hole.

DIE CUT KITS

Ruben Dominguez recalls another application where a customer was using tape to individually mask 12 threaded studs and a heavy steel mask to protect the hub surface on a wheel assembly. It was a time consuming process, and because of the steel mask, a heavy duty one. Dominguez solved both problems with a molded rubber mask that protected all 12 threaded studs and the hub surface too. Now, the client uses a single mask that applies in minutes. In addition, workers could ready the molded Ultrabake mask for another cycle simply by shaking it over a waste container, where the accumulated finish would simply fall off.

A more extreme example was the construction of a bonded rubber/metal mask to protect a large transmission aperture to several atmospheres of pressure.

"Again, these masks can handle almost any application" says Dominguez. "They solve previously 'unsolvable' masking problems, but can also replace the cumbersome, manual masking techniques used on many lines with a fast, plug-and-play solution that pays off with increased productivity."

RAPID INSTALLATION AND REMOVAL

Productivity is key on high volume production lines, and custom molded masks are often used to eliminate coating shop bottlenecks. When operators are forced to manually create a mask from tape, apply multiple masks, or engage in a time-consuming alignment process, it is probable that a custom molded mask would speed up the process and pay for itself very quickly.

Properly designed molded masks are self-aligning, and can mask multiple surfaces with one insertion (e.g. masking many threaded bores with one mask). Since they are molded in three dimensions, they can be ergonomically designed with flanged handles, rings, or other aids.

"This is the part of the design process you can't take for granted" says Dominguez. "You have to know how the part hangs on the rack, or what the space constraints are. You don't want to design a beautiful mask that can't be inserted because there's no handle clearance. That wouldn't make anyone happy."

It is why Design Engineer Richard Ramos prefers to visit his customers whenever possible. "Everybody's process is different. When you visit a shop, you can look for areas that are causing problems, and often resolve several issues instead of one."

Interestingly, Ramos credits his customers with a great deal of creativity, "People on production lines are very innovative, and they produce some pretty ingenuous workarounds for coating problems. Problem is, a series of manual steps involving operators and X-acto knives can add up, and these things tend to creep up quietly so you don't even notice how much time is being wasted."

He adds, "One customer filled a

DIE CUT KIT FOR CYLINDER HEAD

completed gear assembly with wax so they could machine the outside without depositing metal fragments on the inside. We designed a molded mask with a lip that sealed the aperture. They didn't need to pour in the wax or heat the whole assembly for removal. We saved them a lot."

Molded masks also typically cycle quickly from the exit of the coating line to the start. Making them ready to use again often involves little more than flexing them over a waste container, a nice time savings over steel masks, which often require a burn-off step before they can be used again. To make sorting easier, they can be color-coded.

REUSABILITY

Advances in rubber compounding allow manufacturers to produce molded masks with precisely the right combination of flexibility and durability. They can handle applications where flexibility is called for; yet survive multiple trips through harsh e-coat and powder coat cycles.

2PC WRAP MASK

Dominguez recalls one customer who employed single-use plastic caps to protect threaded studs, but was throwing away literally barrels of the things. This conflicted with the company's desire to be a "green" corporate citizen, and they also foresaw a dim future for disposal of the plugs. A reusable custom molded mask was designed and put into production. After several years, the original masks are still in use, solving the disposal problem and speeding up the production line, too.

"We compound all our own rubber in our factory" says Dominguez, referring to the mixing process. "It allows us to fine-tune the compound to suit the particular application.

SUMMARY

Custom molded masks can solve production problems and often outperform die-cut tape masks in even simple applications where alignment or insertion/removal speeds are important. In difficult environments, molded masks are often the only reasonable choice.

POWDER COATING TAPE PC21

The downside is the initial tooling costs. Still, given the cost structure driving today's production environments – where consistent quality is paramount and productivity an imperative – custom molded masks can make a huge difference and pay back the initial up-front costs very quickly.

The key, says Dominguez, is to look at your coating shop processes with fresh eyes, or to invite a professional to audit the areas where you struggle for productivity and consistency.

"A lot of questions have to be asked. The customer has to ask himself if they're really as efficient as they could be, and if their finish quality is as good as it should be. We also have to ask our clients a lot of specific questions or we don't improve their coating results as much as we could," says Dominguez. He concludes, "It's all about asking the right questions." ■

This article was provided by Shercon Inc.

Energy Efficient Spray Booths

In the past few years, we have probably seen more changes in spray booth design than we have seen in the previous 20. The major booth manufacturers are always looking for new features that will help improve the finishing environment. However, the biggest influences behind most of the recent changes have been the increased costs of energy (gas prices have soared over the last few years, as have hydro costs) and the new government regulations under the Environmental Protection Act.

Today's spray booths offer many system options, so make sure you choose wisely.

EFFICIENT USE OF ELECTRICITY

For years, all anyone really wanted to know about the booth was: How much gas will it burn during a job/day/week/month? Today, we are all just as interested in how much electricity it will use. How will your booth operation impact your monthly hydro bill?

If you are looking for a new booth system, the biggest bang for your buck is variable frequency drives (VFDs). These drives control the motors on the air makeup intake as well as the exhaust system. They talk to each other and adjust for the changes inside the booth cabin. This lessens the loads on the motors, so they require less power to operate. The booth draws the most amps on start-up. This is lessened when the VFDs allow for a low-amp "soft start." VFD systems come in single or dual packages, and although single-VFD systems work well, the most efficient is the dual system. In the dual system, both the input and the exhaust are controlled by the VFDs. These dual systems provide automatic balance capability, taking that responsibility off your painter, and giving him the confidence to paint in a trouble-free environment.

A VFD system also replaces all the piston/pneumatic-driven dampers that have traditionally controlled balance and paint-to-bake changeovers.

Most shops can identify with seized or out-of-line transition dampers. VFDs allow for smooth, energy-efficient electrical transitions, as opposed to the harsh environment changes that occur when a damper slams shut or open.

EFFICIENT USE OF FUEL

Both indirect and direct-fired air makeup systems are still available on the Canadian market.

However, if you want to minimize fuel usage, you should consider a direct-fired system. Direct-fired systems will burn just the amount of fuel that is required to heat the air coming in from outside.

