



# CFM

**CANADIAN FINISHING & COATINGS MANUFACTURING**

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September 2008



STORY BY SANDRA ANDERSON  
PHOTOS BY PETE WILKINSON

## Pinnacle, At a Successful Point

**With a focus on integrity, cleanliness and two washing stages, Pinnacle sets itself apart**

**W**hat strikes you most when you walk into the Pinnacle Finishing plant in Chatham, ON, is its overwhelming size, 170,000 sq ft. of which Pinnacle uses only 60,000, the rest leased out. It has 11 loading docks. The other thing that strikes is its cleanliness and brightness.

*continued on page 14*

Pinnacle Finishing employees hard at work in the 170,000 sq ft facility.

### ALSO IN THIS ISSUE

- **Endless applications for recycled glass as paint filler and more with Poraver**
- **World's Biggest Ball of Paint, on the way to Coatings 2008**
- **Water Wise with John Seldon**

PM # 41515012 Return undeliverable Canadian addresses to Wilkinson Media Canada Inc., 250 The East Mall Suite 1103, Toronto, ON, Canada M9B 6L3

## Home Cooking

### Bringing Powder In-House Helps Canadian Manufacturer Slash Production Time and Beat Out International Competition

**W**hen Soucy International Inc., wanted to dramatically decrease its production time, the manufacturer quickly turned attention to its finishing process.



Sylvain Richard, head painter at Soucy works on the line in a manual spray booth, the Nordson Lean Cell.

The Metal Division of Soucy International specializes in the development of parts and accessories for snowmobiles, all-terrain vehicles (ATVs) and industrial equipment. Soucy keeps a competitive edge over foreign competition through flexibility and rapid response. The problem was it outsourced finishing to an outside powder coater, which delayed delivery of finished products and increased transportation costs.

Soucy began in 1967 as a distributor of snowmobile parts in Quebec and Ontario. The Soucy Group has since grown to comprise seven companies and 1,300 employees in North America and Europe. Its companies design, engineer and manufacture a wide range of components for original equip-

*continued on page 12*

### IN THE NEWS

#### Health Canada Cracking Down on Non-Compliant Consumer Labels

By Mike Moffatt

The summer is typically a slow time for our chemical product compliance firm, but 2008 has been anything but quiet. We have been receiving an unusually high number of panicked phone calls and e-mails from potential new clients in the cosmetics, coatings and specialty cleaning industries. The reason: Health Canada audits of consumer products.

#### The Issue: Non-Compliant Consumer Cosmetic and Chemical Labels

The stories we are hearing are all far too similar. A Health Canada inspector conducts an audit of a retail store and finds that the label on a particular consumer product does not meet the rules set out in either the Consumer Chemicals and Containers Regulations, 2001 (CCCR-2001) or the Cosmetic Regulations. The product is 'pulled' from the shelf by the inspector until the label issue can be rectified. The retailer informs the manufacturer of the product about the problem; the manufacturer then has to scramble to find a solution.

Health Canada auditors have a number of tools at their disposal. Clause 22.1.e of the Hazardous Product Act allows an inspector to "seize any product, material or substance, or any labelling, advertising material or other thing" reasonably believed to be non-compliant with the CCCR-2001; the Food and Drugs Act has a similar clause relating to the Cosmetics Regulations. Health Canada can also request a recall if a product does not comply with either piece of legislation.

#### How Many Manufacturers Are Affected?

It is difficult to determine – as far as we are aware Health Canada does not release statistics on how many products are seized over a period of time. Based on the number of inquiries from manufacturers we have

*continued on page 4*

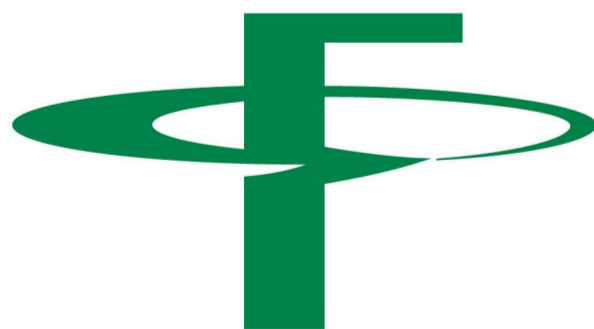
## Fielding Questions...(#3)

**Q** How can costly, complex waste become useful products?



**A** Fielding has the people, facilities and know-how to make waste “wonderful”!

At Fielding our laboratory, research and production facilities get the most out of every type of material. Spent and contaminated solvents and refrigerants are all good stuff to us! As one of North America's leading chemical recyclers, we take old waste and give it new life by making it into something useful again...and again and again! Even if your waste isn't "Grade A" as we say, chances are we'll still keep it from landfills and incinerators and turn it into like-new products that save you money! Saving the environment along with savings on chemical products, now that's wonderful! Call Fielding today and find out more about how wonderful your waste can be!



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## NANO, NANO...

In this picture I am outstanding in my field again, this time at Pinnacle Finishing in Chatham, ON with VP of operations, Adam Pernasilici and quality manager Todd VanHal. The story starts on page one in this issue.

Over the years we have been hearing more and more about nano materials. And they have nothing to do with Mork from Ork... "Nano nano"... sorry I am dating myself.

Apparently, Nanomaterials could pose health risks according to a report released by the Council of Canadian Academies.

Their report says that not enough is known about the health and environmental effects and overall safety of nanomaterials and nanoproducts, and more must be done to regulate items that contain them. It called this "major gaps in knowledge".

The Council is a not-for-profit organization with a mandate is to provide independent, expert assessment of the science underlying matters of public interest. The council's reports are commissioned by the Canadian government.

Apparently, as of April 2008, more than 600 nanotechnology-based consumer products were known to exist, according to the council.

Because nanoparticles are so small, they have the potential to migrate beyond the products in which they are used, such as into the human body or the environment — and that is where their effects are unknown, says the report.

Another implication of the small size of nanoparticles is that they have different chemical properties than larger particles of the same compound. Titanium oxide nanoparticles in sunscreen, for example, are transparent to visible light, but absorb UV light. The same chemical in its conventional form is thick, white and opaque, and is used in house paint.