Adjustable flames will fire and modulate depending on how cold the outside temperatures are. The old DeVilbiss Company developed its paint-and-bake systems with direct-fired units back in the late 70s and early 80s because these systems were designed for Canadian climates. Even way back then, fuel efficiency was a major concern.

The other advantage of using direct-fired systems is they are much more cold temperature friendly than indirect. Much of western Canada has very severe winter temperatures. Indirect-fired heaters heat a heat exchanger, which in turn heats the air. This works fine in more moderate climates, but it has been our experience that when temperatures go below minus-20 degrees Celsius, the booth cannot achieve temperature.

Today, you will find that most major booth manufacturers not only use but also recommend direct fire. Unfortunately, if you do not have access to natural gas or propane, indirect fire is your only option.

BAKING/FORCE DRY SYSTEMS

Even if you do not have natural gas or propane and have to use an indirect-fired heating system, take your time when choosing the baking/force dry system your booth will use. There are basically three systems on the Canadian market today, and although they all will achieve the same temperatures, the amount of fuel they use varies greatly.

RECIRCULATING SYSTEMS

These are by far the most fuel- efficient. When the system is in baking/force dry mode, high temperatures are achieved by recirculating 80 to 90 percent of the air while bringing 10 to 20 percent fresh air into the booth. This means that in a typical 12,000-cubic-feet-per- minute booth, only 1,200 to 2,400 cfm require heating.

FORCE DRY SYSTEMS

These are sometimes referred to as two-speed systems.

Using damper systems, two-speed motors, or variable frequency drives, these booths will exhaust 100 per cent of the air during the paint cycle (using our example above, 12,000 cfm).

These systems will still exhaust 100 per cent of the air during the bake/force dry cycle, but at approximately half the capacity (6,000 cfm). If you are considering this type of system, please think about direct-fired heating and a VFD transition/balancing system. This combination will operate the most efficiently in this type of system. With direct-fired heating, this system will burn approximately 30 to 40 per cent more fuel than a recirculating system. Still, this is a very viable option for lower production shops.

HIGH-TEMPERATURE AIR MAKEUP SYSTEMS

Be very cautious when considering these systems.

Air makeup units can be oversized or have temperatures rise beyond legal limits to achieve bake and force dry temperatures.

Many of these systems are not only illegal; they are burning tons of fuel and will cost a small fortune to operate.

Our advice would be to check with your local gas authority before installing anything other than traditional recirculating or

force dry systems.

HIGH-FLOW SYSTEMS

While we are discussing fuel and energy efficiency, we must talk about another new option that you might be considering—high-flow systems.

High-flow booths move more air than we have become accustomed to.

Until recently, the average booth moved 8,000 to 12,000 cfm. High-flow booths are moving anywhere from 16,000 to 20,000 cfm through the traditional auto refinish downdraft cabin.

One of the best means for the efficient application and curing of waterborne paints is increased airflow past the wet surfaces. This is another European import based upon the head start they have had in refinishing with water- based products. If you have attended clinics or discussed the new waterborne paints with your local paint rep, you have likely seen all the acceleration additions that will concentrate or increase the airflow of your existing booth (towers, Direct Fired burner fans, portable blowers, etc.).

High-flow booths simply use bigger motors to drive the input and exhaust systems. Obviously, these bigger motors will burn more electricity. To heat the larger amounts of air, the burners also have to be upsized, and thus high-flow booths burn more fuel. However, for the most part, energy efficiency has been taken into account in these developments, and they are often coupled with automatic balancing and VFD systems such as those discussed above.

The bottom line is that these booths are like SUVs—they are slick and big and are all the rage, but they are not as energy and fuel efficient as the less sexy standard-flow systems. The good news is there are tons of new products that can easily be added to standard-flow systems that will help you with cost efficiencies and also handle the new water-based materials.

This article was adapted with permission from one that appeared in Collision Quarterly Fall 2007. Photos are supplied by Global Finishing. ■

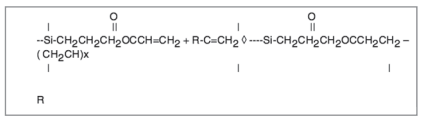
continued from page 11

and epoxy silicones are normally employed. Urethane systems can co-react with silicone carbinols and amines.

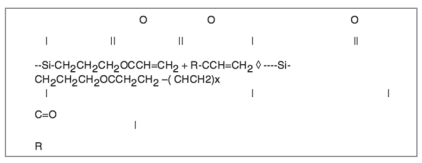
A summary of the reactions that can take place are as follows:

SILICONE ACRYLATES

Reaction With Vinyl Monomers

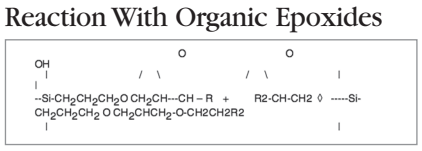


Reaction With Acrylic Monomers

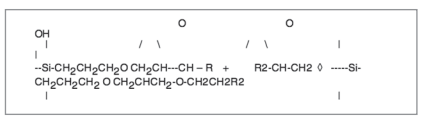


SILICONE EPOXIDES

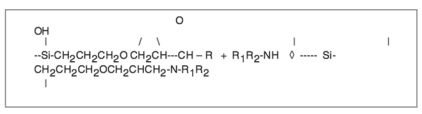
Reaction With Organic Epoxides



Reaction With Alcohols

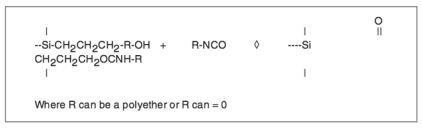


Reaction With Amines

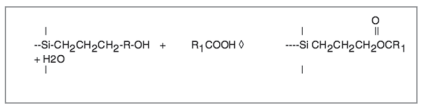


SILICONE CARBINOLS

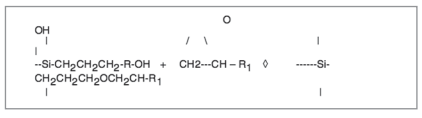
Reaction With Isocyanates



Reaction With Carboxylic Acids

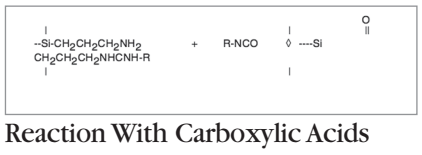


Reaction With Epoxides

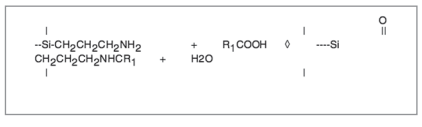


SILICONE AMINES

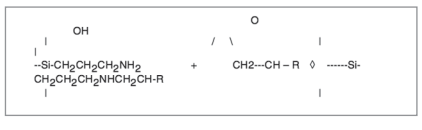
Reaction With Isocyanates



Reaction With Carboxylic Acids

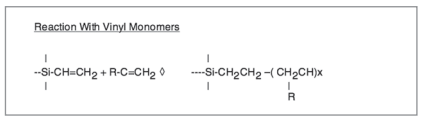


Reaction With Epoxides

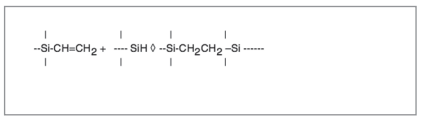


VINYL SILICONES

Reaction With Vinyl Monomers



Reaction With SiH



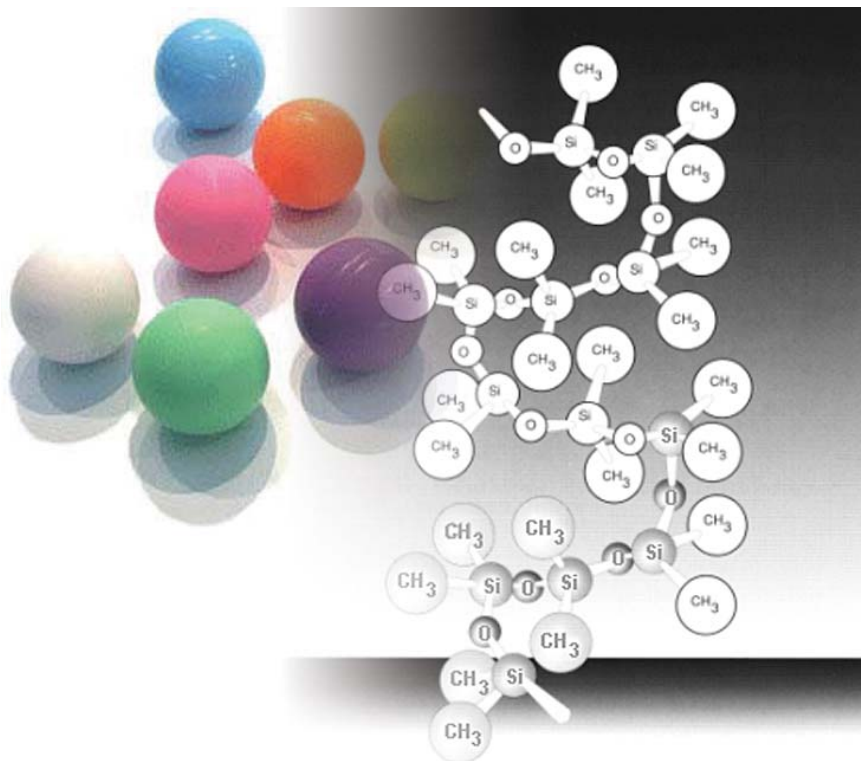
The reactive silicones can also be modified with polyether groups, alkyl groups, and fluoro to make them more compatible, or to increase chemical and stain resistance.

Because of the unique attributes of the silicone backbone, they can provide water repellency and water permeability, as well as UV and chemical resistance, which can be very useful in architectural coatings, such as masonry and wood coatings.

SUMMARY:

Silicones have come a long way in their use in paints and coatings. Because of the versatility of the silicone molecule, it can be modified with various organic groups and the molecular weight can be modified to make a molecule that can be customized for specific formulations for use as defoamers, slip, flow, mar resistance, pigment dispersants and as reactants into the polymer system to help improve heat stability, flexibility, water repellence and water permeability. They can be used in basically all types of coatings including automotive, wood, anti-fouling, architectural, inks and paints. As more formulators discover the uniqueness and adaptability of silicones, the future for coatings looks very bright. ■

Rick Vrckovnik is the Technical Director for Siltech Corp, a silicone specialty manufacturer based in Toronto, Canada.



PLATING RECTIFIERS

By Chris Janacek

The power conversion systems and components contained within the power supplies, or rectifiers, used in the surface finishing industry today rely mainly on methods and technologies developed decades ago. This power conversion methodology remains as a highly efficient and reliable source of the high currents necessary in the surface finishing industry. The power conversion components contained within the rectifier include voltage regulating devices, transformers and rectifying devices. The cooling system and the control system are other major components of the rectifier. Three major types of plating rectifiers are tap switch, variable transformer and silicon controlled rectifier (SCR). A brief overview of tap switch and variable transformer rectifiers will follow, but the majority of this discussion will be concerned with the SCR controlled rectifier. The control systems of today's rectifiers have changed and become more sophisticated over the years. There are also numerous options available on today's rectifiers. Most of these options have been available for some time, but the sophistication of implementation has increased over the years.

TAP SWITCH AND VARIABLE TRANSFORMER RECTIFIERS

Tap switch and variable transformer rectifiers represent a smaller percentage of the plating rectifiers produced today. These two types of rectifiers, while providing lower initial procurement costs, require more maintenance due to their mechanical nature and do not provide the level of control that SCR controlled rectifiers provide. Disadvantages of tap switch rectifiers include the necessary mechanical maintenance of the tap switch itself, the incremental stepped voltage output, and less desirable ripple content. Disadvantages of variable transformer rectifiers include the wear on the wipers of the variable transformer and their lower achievable KVA.

POWER CONVERSION IN SCR RECTIFIERS

As previously mentioned, the power conversion components of the SCR rectifier include voltage regulating devices, transformers, and rectifying devices. The voltage control device in the SCR controlled rectifier is the SCR itself. There are three basic physical types of SCRs used in rectifiers; stud mount, encapsulated and disc (or "hockey-puk"). An SCR is a three terminal device. The three terminals are the gate, the cathode, and the anode. The gate controls the flow of current through the SCR. Without a gate signal, the SCR blocks the flow of current in either direction. When a signal is applied to the gate, the SCR behaves like a diode allowing current flow in one direction only. The gating of the SCR controls the voltage to the main transformer.