A chemical in nanoparticle form has a much larger surface area than the same amount of that chemical in larger chunks. In the same way that powdered sugar dissolves faster in water than sugar cubes, chemical reactions involving nanoparticles can take place much more quickly, meaning they could be much more reactive, and possibly more toxic according to the report. It seems incredibly negative to me... "possibly more toxic." That means it could also be possibly less toxic. They don't really know. Are they trying to scare us? If the substance is organic, green and safe will it not remain that way when it becomes "nano?"

The report says that chemicals that have been reviewed and approved may have very different properties in nanoparticle form, and may have to be reviewed again before they hit the market.



"There has been no identification of unique biological effects associated with exposure to nanomaterials, but there is still a poor understanding of the pathways by which these effects may occur," the report reads.

"Changes in the potential for nanomaterials to cause harm at different stages — from production, through usage, to final disposal — implies the need for a full, life-cycle approach to risk assessment," write the authors.

The council is calling for:

- \* Development of standardized definitions and nomenclatures for nanomaterials to help regulators oversee these materials.

- \* Consistent monitoring of the exposure of employees and the public to nanomaterials.

- \* Alteration of current regulations to reflect the new chemical structures of materials.

- \* Canada to work collaboratively with other countries to study and regulate nanomaterials.

The report, *Small is different: A science perspective on the regulatory challenges of the nanoscale*, is sponsored by Health Canada. It has been sent to the federal government for review.

Interesting.

**We would like to hear your views.**

And by the way, thank you for all the kind comments about our first Buyers Guide. You will be able to access it online 24/7 at [www.cfcmmercuryemail.com](http://www.cfcmmercuryemail.com)  
Contact the editor at [sandra.anderson@cfcmm.ca](mailto:sandra.anderson@cfcmm.ca)

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received, our estimate is that product seizures are up three-fold from last year.

More concrete numbers come from the publicly available list of product recalls. During 2008 five products have been recalled due to labels found non-compliant with either the CCCR-2001 or the Cosmetic Regulations – three of them in July alone. We are unaware of any products being recalled prior to 2008 due to label non-compliance under either of these regulations. There is no guarantee that this trend will continue, but the fact that more products were recalled for these label violations in the previous month than were recalled for label violations in the entire history of the CCCR-2001 and the Cosmetic Regulations is an alarming trend.

A product seizure or recall is expensive and can damage the relationship between manufacturer and retailer. Your company can easily and inexpensively avoid this problem; the first step is through understanding the four key CCCR-2001 documents.

## The Four Key CCCR-2001 Documents

The first two relevant documents are the act and the regulations governing consumer chemical products in Canada; they can be found at:

- Hazardous Products Act: <http://tinyurl.com/hpatext>
- CCCR-2001: <http://tinyurl.com/cccrtext1>

The third document is Health Canada's Proposed Technical Amendments to the CCCR-2001, which is available at: <http://tinyurl.com/cccrtext2>. The proposed changes, which appeared in the February 16, 2008 edition of the Canada Gazette, are meant to "clarify certain regulatory requirements, correct editorial errors and ensure that the original intent of the Regulations is maintained." The biggest change the technical amendment introduces is the prohibition of products which simultaneously exhibit a flashback and are classified as "Very Flammable".

The final document is Health Canada's Reference Manual for the Consumer Chemicals and Containers Regulations, 2001 of the Hazardous Products Act, which is available at: <http://tinyurl.com/cccrtext3>. The reference manual provides interpretation, discussion and suggestions to both the law as it is written and the intent of the law.

**Our recommendations:** If you have not done so, read the proposed technical amendment to determine if any of the proposed changes apply to your company's products. Secondly, read the Reference Manual and, if applicable, use the suggested wording given in the manual. For instance, section 10 of the reference manual suggests (but does not require) the following wording for the hazard statement regarding the child-resistance of caulking guns "THIS CONTAINER IS NOT CHILD-RESISTANT ONCE OPENED. STORE TUBE AND CAULKING GUN SEPARATELY". Similarly, the phrasing "THIS CONTAINER IS NOT CHILD-RESISTANT WHEN THE TUBE IS USED. REMOVE AND STORE TUBE IN THE HOLDER PROVIDED" is recommended in section 40 with regards to spray containers with tube attachments and "IRRITATING FUMES RELEASED WHEN USED" is recommended in section 46 with regards to corrosive products with irritation hazards. While it is permissible to use alternative phrasing, we believe that by using the suggested wording a manufacturer sends a signal to an inspector that they are aware of the regulations and reference manual and have done their utmost to follow them.

## Keep Detailed Records of Your Label Compliance

One common misconception is the belief that it is simply enough to have a consumer chemical product label that has the correct hazard symbols, statements, and back panel information. However, the regulations include a record keeping requirement; failure to comply can cause a company a great deal of stress if Health Canada has concerns about one of their products.

Subsection 5.1 of the CCCR-2001 requires the manufacturer or importer of a product to keep records of the following information for that product:

- The hazard categories of the product or container and appropriate subcategories (if applicable).
- The type of container required for the product.
- The regulatory information required to be displayed on the container/product label.

Subsection 12.1 also provides additional record keeping requirements for products requiring a child-resistant container. The information in 5.1 and 12.1 must be kept for at least three years after manufacture or importation of the product. The manufacturer or importer must be able to provide these records within 15 calendar days of a request from an inspector.

**Our recommendations:** Keep your label compliance records together in a binder or, ideally, if you have electronic copies of your records, a single file directory.

Any reputable third-party label compliance consultancy will be able to provide your company with an electronic copy when completing a CCCR label review. Make sure to complete a new review of the label if the formulation of the product changes. There are two best practices we recommend to our clients. Our first recommendation is to once a year evaluate the binder or directory of reviews and ensure that none of the reviews are missing or outdated. The second is to update your labels every three years to ensure that they are still in compliance. Unlike the MSDS provisions of the Controlled Products Regulations there are no requirements that consumer labels be reviewed every three years. However, we believe doing so will minimize your company's chances of running into trouble during a Health Canada audit.

Running afoul of Health Canada is needlessly stressful, expensive and can damage your company's reputation with your customers. By following these simple tips, your company can save money and you can avoid having an inspector-induced sleepless night.

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## Gelest Plant Expansion Production

Gelest, Inc., manufacturer and supplier of research and commercial quantities of organosilicon and other group IV organometallics has completed the final phase of a multi-year project to double the capacity of its Morrisville, PA headquarters and production plant, which was necessitated by the increased world demand for specialty silane and metal organic molecules used in a wide variety of applications including specialty adhesives, sealants, coatings and the modification of surface treated micro-particles as well as

other industries.

"The plant expansion effectively more than doubles reactor capacity and adds new capability in ultra high viscosity polymerization and micro-particle surface modification. QC and bulk storage have also been expanded to support the new capacity. The expansion increases the physical size of the plant to 55,000 square feet and the facility now fully occupies seven acres on the 21-acre site, leaving space for additional future expansion," says Matt Edison, Silicones Business Manager and Project Manager of the expansion.

## Company News

### Venjakob Acquires Nutro Corporation

Venjakob Holding GmbH has acquired the assets of Nutro Corporation of Strongsville, Ohio.

The acquisition combines Venjakob's worldwide resources in producing paint, pretreatment, material handling and curing technologies with Nutro's US engineering and manufacturing resources and Nutro's expertise in custom engineered liquid and powder paint finishing systems.

"Venjakob's purchase of Nutro presents both companies with exciting new opportunities" says Nutro Inc. president Barney Klevay. "Nutro Inc. gives Venjakob a strong engineering and manufacturing base in the heart of the US industrial market, while Venjakob's broad product line allows Nutro to extend its reach into new, but allied finishing markets" says Klevay.

Nutro Inc. provides custom engineered systems in the automotive, ceramics, electronics and general industrial markets, specializing in chain-on-edge and highly automated applications as well as UV, infrared and induction heating and robotic technologies. Venjakob has a global reputation for its finishing systems in the wood, pipe and tube, automotive and plastics finishing segments.

### The European Parliament to include IPBC as an Active Substance in Annex I

Troy Corporation has been notified of the Annex I listing of IPBC, as published on July 29, 2008 in the Official Journal of the European Union. As part of its continued investment, Troy Corporation led the effort of a group of

companies to supply a complete dossier to the European Union (EU) authorities to fulfill the requirements of the Biocidal Products Directive (BPD). This dossier contained more than 20 binders full of toxicology, environmental, risk assessment, efficacy data and technical and safety information for one of the world's key biocidal actives.

"Registration of our active substances (Polyphase®) under the BPD is a key part of our commitment to our customers in the biocides industry," said Dr. Donald Shaw, Vice President, Development, Troy Corporation. "Annex I listing under the BPD represents one of the most significant regulatory approvals in the world. Troy Corporation, as a leader in the biocides industry, remains committed to investing the financial and people resources necessary to support approval of active substances in its products worldwide.

"Polyphase® (IPBC) was discovered by Troy Corporation in the 1970's. Troy Corporation has pioneered the development of this active ingredient and related formulated products, creating the world's leading biocide. "Annex I listing, together with EPA's earlier decision to re-register IPBC, ensures that this important material will be available for years to come", according to Don Shaw.

Polyphase® is one of an extensive product line of

- Session 1: 9:15 am—10:00 am, Economy, Something Old, Something Borrowed, Something New—Canada's Commodity, Construction and Service Economy, Aron Gampel, Vice President and Deputy Chief Economist, Scotiabank
- Break: 10:00 am—10:45 am Break & Viewing of Exhibits,
- Session 2: 10:45 am—11:30 am, Environmental Legislation, Updates in Environmental Legislation that affect the Canadian Surface Finishing Industry, Jackie Campbell, B.Sc., LLB, Dianne Saxe Professional Corporation, Saxe Law Office
- Session 3: 11:30 am—12:15 pm, Environment & Economy, Global Environmental and Economic Trends Impacting the Surface Finishing Industry, Christian Richter, The Policy Group
- Lunch: 12:15 pm—1:15 pm Awards Luncheon in Grand Event Room
- Break: 1:15 pm—1:45 pm Viewing of Exhibits
- Session 4: 1:45 pm—2:30 pm, Safety, Ontario's Targeted Firms Initiative  
Melanie Wegler, Ontario Ministry of Labour
- Break: 2:30 pm—3:15 pm Break & Viewing of Exhibits
- Session 5: 3:15 pm—4:00 pm, Water, How Source Water Protection (under NEW Clean Water Act) will Impact Industry in Ontario, Ian Smith, Ontario Ministry of Environment
- Conference Wrap-Up, 4:00 pm, Door Prize Draws

## WHMIS training now online

The Canadian Association for Surface Finishing's online WHMIS training is now available online to members.

This program allows companies to train workers in the legislated annual WHMIS review. Annual WHMIS review is required by all employees in an organization who work around or handle any hazardous material. This program is automated and includes an online test that must be passed in order to print a training certificate.

## Environmental Concerns for Automotive Parts Manufacturers

To remain a competitive auto parts supplier in the global market a company can not afford shut downs, due to lack of compliance or technical issues resulting from changes in environmental legislation.

To keep Automotive Parts Manufacturer's Association (APMA) members aware and ahead of competitors, APMA has partnered with Willms & Shier Environmental Lawyers LLP and RWDI Air Inc. to present Environmental Concerns for Automotive Parts Manufacturers on Tuesday, October 21, 2008 in Windsor and Wednesday, October 22, 2008 in Guelph.

This one day conference features speakers with experience and technical knowledge that will help you understand the new regime and anticipate and solve the potential compliance and technical issues before they affect your bottom line. Similar conferences with speakers of this caliber can cost up to \$1000.00, making this conference an excellent value for all APMA members.

Speakers will cover the legal, environmental and engineering challenges of local air quality, land use conflicts, site contamination and odour and VOC issues. Willms & Shier Environmental Lawyers LLP has worked with many APMA members to resolve complex approval and compliance issues. RWDI Air Inc. is known worldwide for expertise in industrial air emissions measurement, monitoring and engineering solutions for industry.