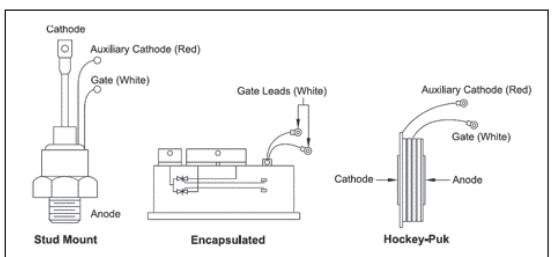


Figure 1

The main transformer is used to change an AC (Alternating Current) voltage from one value to another. Each transformer has both primary and secondary windings. The voltage in the primary winding of the transformer induces the voltage in the secondary winding of the transformer. In plating rectifiers, the main transformer reduces the relatively high voltage, low current primary AC voltage to the necessary lower voltage, higher current secondary AC voltage.

The third power conversion component of the SCR controlled rectifier is the rectifying device. The rectifying device used in rectifiers is the diode or the diode assembly. The diode is a solid state device that allows current flow in only one direction. The diode assembly is the final stage of power conversion that converts the regulated AC voltage to rectified DC voltage.

The previous discussion describes what is known as a primary SCR, secondary diode rectifier. There are some rectifiers that use the SCR as both the voltage regulating device and the rectifying device. These types of rectifiers place the SCR on the low voltage secondary side of the transformer and are called secondary SCR rectifiers. Either type of rectifier can produce the output necessary for plating rectifiers. The voltage and current rating of the rectifier, the type of cooling method used and other factors determine which type of rectification the rectifier manufacturer uses.

COOLING SYSTEM TYPES

There are different cooling methods available for cooling the internal components of the rectifier. Rectifier cooling is necessary because the power conversion components used within the rectifier are not perfect conductors and have power losses associated with them. While the power conversion devices used in plating rectifiers are highly efficient devices, the high power ratings of the plating rectifier can result in generation of large amounts of heat. Cooling methods include natural convection cooling for small low power single phase rectifiers, forced air cooled, indirect water cooled, direct water cooled and combinations of the above. In large plating rectifiers, the three major methods employed for cooling are forced air, indirect water and direct water. A major consideration against the use of air cooled rectifiers is the corrosive nature of the plating environment. If the rectifier is to be located in an unconditioned air space near plating tanks, one of the water cooled rectifier types should be considered. Table 1 compares the three cooling types.

CONTROL SYSTEMS

The single most important function in the SCR controlled rectifier is the control of the SCR itself. In general, the system component that accomplishes the control of the SCR is called the gate drive. As you may recall, the SCR has three terminals, the gate, cathode and anode. The gate terminal is the terminal that controls the flow of power through the SCR. The gate drive is incorporated on a printed circuit board or PCB. The gate drive can be a standalone PCB, or a PCB that incorporates the gate drive and other rectifier control functions into one PCB. The gate drive receives control signals from an operator panel or a computer control system. Rectifiers can be operated in either a voltage control mode or a current control mode. In voltage control mode, a command is sent to the control board that represents the desired output voltage of the rectifier. A feedback system within the rectifier sends a signal back to the control board that indicates the actual output of the rectifier. The control board responds to this feedback by changing the gate drive output to maintain the desired output voltage. This comparison occurs at a very rapid rate and allows for tight con-

COOLING METHOD COMPARISON CHART

Type	Water Usage	Size and Weight	Reliability of Cooling Method	Noise Level	Corrosion Resistance	Ability to withstand High Ambient Temperature	Description
Forced Air	None	Medium	Fair	High	Poor	Good	Fan causes air movement and cooling
Direct Water	Low	Low	Good	Low	Excellent	Excellent	Local water source cools some or all components
Indirect WaterLow	Low	Low	Excellent	Low	Excellent	Excellent	Uses closed loop liquid system w/water to liquid exchanger

trol of the output voltage. In current control mode, a command is sent to the control board that indicates the desired output current of the rectifier. The feedback system operates in much the same manner as the voltage control system, except that the output current is regulated.

In addition to the gate drive, there are other functions and protection systems that are built into the various control boards of the rectifier. The gate drive itself will normally employ voltage limit and current limit circuitry that will prevent the output of the rectifier from exceeding a set limit in the event of system component failure. Systems may also include a line monitoring system to protect the major components of the rectifier. These line monitoring systems are designed to detect incoming line problems normally caused by component failure within the rectifier. One problem that line monitoring systems may detect is excessive incoming line current. Another problem that the line monitor may detect is an unbalanced line. Either of these problems is normally caused by failed semiconductor device, such as an SCR or diode. Left undetected, these failures can have a cascading effect where the remaining good components fail due to excessive power dissipation. There are other controls built into liquid cooled systems that actuate solenoids to control the flow of coolant in these systems. Finally, there are temperature sensors built into most systems that will either provide a visual over temperature warning or actually shut down the rectifier if it reaches an over temperature condition.

STANDARD RECTIFIER FEATURES

Standard rectifiers will include knobs for the voltage and current control mentioned previously. Systems will also include START and STOP buttons to initiate and end plating cycles and control switches to disable the rectifier output without actually shutting down the entire rectifier. A standard rectifier will also include analog panel meters to display the output of the rectifier. These controls can be located in the front panel of the rectifier itself, or in a remote control box (Figure 2).

RECTIFIER OPTIONS

In addition to these standard rectifier controls, options can be added to the rectifier for specific processes. Ramp functions, cycle timers, digital meters, amp hour meters, and pump controls can be added to the basic rectifier. These custom functions are typically added by installing additional stand alone components within the rectifier or the remote control box. However, the Programmable Logic Controller (PLC) can in some cases replace these individual components allowing for the addition of multiple options in a single instrument. Ripple filters can also be added to rectifiers for processes that require less ripple in the plating process.