The Windsor session will be held at the Giovanni Caboto Club, 2175 Parent Avenue, Windsor Ontario. The Guelph session will be held at Rowan Williams Davis & Irwin Inc, 650 Woodlawn Road West, Guelph Ontario.

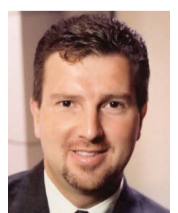
The APMA is extending its member rate for the event to Canadian Association of Surface Finishing (CASF) members.

## People On The Move

### New at Gelest

Gelest Inc. recently announced the appointment of Joel M. Zazyczny of Buckingham, PA as Business Manager for Silanes and Metal-Organics.

In his new position, Zazyczny responsibilities include product management, marketing, business development and strategic global initiatives for the Silane and Metal-Organic product lines. He has 20 years experience in silicon chemistry, surface modification and industrial minerals applications development; holding key technical, commercial and executive positions with Hüls America, Polar Mineral and Imerys Performance Minerals N.A.



# Atotech Canada's GMF TechCenter for the Automotive Industry



Atotech Canada's state of the art General Metal Finishing (GMF) Tech Center is now open for business! This latest example of Atotech's continuing commitment to North American industry is the 11th facility of its kind in the world and is located at the company's national head office in Burlington, Ontario. Constructed primarily for the Automotive Industry, this new facility houses the latest testing equipment for corrosion resistant coatings, including a complete plating line for North American metal finishers seeking application approvals. ° For more information on the Tech Center's capabilities, contact Atotech Canada.

## Atotech GMF TechCenters Worldwide:



## We're Open for Business!

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## Pricing Updates

### DuPont CoatingSolutions 10 per cent Price Increase Industrial Coatings

DuPont CoatingSolutions will increase prices 10 per cent, effective September 1, on powder and liquid industrial coatings in the United States and Canada.

The company says the price increases are driven partly by high prices for raw materials and feedstocks derived from petroleum, especially epoxy based materials, polyester resins and solvents. Availability of these materials is also an issue due to insufficient capacity and production problems at some suppliers. Continued volatility in raw material markets is expected for the foreseeable future.

"DuPont CoatingSolutions will continue to do everything possible to mitigate the impact of these cost pressures and deliver superior solutions to ensure customers' success," said Dave Lazzeri, business director, Americas – DuPont Industrial CoatingSolutions.

### Oxea Announces Global Price Increases

Oxea, a global supplier of solvents, polyols and oxo derivatives such as carboxylic acids, olefin derivatives and alkylamines, has increased list and off-list prices on the following products effective September 1, 2008, or as contracts allow: Butanol, Butyl Acetate, Propanol and Propyl Acetate.

This increase is in addition to any previously announced mid quarter price increase.

### Dow Oxygenated Solvents to Raise Prices

The Dow Chemical Co. raised prices of Oxygenated Solvents in North America, effective Sept. 1, 2008, or as contracts allow. The company blames the continued escalation in raw material costs for the increase.

### Cognis Announces Price Increase

Effective Sept. 1, 2008, or as contracts dictate, Cognis Corp. has had a 5 to 12 per cent price increase for its Photomer® and Bisomer™ range of UV/EB-cure products.

### Sartomer Raises Monomer and Oligomer Prices

Effective Sept. 1, 2008, global specialty chemicals manufacturer Sartomer Co. has increased prices by 15 per cent on its acrylate and methacrylate monomers, and 3 per cent for oligomers. Increases will vary based on the product line.

### Dow Oxygenated Solvents to Increase Prices

The Dow Chemical Co. has raised prices in North America for products in the Oxygenated Solvents portfolio effective Sept. 1, 2008, or as contracts allow.

### Huber Increases Price for Silica and Silicate Grades

Huber Engineered Materials (HEM), part of J.M. Huber Corp., has announced a global price increase for its dental, paper and specialty silica, and silicate grades. The 15 per cent increase was implemented between Aug. 15 and Sept. 1, 2008, or as contracts allow.

### More Price Increases Due to Rising Raw Material, Freight and Energy Costs

Effective immediately, Dianal America, Pasadena, Texas, is raising prices on methyl/butyl methacrylate copolymer resins by up to 20 per cent. These increases are mandated by sharp rises in raw material prices.

Effective Oct. 1, 2008, or as contracts allow, Cognis Corp. is increasing prices for products made with oleic acid and tall oil fatty acid as follows: empol TOFA-based dimers, distilled and hydrogenated dimers, trimers, and monomers will increase 5 to 15 percent; Versamid, Versacure and Versamid solvent blends and Genamid Liquid polyamide epoxy curatives will increase 10 to 20 per cent; Versamid solid thermoplastic surface resins will increase between 10 to 25 per cent; Versamid solid thermoplastic lamination resins will increase between 10 to 25 percent; and CEX, VCX, Versamine amines will increase between 10 per cent and 25 per cent, depending upon the amine type.

Tronox Inc., on behalf of its subsidiary companies, has announced price increases for all TRONOX titanium dioxide (TiO2) grades sold in Europe, Africa and the Middle East.

The following price increases were effective Sept. 1, 2008, or as contracts allow: EUR 50 per tonne in all Euro markets and U.S. \$150 per tonne in the Middle East, Africa and Eastern Europe.

Effective Sept. 1, 2008, Almatix has increased the prices for its entire specialty alumina product line for all new contracts worldwide. Increases on ex-works prices for standard Tabular, Calcined Alumina and Calcium Aluminate Cement, as well as fine-precipitated hydrates, will range from 150 to 200 \$/MT depending on product grade and availability. Prices for all other product lines will be increased correspondingly.

### Sun Chemical Price of Specialty Inks

Sun Chemical's Specialty Inks Group increased prices 6 to 10 per cent on all products sold in North America, effective Sept. 1, 2008, due to continued increases in raw materials and operating costs.