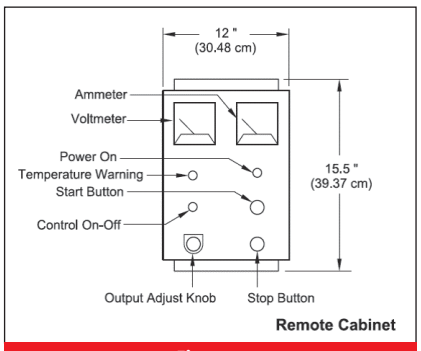


Figure 2

Interface boards can be added to rectifiers to allow control via a control signal from a remote PLC. The PLC signal to this interface board is typically a 4-20mA control signal, but can also be a voltage control signal. The 4-20mA current control signal is the most popular choice for PLC control because of its ability to travel long distances without signal loss as well as it being less susceptible to noise. PLC controls are typically added by the end user themselves or by third party vendors that specialize in the installation of large plating lines. These PLCs can be incorporated into large systems that also control automated lines.

Today's rectifiers are functionally the same as they have been for decades. However, the methods used to control these rectifiers have progressed over the years. Options for specific finishing needs can easily be added to rectifiers and most rectifier companies can customize a rectifier to fit your specific needs. The large combination of required input and output voltages, currents and rectifier options makes stocking complete rectifiers impracticable for rectifier manufacturers. Therefore, investigate your rectifier needs thoroughly because your chosen rectifier provider will most likely be able to provide the rectifier that best suits your needs. ■

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Improvements in the Processing

of Aluminum Alloys with Electroless Nickel From a Health and Safety Perspective

By Robert Jones B Sc, CEF

The pretreatment of aluminum alloys for electroless nickel plating traditionally involved the use of chemicals that gave excellent results with respect to coverage and adhesion of the coating, but were not very user friendly for the plater or platers on the processing line.

THE BOMB

This was particularly true for hard to plate aluminum alloys such as silicated A356 castings or high strength 7075. The need for an effective desmut when processing these alloys is critical and for many years the standard in the industry was what became known by many platers as the 'bomb'. The 'bomb' was a tri-acid mixture of nitric acid, sulphuric or phosphoric acid, and a large amount of ammonium bifluoride. It did a wonderful job of desmutting the aluminum after etching, but it was difficult to make up (very exothermic make-up) and nasty to work with. It typically released significant amounts of NOx during use and under some circumstances could even become unstable (hence the nickname). Even with good tank ventilation most platers did not like working with this stuff. Nitric acid was also used in the zincate strip step when processing aluminum through a double zincating cycle and strong caustic soda etches were also common when processing aluminum.

ADDRESSING HEALTH CONCERNS

New products have been introduced in recent years to address the health and safety issues of the materials like the 'bomb' but in many cases the results were mixed or the products simply did not cover the wide range of aluminum alloys that the nasty pretreatment chemicals like the triacid desmut did. After receiving two almost simultaneous requests from customers to eliminate NOx fumes from their aluminum pretreatment lines I embarked on a mission to replace the standard pretreatment chemistry. The key was to replace the bad products, while maintaining the quality of the work over a wide variety of aluminum alloys.

CONSIDER PRETREATMENT SYSTEM AS A WHOLE

The first important thing that I found is that the pretreatment cycle must be considered as a whole, from start to finish. Changing just a single step in the traditional cycle to a newer safer product is likely to lead to some failures. The new safer alternatives work much better when matched correctly together from start to finish.

> "The key was to replace the bad products, while maintaining the quality of the work over a wide variety of aluminum alloys."

RANGE WIDENED

The second thing I found is that when this proper matching of products is done the range of alloys that could be processed is actually very wide – everything from difficult castings to most wrought alloys. The new process sequence uses no nitric acid or caustic soda at all (hence no NOx fumes) and the products have excellent bath life. The adhesion overall has been excellent, but there is a definite need for good rinsing between steps particularly around blind holes (although in fact this has always been the case - even with the old standards). One benefit is that the line operators were quite motivated to get away from nitric based desmuts so they were happy to rinse more carefully. From the results obtained at these and other customers, it looks like the days of the 'bomb' are pretty much numbered when processing electroless nickel. Both customers had already changed to cadmium and lead free electroless nickel baths, so from a health and safety point of view, things have come a long way for the average guy working the line-which is good. ■

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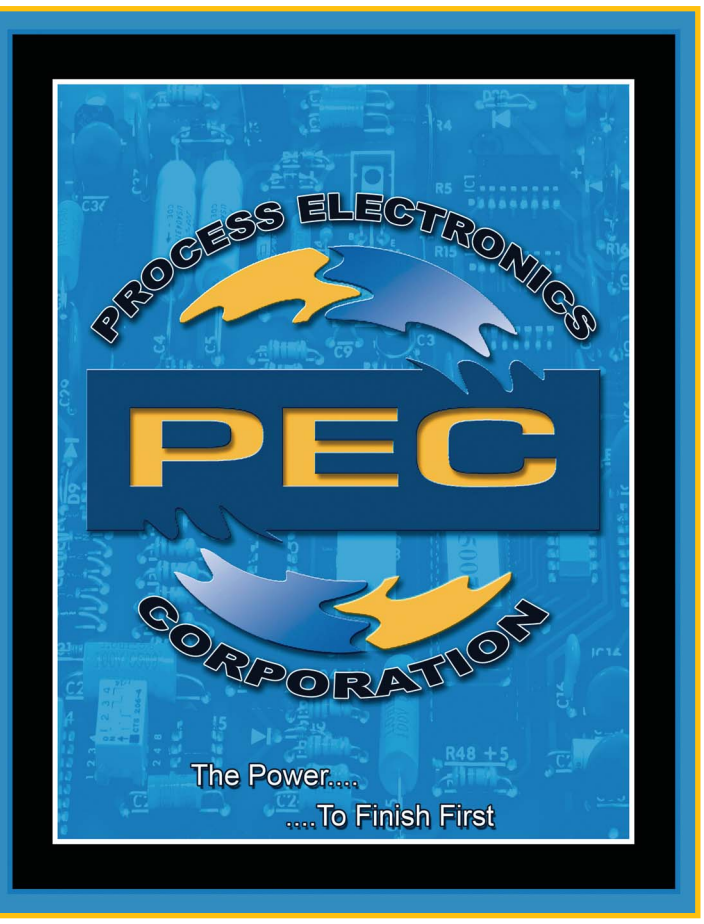

Anodizing 101

Talking to those in the industrial anodizing trade, CFCM received comments such as "There is really nothing new happening when it comes to anodizing." It seems that this is a case of "if it's not broke, don't fix it."