### Wacker Polymer Systems

#### Increases Price of Solid Resins

Effective Sept. 15, 2008, Wacker Polymer Systems, L.P. will implement a price increase of up to 10 per cent, or as contracts permit, on all prices for its solid resin products sold under the VINNOL® and VINNAPAS® brands sold in the Americas region.

## Company News

### EPA Finalizes Area Source Standards for Metal Fabrication and Finishing Operations

The U.S. Environmental Protection Agency, EPA published its final Area Source Standards for nine Metal Fabrication and Finishing source categories in the Federal Register in July. Apparently, EPA made most of the National Paint and Coatings Association (NPCA)'s suggested changes, which were submitted in May. The final rule narrows its applicability to only those facilities that use or have the potential to emit Metal Fabrication

hazardous air pollutants (HAPs), such as cadmium, chromium, lead, manganese, and nickel. Further, EPA included the Occupational Safety and Health Administration's de minimis limits: any material that does not contain cadmium, chromium, lead, or nickel in amounts greater than or equal to 0.1 percent by weight (as the metal), and does not contain manganese in amounts greater than or equal to 1.0 percent by weight (as the metal), is not considered to be a material containing metal HAP.

In response to comments, EPA extended the two year compliance period to three years. It also dropped the volatile organic HAP coating limit requirements; facilities are subject to spray painting management practices (high volume, low pressure paint guns, painter training/certification and spray gun cleaning requirements). Spray booth filters are needed on spray booths when spray painting objects less than 15 feet in any dimension.

EPA exempted:

- small capacity hand-held spray devices;
- surface coating application using powder coating, hand-held, non refillable aerosol containers and non-atomizing application equipment;
- any painting with airbrush or spray gun extension to reach limited access spaces;
- thermal spray operations.

The agency also exempted research and quality assurance operations; facility maintenance; and military operations. And while EPA did not exempt training facilities, it clarified in the preamble that the rule does not apply to trade schools, academic centers of learning and industrial training facilities.

Although EPA agreed with industry that trivalent chromium is relatively benign as compared to hexavalent chromium, unfortunately the agency decided to regulate all chromium compounds in this rule.

The final rule provides further clarification on potential overlaps with the Paint Stripping and Miscellaneous Surface Coating Operation at Area Sources rule.

<http://edocket.access.gpo.gov/2008/pdf/E8-16263.pdf>.

### Wagner Training Class A Success

Wagner hosted a Distributor Training class on July 14-15, 2008, at their new applications center in Elgin, IL. Distributors received product training on both powder and liquid systems over the two days.

Hosted by Hans Wolf, liquid product manager, and Mark Zimmermann, liquid application specialist, the class covered facets of automatic and manual coatings applications by combining classroom theory with hands-on training in the applications lab.

With the launch of Wagner's liquid product line in North America much focus was on the AquaCoat electrostatic water-based unit, the FlexControl+ plural component system, and Wagner's extensive range of piston and diaphragm pumps.

Barry Parsonage, Distributor Development Manager said, "This is the first of many training classes to help our network of distributors in North America, and we

are delighted with the response." The next classes will be held on November 18-19, 2008.

## Association News

### Staff Changes at FSCT

FSCT President Yasmin Sayed-Sweet announced that Joe Pontoski has resigned as FSCT Executive Director effective July 8, 2008. "Joe has been an outstanding leader for the FSCT especially during this past year as we finalized the merger with NPCA. His dedication, commitment and passion for the organization will be sorely missed and we wish him every success in the coming years" Pontoski commented that "during my time with the FSCT, I have had the great pleasure to meet and work with so many talented people."

Following Pontoski's resignation, Pat Ziegler was appointed FSCT Staff Director, responsible for managing the day to day administrative functions of the Plymouth Meeting, PA office while maintaining her current responsibilities as Director of Communications. The remaining duties of the Executive Director's position will be combined into the office of the FSCT CEO. "Although Joe will be missed by everyone at NPCA and FSCT, we remain on track with our efforts to integrate many of the common functions of the NPCA and FSCT creating increased value for all members. Working with our respective Boards and the FSCT Management Council, our goal is to create a seamless transition that delivers unparalleled service to companies and individuals alike," said Andy Doyle, FSCT CEO and NPCA President.

### TOSCOT Spouses Night, Mysteriously Yours...Mystery Dinner Theatre

Dancing with the Stars can be Murder as the Toronto Society of Coatings Technology (TOSCOT) hosts a Spouses Night "whodunit" dinner theatre on Sat. Nov. 8, 2008 at 6:30 pm, curtain time 8 pm, Mysteriously Yours Mystery Dinner Theatre, 2026 Yonge St. Toronto, ON. Members are asked to register by Oct. 24.

### TOSCOT Scholarships

Toronto Society of Coatings Technology (TOSCOT) received seven applicants for its scholarship program and were impressed by their record of achievement. The three students who stood out and will receive scholarships are:

- Jamie Biederman, A. Clarke Boyce memorial Scholarship, \$2000, daughter of Jim Biederman, Canada Colours;
- Nathan Biederman, Walter Fibiger Scholarship Award, \$1000, son of Jim Biederman, Canada colours
- Eric Wolinsky, Walter Fibiger Scholarship Award, \$1000, son of Steve Wolinsky, Rustoleum.

Speaking of education, TOSCOT's courses for the diploma in coatings technology began Sept 4, 2008. The third semester series of lectures cover Industrial coatings.

### CPCA Conference, Ottawa

Organizers are confident of good attendance for the Canadian Paint and Coatings Association's (CPCA) annual

*continued on page 10*

# ATTAIN

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## On the Links with OPA

The Ontario Paint Association (OPA) held its annual golf tournament August 12, 2008, at the Glen Eagle Golf Club in Bolton, Ontario. 88 golfers participated.



Pat Martin, Univar chips in the hole from the fringe, witnessed by Franc Gregorin, Microcolor, Petr Sida, Luxul, and Kamlaish Mudhar, Univar.



Petr Sida Luxul receives the men's low net.



Dag Enhorning, Siltech Corporation, captures Men's Low Gross.