Anodizing is a tried and true 85-year-old technique used to coat the exterior of a metal with a protective film using an electric current as a power input. The component is immersed in the acid bath and is connected to the positive terminal and an electric current is passed through the bath. After being immersed for a fixed amount of time, the component is washed and is ready to use. The acid in the bath is corrosive and proper care needs to be taken in mixing and handling. The anodizing process produces a hard layer of aluminum hydrate. This compound is porous and it can also be dyed with different colors to make the component look more attractive. The thickness layer is about 0.0005 to 0.002 inches. Automobile parts and electrical housings are some of the common types of components that are anodized. The hard outer layer also acts as a resistor to electricity. Care must be taken when anodizing aluminum, as the part will be thicker when it is finished and may not fit its original purpose. To have colour on aluminum, it must be anodized. Anodizing is also used for metals other than aluminum such as, niobium, tantalum, titanium, tungsten, zirconium. For each of these metals there are process conditions that promote growth of a thin, dense, barrier oxide of uniform thickness. The thickness of this layer and its properties vary greatly depending on the metal, with only the aluminum and tantalum (and recently niobium) films being of substantial commercial and technological importance as capacitor dielectrics. Aluminum is unique among these metals in that, in addition to the thin barrier oxide, anodizing aluminum alloys in certain acidic electrolytes produces a thick oxide coating, containing a high density of microscopic pores.

ANODIZING EVOLUTION

The aerospace industry is credited with having given birth to industrial anodizing as far back as 1923, when it was used to protect seaplane parts from corrosion. This early chromic acid (Bengough-Stuart) process is still used today, although its complicated voltage cycle is now known to be unnecessary. Variations of this process evolved, and the first sulfuric acid anodizing process was patented by Gower and O'Brien in 1927. Sulfuric acid is today's most common anodizing process.

Anodized aluminum extrusion was popular in the 1960s and 1970s, but plastics and powdercoating, being less expensive alternatives, took its place. The phosphoric acid process is the newest in anodizing, used primarily as pretreatments for adhesives or organic paints. A wide variety of proprietary and increasingly complex variations of all these anodizing processes continue to be developed by industry, so the growing trend in military and industrial standards is to classify by coating properties rather than by process chemistry. The need for corrosion-resistant aluminum aircraft parts fueled the pioneering of the technique, and from there it was perfected for military use and industrial applications.

There have also been nanotechnology applications. A hexagonal array of nanoscale (on the order of billionth of a meter) depressions was impressed on an aluminum surface using a silicon carbide die fabricated using electron beam lithography. Feature interval was 70-500 nm, feature depth was 200 nm, and feature width was of similar magnitude. Adjustment of process conditions produces precisely ordered pore arrays with dimensions suitable for use as 2-D (two-dimensional) photonic crystals in the visible wavelength.

Pores can be used as templates to make structures such as nanowires and nanotubes.

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Clarification via Sedimentation

Or a Little Chemistry, a Little Math, Makes for Better Effluent

WATER FACT: WATER AS A SOLVENT

"Water is … a good solvent due to its polarity. Substances that will mix well and dissolve in water (e.g. salts) are known as 'hydrophilic' (water-loving) substances, while those that do not mix well with water (e.g. fats and oils), are known as 'hydrophobic' (water-fearing) substances. The ability of a substance to dissolve in water is determined by whether (it) … can match or better the strong attractive forces that water molecules generate between other water molecules. If a substance … (cannot) … overcome these strong intermolecular forces, the molecules are 'pushed out' from the water, and do not dissolve." Let's take a look at a few basic chemistry and math issues that are at the core of operating a clarifier. It is a sophisticated vessel that is dependent on some basic operating criteria in order for it to do a proper job.

YOU NEED SOLIDS THAT SETTLE

Suspended solids may be defined as solids which may be captured by being filtered across a 0.45 µm filter membrane, distinguishing them from (smaller) colloidal or dissolved solids. Clarification may also separate substances that don't settle in water. Fats and oils will float to the surface and be captured by skimming. A waste stream may have both colloidal solids and fine suspended solids that need to be removed to successfully reduce the waste stream's loading for any one type of contaminant. Colloidal solids tend to not settle and solids too fine to settle at a waste stream's flow rate will not settle sufficiently to be removed, leaving the effluent with an elevated contaminant concentration. Something has to be done to improve settleability and this is often accomplished by bringing small particles (colloidal, suspended) together (coagulation) and then, if needed, making them even larger (flocculation).

COAGULATION, FLOCCULATION

These two processes are understood to occur sequentially, coagulation preceding flocculation, although it is not unusual to have the two terms used interchangeably. Coagulation is the process of bringing very fine particulate together, typically colloidal materials, by adding a metal salt (such as ferric chloride, FeCl+3, with the iron ion (Fe+3) being the effective agent, or aluminum sulphate (Al2SO4, ion (Al+3). These positively charged particles tend to reduce the negative charge of colloidal solids, allowing them to come together to form larger particulate, called "flocs" and increasing their likelihood of settling. Indeed they may also be effective in agglomerating very fine suspended solids as well, with the same effect. In order for the coagulant to be effective, it needs to contact the colloidal material by colliding with it. Therefore, coagulant addition is typically accompanied by high energy mixing in order to increase the number of collisions. Mixing time may be measured in seconds. Use of metal salts such as iron and aluminum also result in the formation of their respective hydroxides when added to the water or wastewater stream they are used to treat. The nature of the hydoxides is such that they tend to form their own flocs which then may "collect" the colloidal particles, forming the needed larger particulate. However, using metal salts also tends to generate a lot of sludge volume with poor dewatering characteristics. Flocculation extends the process of coagulation and may again use iron or aluminum salts to accomplish this or, as is often the case these days, use high molecular weight polyelectrolytes (polymers). These latter flocculants are carbon-based molecules, often delivered as .1 per cent to .01 percent weight to weight liquid solutions to the waste stream after coagulation. They bridge flocs into an agglomerate resulting in a larger particle more easily settled. Unlike adding coagulant, the polymer solution is added into a slow mixing environment, measured in minutes rather than seconds, allowing time for the bridging to occur and, with less energy added, preventing the new large floc from breaking up once it has formed. Smaller particulate, from broken larger floc, do not tend to reform and typically settle more poorly than their bigger predecessors.