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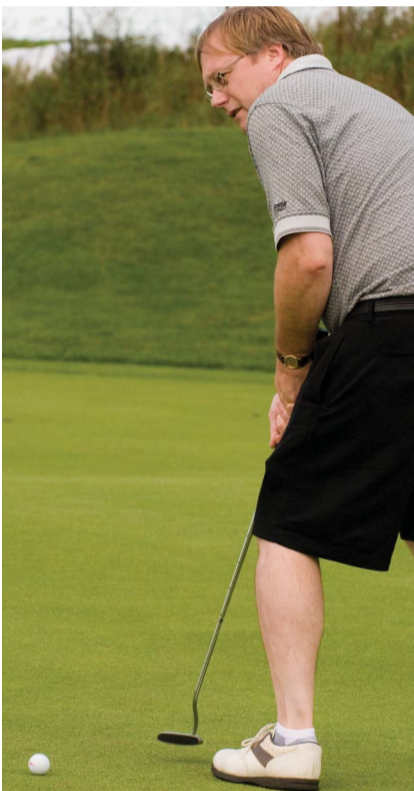




The Ladies Low Gross trophy is presented to Mary Maclellan of Home Hardware Stores Ltd by Steve Nuyten and Jacqueline Moore, L.V. Lomas.



Nancy Dingman continues the success of the Home Hardware Stores Ltd. ladies with the low net trophy.



Darrin Noble, Home Hardware, OPA President putts out.



Denis Blanchette from the Canadian Paint and Coatings Association (CPCA) shows classic form.



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## IN THE NEWS

al conference, being held Sept. 13-16 at the Lord Elgin Hotel, Ottawa, ON

The two days of business sessions promise to bring the latest news on the new VOC regulations and much more. Special keynote speaker is the Honourable John Baird, PC, MP minister of the environment.

Among activities, a tour of Ottawa in a double decker bus is planned with stops at historical sites.

This year's spouse program offers either Spa treatments, a tour of the "original Haunted Walk of Ottawa," or a River Boat Tour.

Evening program includes visits to the National Art Centre, Parliament Buildings and the Museum of Civilization.

The chairman's dinner offers fine dining and awards presentations

### Troy Chemical Receives NJ Dep Environmental Stewardship Award

Troy Corporation, Newark, NJ, manufacturing facility was recently awarded the New Jersey Department of Environmental Protection Stewardship Award. This award is given to members of the regulated community who are engaged in positive activities that benefit the environment. The NJ DEP presented the award to

Edward Capasso, Corporate Director Environmental /Regulatory Affairs.

The NJ DEP's Environmental Stewardship Award recognizes businesses and corporations that go beyond the minimum requirements of existing rules and regulations. Troy is committed to sustained excellence and outstanding achievement in protecting the environment. In addition, Troy encourages innovations in operations, maintenance, and the sharing of best practices throughout the industry.

### America's 5,000 Fastest-Growing Private Companies Revealed

Inc. magazine today ranked Powder-X Coating Systems on its annual ranking of the 5,000 fastest-growing private companies in the country. The list is a comprehensive look at America's independent-minded entrepreneurs.

Ranked number 2,185 out of 5,000 of the fastest-growing private companies in America,

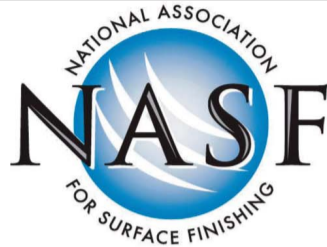
Powder-X Coating Systems is proud to be recorded on such a prestigious list as the Inc. 5,000. They have been working for many years to build up the brand name Powder-X nationwide. Powder-X Coating Systems is a leading powder coating equipment manufacturer in the industry. They are a supplier of powder coating systems and equipment including ovens, spray booths, and automated systems, as their own brand of high quality powder, chemicals, and other consumables.

### Sherwin-Williams Automotive Finishes Opens New Branch Office

Sherwin-Williams Automotive Finishes Corp. (SWAFC) has opened a new branch in the Houston area. The new facility, located at 1705 Garth Road, Baytown, TX, will enhance the purchasing experience for customers by including wider, more open aisles, brighter lighting and newly organized displays of coordinating products.

New and renovated branches have a consistent look and feel, reinforcing the Sherwin-Williams brand while providing customers with an instant comfort level and familiarity with the branch whether they are in Texas, California or Canada.

A greater selection of products is promised.



## Surface Finishing Conference & Exhibition

November 20, 2008

White Oaks Conference Resort & Spa (Niagara-on-the-Lake, ON)

### PLAN TO ATTEND! LIST OF TOPICS INCLUDE:

- A Report on the Metal Finishing Energy Efficiency Benchmarking Study
- Canada's Commodity, Construction and Service Economy
- Updates in Environmental Legislation That Affect the Canadian Surface Finishing Industry
- Global Environmental and Economic Trends Impacting the Surface Finishing Industry
- Ontario Ministry of Labour's Targeted Firms Initiative
- How Source Water Protection Initiatives (under NEW Clean Water Act) Will Impact Industry in Ontario



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## CALENDAR OF INDUSTRY EVENTS

**September 13-16:** CPCA 2008 Annual Convention, The Lord Elgin Hotel, Ottawa, ON, [mfoucher@cdnpaint.org](mailto:mfoucher@cdnpaint.org), [www.cdnpaint.org](http://www.cdnpaint.org)

**September 23-25:** Coating 2008, Indiana Convention Center, Indianapolis, IN. [www.thecoatingshow.com](http://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](http://www.smecanada.ca)

**October 14-15:** North African Coatings Congress 2008, Hyatt Regency Hotel, Casablanca, Morocco, [www.northafricancoatingscongress.com](http://www.northafricancoatingscongress.com)

**October 21:** Environmental Concerns For Automotive Parts Manufacturers, Windsor, ON [www.apma.ca](http://www.apma.ca)

**October 22:** Environmental Concerns For Automotive Parts Manufacturers, Guelph, ON, [www.apma.ca](http://www.apma.ca)

**October 30 - November 2:** TURKCHEM 2008, Chemicals - Laboratory - Technology, Istanbul Expo Center. Contact [demir@artkim.com.tr](mailto:demir@artkim.com.tr), [www.artkim.com.tr](http://www.artkim.com.tr), [www.turkchem.net](http://www.turkchem.net), [www.turkcoat.com](http://www.turkcoat.com)

**November 8:** TOScot Spouses Night, Mysteriously Yours Mystery Dinner Theatre, 2026 Yonge St. Toronto, ON at 6:30 pm, curtain time 8 pm. Members are asked to register by Oct. 24. [www.toscot.org](http://www.toscot.org)

**November 20:** Surface Finishing Conference & Exhibition, White Oaks Conference Resort & Spa, Niagara-on-the-Lake, ON. Visit [www.thecasf.ca](http://www.thecasf.ca) for more information.