MATH AND METAL SALTS ADDITION RATE

If a ferric salt is being added to a waste stream it is useful to know the ferric ion concentration level addition rate (Fe+3/L or, better, weight Fe+3/unit weight of contaminant). Jar testing is often used to determine the appropriate dosage for a metal salt addition rate to a wastewater stream. Often dosage addition rates of metal salts or polymers are stated as "parts per million, ppm". That is, so many parts of iron salt solution to a million (equivalent) parts of fluid being treated. For example, 1.0 ppm. However, this aproach of chemical addition can be less than cost or operationally effective except where the contaminant of concern is at a constant concentration in a set waste stream flow rate.

Consider the following:

A typical commercial delivery of liquid ferric chloride would be characterized by product information (check this information for each load):

1. Concentration of iron salt; say, 38 per cent as FeCl3. (Caution. Iron salts may be identified with "water of hydration" associated with them (i.e. FeCl3 · 6H2O); ensure that the concentration information from the supplier reflects any water of hydration associated with the concentration value. For this example, no water of hydration is included in the 38 per cent).
2. Density of the solution, say 14.3 pounds/gallon, or 1.43 kg./L.

Calculate the amount of ferric ion (Fe+3) per unit volume of solution delivered.

Calculate the ratio of Fe+3/FeCl3. From the periodic table the atomic weight of iron (Fe) is 58.85, and chlorine is 35.45. Therefore, the gram molecular weight (GMW) of FeCl3 is equal to (1X 58.85 + 3X 35.45) grams = 165.2 grams. The ratio of Fe/FeCl3 is equal to (58.85/165.2) = .356.

Calculate the grams of FeCl3 in a liter of solution. Knowing that the iron chloride concentration is 38 per cent by weight of the solution and the solution weighs (density) 1.43 kg/L, the weight of FeCl3 in solution is equal to (.38 X 1.43 kg/L) = .5434 kg/L. That is, there are .5434 kg (or 543.4 gr.) of FeCl3 in a liter of the delivered solution.

Calculate the amount of iron, Fe, in a liter of solution. Knowing the ratio of iron to iron chloride is .356, the amount of iron in a liter of commercially delivered solution (using the above parameters) is equal to (.356 X .5434 kg) = .1935 kg (or 193.5 gr.) as Fe+3.

SO WHAT?

Cost. And the consistent use of a resource. At some point in establishing the operating parameters for the clarifier, a dosage rate for iron as Fe+3 (or Al+3, polymer, lime) was established that optimized the performance of the clarifier for the contaminant chemical in question. Using less would provide poorer operation, excess use would add cost to the operation without a corresponding improvement in performance. This may have been established initially by a jar testing program and then refined through a full scale testing program across the clarifier.

Ideally, the dosage would be stated on a weight of iron (for this example) to a unit weight of contaminant, say .3 gr of iron to a gram of contaminant – a ratio of .3.

That is, if the contaminant was at a concentration of 10 mg/L, you would need to add (.3 X 10) mg = 3.0 mg of iron for every liter of waste solution to obtain optimal results from the iron. That is, the ratio of Fe+3 weight to contaminant weight in any volume stays the same: 3.0 mg Fe+3/10 mg contaminant giving a ratio of .3.

We know there are 193.5 gr. (193,500 mg) of iron in a liter (1,000 ml) of delivered solution. 1 ml contains 193.5 mg. of iron. If you require 3.0 mg of iron per liter of

wastewater, then you need: (3.0/193.5) ml = .0155 ml of iron chloride solution to be added to the liter of wastewater. For the 1 L example immediately above, adding .0155 ml of the iron solution to a liter of wastewater would provide the needed .3 ratio of Fe+3/contaminant, by weight.

If your flow is 1,000 L per minute, then you need to deliver (1,000 X .0155) ml/minute = 15.5 ml of iron chloride solution/minute. On a concentration basis you are still delivering .3 mg of iron per mg of contaminant ((15.5 ml iron chloride X 193.5 mg Fe+3/ml)/(1,000 L wastewater X 10 mg contaminant/L) = (2999.25/10,000) = .3).

If your wastewater flow and the level of contaminant were each constant and the iron chloride solution was consistently supplied at the same metal salt concentration, then you could always add the iron solution at a rate of 15.5 ml/1,000 L and obtain a ratio of .3, the value found to be the best for treating the contaminant. 1 L has 1,000 milliliters (ml).A 1,000 L has a million ml (i.e. 1,000 X 1,000 or 1X106)ml. Therefore, for every minute, 15.5 ml of iron solution is added to a million mls. of wastewater: 15.5ml/ per 1X106 ml.This can also be stated as an addition rate of 15.5 parts per million (ppm).

But wastewater flows rarely reflect such consistency. Say the contaminant's concentration dropped to 8 mg/L and the metal salt addition continued to be added at 15.5 ml/minute. The amount of iron being added would continue to be 2999.25 mg, (rounded to 3,000 mg). The amount of contaminant would be equal to 1000 L/min. X 8mg/L = 8,000 mg./min.The ratio of Fe+3/contaminat would be (3,000/8,000) or .375, an increase of 25 per cent over the ideal ratio. Consequently your iron solution costs are now 25 per cent greater than needed.

Similarly, if the contaminant concentration remained at 10 mg/L, but the wastewater flow dropped from 1,000 L/minute to 800 L/minute, the amount of contaminant per minute would again drop to 800 mg/min and the ratio would again increase to .375 and excess iron solution would be wasted.

On the other hand, if the level of contaminant increased from 10 mg/L to 12 mg/L, the amount of contaminant/minute would equal 12 mg/L X 1,000L = 12,000 mg. With the iron still being added at 3,000 mg/minute, the ratio of Fe+3/contaminant would drop to (3,000/12,000) = .25, a 16.7 per cent decrease in the ratio. Less iron is being used per unit contaminant but what is being used is less effective as the ratio is too low.As a consequence, the treatment process may be compromised and the effluent discharge may not be meeting regulatory requirements. Similar consequences are found if the contaminant flow increased without a corresponding increase in metal salt addition.