## NORDSON LIQUID PAINTING FOR WOOD MANUFACTURING

The most recent expansion to the Nordson liquid product line, the Champion™ Air-Assisted Airless (AAA) Liquid Spray System is designed for easy adjustments to deliver smooth, even coating coverage with high transfer efficiency and minimal overspray. The system can spray a variety of coating materials, including synthetic paints, bases and enamels; polyurethane; varnishes; liquid dyes; pastel and water-based paints; lacquers; and primers.  
[www.nordson.com](http://www.nordson.com)

## AEROSIL® and AEROXIDE® Alu C for Powder Coatings

Evonik Degussa's AEROSIL® fumed silicas and AEROXIDE® Alu C (fumed Aluminium Oxide) are designed to improve the manufacturing process, transfer efficiency, fluidization and performance of powder coatings. This year at Coatings 2008 a new, high surface area Alumina grade will be introduced VP Alu 130, with a surface area of 130 m<sup>2</sup>/g. Pigment carbon black and color preparations will also be featured which meet a variety of color requirements.  
[www.degussa.com](http://www.degussa.com)

## Cabot Features New Grades

Cabot Corporation has launched new fumed metal oxides and aerogels developed by the company specifically for the coatings industry and to promote its innovative pigment technology for water-based automotive base-coats.

CAB-O-SIL® CT-9709 is a treated fumed metal oxide that provides improved abrasion resistance to radiation-curable coatings without sacrificing clarity and color and with minimal impact on viscosity. This new grade is particularly suited for coatings applied to pre-coated wood flooring, abrasion-resistant coatings requiring optical clarity such as helmet visors, and clear coatings for compact disks.

CAB-O-SIL TS-382 is a treated fumed silica that prolongs viscosity stability in epoxy-based adhesives and coatings with minimal impact on the colour of the finished coating system. This new grade also improves wetting-out and adhesion on poorly prepared metal surfaces, which greatly assists formulators that have to address imperfect application conditions.

CAB-O-SIL CT-1111G is another new treated fumed silica that improves flow properties in powder coatings, resulting in more consistent processing, reduced clumping, easier application of the finished product and better visual appearance of the applied coating. It can be added before or after the micronizer during the manufacturing process.

EMPEROR® 2000 is a high-performance black pig-

ment specially developed by Cabot for water-based automotive base-coat systems. In particular, it provides excellent color performance in terms of jetness and blue-tone, while the neutral pH of the pigment and the compatibility of the surface treatment with resins used in aqueous systems produce highly stable dispersions.

Nanogel® TLD201 is a new fine-particle aerogel that has been specifically designed for coatings applications to act as a matting agent, rheology modifier and absorbent. It can also be used to provide a high degree of thermal insulation in some coatings. The hydrophobically treated amorphous silica material has a large pore volume, high surface area, low density and tailored particle size.  
[www.cabot-corp.com](http://www.cabot-corp.com)

## New High Molecular Weight Polymer

Growing environmental awareness leads to changes in coating formulations, and one way to fulfill stricter requirements is the swap to higher solids systems.

However, these systems ask for higher molecular weight additives and, due to their chemical nature, these additives often suffer from poor flowability. To avoid this drawback, BYK virtually brought opposites in

line and developed a 100 per cent, high molecular weight polymer which is entirely flowable.

Due to its unique sphere-like molecular structure – in contrast to conventional linear structures – DISPERBYK®-2155 opens up new horizons in the wetting and dispersing of high solids systems. DISPERBYK®-2155 guarantees outstanding deflocculation and stabilization yet remains liquid. DISPERBYK®-2155 effectively reduces millbase viscosity, is storage-stable and shows a wide compatibility with many resin systems.

DISPERBYK®-2155 is designed for use in pigment concentrates for general industrial, wood and furniture coatings, floorings (based on PU and Epoxy), PUR foams and 100 per cent UV systems. In addition, the additive can be successfully used in co-grinds.  
[www.byk.com](http://www.byk.com)

## EXEL North America New Pump

Exel has the SAMES Mach-Jet Easy and E-Series powder units now equipped with two enhancements known as the "Fast Pump™" and "Fast Clean™".

1. The "Fast Pump™" modification is a patented and valuable addition that allows the SAMES Powder pump to empty a box of powder more easily and quickly. This



"Fast Pump" bracket is designed to make the SAMES Box Feed unit the most effective system in the industry.

2. The "Fast Clean™" is another modification that allows the operator to use full volume air to purge powder from the Mach-Jet Easy or E- Jet Series of portable powder coating packages.

The new "One Pass™" Fluid Heater manufactured by EXEL North America is now available with an attachable Thermometer kit!

Components of the thermometer kit include: Thermometer Adapter – One Pass Block; Thermometer; Stainless Steel Swivel fittings with screws.

[www.exel-na.com](http://www.exel-na.com)

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CFCM invites manufacturers and distributors to submit items for our New Products section. Preferred method is email or mailed compact disk. Please write New Product Release in the e-mail's subject line. We require a 50-100 word description of the product in MS Word format or pasted in the e-mail. This should be accompanied by a high-resolution digital jpeg photograph approx. 300 dpi. Please do not send pdf flyers. Products must be available and approved for use in Canada. E-mail to: [sandra.anderson@cfcm.ca](mailto:sandra.anderson@cfcm.ca)

## INDUSTRIAL FINISHING: POWDER COATING COLOUR CHANGE CASE STUDY

*continued from front cover*

ment manufacturers in the power sport, industrial, agriculture and defense industries. It is headquartered outside of Montreal in Drummondville, Quebec.