Ideally you add the treatment chemical to the contaminant at an optimized fixed weight to weight ratio, as argued above, assuming all other operating parameters are within operating guidelines (i.e. flow rate). To achieve this requires real time monitoring of the contaminant concentration (for a metal, with an inline specific ion electrode) and of flow. Using a computer-based analysis system, the weight of contaminant can be calculated in real time and the amount of chemical needed for treatment can be delivered through a variable speed pump, automatically adjusted by signals from the instrumentation.

In Summary

If you are clarifying via Sedimentation:

You need to get any dissolved contaminant you wish to remove, out of solution.

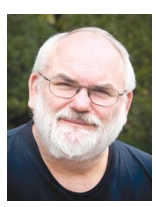
Colloidal solids do not settle and very fine suspended solids may not settle well.

Colloidal and suspended solids may be formed into larger particles to aid in settling ("floc") by the addition of a coagulant, often a metal salt.

Floc may be further agglomerated by a flocculant, again to aid in settling; these are often polyelectrolytes.

The rate of addition of a coagulant or a flocculant is best defined on a weight to weight basis to optimize its performance in capturing the contaminant and optimizing the cost of the chemical.

Monitor your wastewater flow and contaminant levels in real time to aid in adding treatment chemicals at the appropriate rate. ■



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hte Aktiengesellschaft	1029
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ISI PLAST S.p.A.	739
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Jixin, Guangdong Deqing Synthetic Resin	404
JLM Chemicals, Inc.	1956
JPCL PAINTSQUARE	1142
Jyoti Ceramic Industries	923
Kaneka Texas Corporation	600
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King Industries, Inc.	329
Kion Specialty Polymers	1721
Korea International Trade Assoc.	411
Kowa American Corp.	1906
Kronos Worldwide, Inc	1121
Kuraray America, Inc.	1806
KW Container	745
Kyowa Hakko USA	1466
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NorthPak Container Corporation	1040
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Nuplex Resins	440
NürnbergMesse North America Inc	
Oak Printing Co.	849
OM Group	1749
Omega Minerals	1123
Omya Inc.	1021
OPC Polymers	1319
Hebei Oxen Special Chemicals Co, Ltd.	320
Paint + Coatings Industry (PCI)	629
Paint PAC	334
Palmer International	511
Pan Technology, Inc	1013
Paramount Colors/Meghmani Organics	1053
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PLATING AND ANODIZING: ANODIZING

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EQUIPMENT AND ENERGY

Saving energy is always a concern when it comes to the anodizing line. It has been suggested that additives in the bath and/or increasing acid concentration and/or temperature adjustments are ways to conserve energy.

Another is a change in pulse. Direct current (DC) or pulse anodizing with pulses in milliseconds is commonly used in most job shops. Perhaps the newest buzz in this area is that the use of slow, square-formed pulses can decrease processing time by 50 per cent and total energy consumption in the anodizing tank by up to 30 per cent. Apparently existing anodizing lines can be retrofitted with only a few equipment modifications for this to occur. But retrofitting requires a lot of theoretical knowledge about pulse anodizing principles on the part of the shop. The current will eventually even out when higher voltage in a pulsed process is applied and the anodic film will reach a thickness proportional to the voltage applied. The voltage also controls microstructure. When voltage is rapidly lowered, current density decreases in a range of microamps that corresponds to very high resistance in the anodic film, the formation of which slows to almost zero due to a very low electrical field across the barrier layer. After a while, depending on the type of alloy being processed, electrolyte concentration, voltage change and temperature, the anodic layer will thin enough for an increase in the electrical field across the layer. Field-assisted dissolution and formation happens, increasing the total dissolution rate due to lower resistance in the reduced thickness of the oxide layer. After a while, current density will reach a steady level corresponding to the value of the lower voltage and the anodic layer reaches a new thickness with smaller cells corresponding to the lower voltage.

Pulsating between two densities apparently works because the surface of the metal has time to recover during periods of low current.

The industry has rejected slow pulsing in the past due to lack of evidence and current high capital investments in their shop lines. However, new testing and research has shown it to be an effective way to decrease energy use.

Equipment exists in the marketplace for every anodizing need, such as an aluminum finishing line designed to anodize, alodine, chem-film and seal aluminum products, including fasteners and fabricated components, with tanks to accommodate racks and baskets. Support utilities can be located behind the tanks to allow operators clear access. This method allows for a dry floor configuration that recovers or captures most all chemistry back into the tanks or waste piping.

For aerospace anodizing an option is a medium volume barrel plating/anodizing facility. Operations can include cadmium and nickel electro-plating, all aluminum anodize processes, and related finishing operations such as cleaning, etching, passivate and chromate conversion coatings. The system could feature 14 x 36 inch plating barrels with up to 100 lbs capacity per load and produce 4 barrels of plated parts per hour, or 400 pounds per hour.

A line could include a semi-automatic chain-crane anodizing plant for architectural parts.

There are horizontal and vertical automatic anodizing plants. Automatic anodizing plants have central control rooms for chemical polishing and laboratory units. These are just a few equipment examples.

RECYCLING

Of course, one cannot talk about anodizing without looking at recycling and the environment because etching and anodizing generates a large amount of solid waste, even though the chemicals used are water-based. Many plants use recycling equipment to extend chemical life and reduce waste treatment costs.

Purification is important because it can enhance the uniformity of the anodized film.

Many plants collect the rinse water as a 35 per cent solution for resale as fertilizer. Seasonal and regional demand for the rinse water reduces the original chemical cost by 10 to 20 per cent.

With the increased focus on environmental concerns in all facets of business, anodizers can look at recycling to reduce process chemical costs, reduce waste treatment chemical and labor costs, and, in many cases, enhance product quality. And any ideas to conserve energy such as reworking the pulsing in the anodizing process or looking at additives or temperature changes are a step in the right direction. ■

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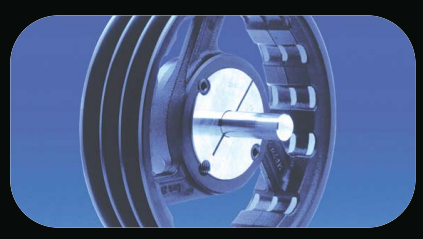

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