Soucy's greatest strength is its ability to develop exclusive products for each customer. Using a team of highly skilled production technicians and flexible multi-application equipment, Soucy can respond quickly to all of its customers' needs. Powder coating was the only process done outside of its metal division manufacturing facility. The finishing process typically took five days from the time Soucy shipped products to the outside coater until finished products were back at its facility and ready to ship. Soucy wanted to reduce the process from days to hours.

"The biggest competitor for most North American manufacturers is Asia. And Soucy is no exception," says Marc-André Patry, project manager, Soucy International Inc., Metal Division. "We realized we couldn't beat foreign competition on production cost, but we could beat them on turnaround time. They have a mean delivery time of eight to 12 weeks. We knew we could compete by keeping the emphasis on production time."

### FROM DAYS TO HOURS

To reduce its finishing turnaround time from days to hours, Soucy wanted to bring finishing operations in-house. Doing so would also reduce transportation costs and increase control over finish quality. Soucy wanted a powder coating system that would provide maximum flexibility to accelerate the flow of parts in the plant. Soucy looked at several powder coating system suppliers, initially consider-



Manual spray booth Nordson Lean Cell, paint from Protech.

ing a manual paint line. After discussions with its chosen suppliers, Soucy decided its production rate was high enough to justify installing an automatic line with an overhead conveyor.

The powder coating system Soucy chose was from Nordson. The system includes three booths, one Nordson Excel 2001® booth with powder reclaim capabilities and six oscillating Nordson Versa-Spray® II automatic guns to paint gloss black, which accounts for 80 per cent of production. The additional two booths are manual Nordson Lean Cell™ fast color change powder coating booths with Nordson Sure Coat® manual spray guns. The Lean Cell booths and manual guns provide touchup for the automatic booth and coating for the remaining 20 per cent of products coated in other colors. Soucy coats parts that range from small bushings 1 inch in diameter and 1 inch tall to large track beams 8 feet by 4 feet.

The powder coating process

begins with parts being hung on a 700-foot overhead conveyor typically running at 5 fpm for smaller parts or 2 fpm for larger parts. Parts travel to a five-stage pretreatment with the first stage a heated cleaner followed by two rinse steps. Instead of a phosphate solution pretreatment, Soucy's fourth stage uses Henkel's Bonderite® NT-1. This phosphate-free pretreatment is used at ambient temperature and creates a nanoceramic coating on steel and aluminum surfaces for corrosion protection and paint adhesion. The pretreatment material produces no sludge.

Following the five-stage pretreatment, the parts enter a dry-off oven for between nine and 22 minutes, depending on which line speed is running. The dry-off oven runs between 325 and 350 degrees Fahrenheit. The parts then enter the



Marc-André Patry, project manager, Soucy International Inc., Metal Division.

paint line. The automatic booth paints gloss black followed by touch up in the manual Lean Cell booths. There is one operator in each of the manual Lean Cell booths, with one booth applying powder to the left side of the part and the other on the right side. For the 20 per cent of parts that don't get coated in gloss black, the automatic booth is closed and parts are painted manually in the Lean Cell booths. Soucy uses powder from Protech with 20 different colors used.

The final cure is done using a polymerization oven with a Sunkiss Thermoreactor, which uses infrared to heat and polymerize the powder. The IR technology reduces curing time by as much as 50 per cent compared to standard convection ovens. At a line speed of 5 fpm, parts



Robin Grandmont, Loading overhead conveyors at Soucy.



Nordson's automatic paint system Excel 2001.

spend 18 minutes in the curing oven. At 2 fpm, parts spend close to 45 minutes in the curing oven. Cooling time is also reduced because the IR technology heats only the surface of the part. Parts under half an inch thick typically cool in 20 minutes while thicker parts take up to 50 minutes to cool. Ayotte Techno-Gaz Inc. supplied the pretreatment washer, dryoff oven, curing oven and conveyor system.

### TIMING IS EVERYTHING

For more than 15 years, Soucy outsourced the powder coating of its metal parts. With an in-house powder coating operation with the latest powder coating systems, Soucy now has complete control of its coating operation. It no longer has to spend time or the expense to ship parts to its outside job shop. For the first time, Soucy is coating parts on a First In, First Out basis. It has dramatically reduced total processing time for painting from an average of five days to less than 24 hours.

"We have much greater flexibility and can now regularize the flow of production by controlling the painting time," says Patry. "By controlling all of our processes, we can give customers an exact delivery date instead of an approximation like we used to do."

The system was installed in the summer of 2007, just in time for the busy fall production period. The coating operation ran successfully eight hours per day, five days per week during Soucy's peak season.

The features of the automatic guns and the reclaim Excel booth provide high transfer efficiency so Soucy can maintain a high conveyor line density. The coating booth, including the filters, collector module, canopy and fan section are designed to facilitate uniform, constant air flow. The integrated system approach delivers more efficient powder recovery, enhanced collector efficiency and better coverage of parts. The Lean Cell booths and manual guns allow for quick color changes. Soucy doesn't change colors often - two to three times per day on average - but when it does, lost production is minimized.

Another benefit is the complete control over the coating process. If there are ever any issues, operators can quickly solve them. Part of that control comes from the Nordson® iControl® integrated control system. The iControl system accepts input from the part identification sensors for gun triggering, and in/out positioning, and can accommodate up to 255 presets. This allows operators to adjust various gun control parameters such as flow rate, atomizing, KV and cur-

rent for various part styles.

"We have greatly reduced our production time, cut transportation fees and reduced our expenses so we can offer a high quality product at a lower price with a fast turnaround," says Patry. "Our customers know they can rely on Soucy when they need rapid delivery." ■

*Article written by Robert Allsop, Global Marketing Manager, Powder Industrial Coating Systems, Nordson Corporation.*

*Photos by Réjean Morin of Soucy.*



A part heading through Soucy's paint system on an overhead conveyor, automatic Nordson Excel 2001.

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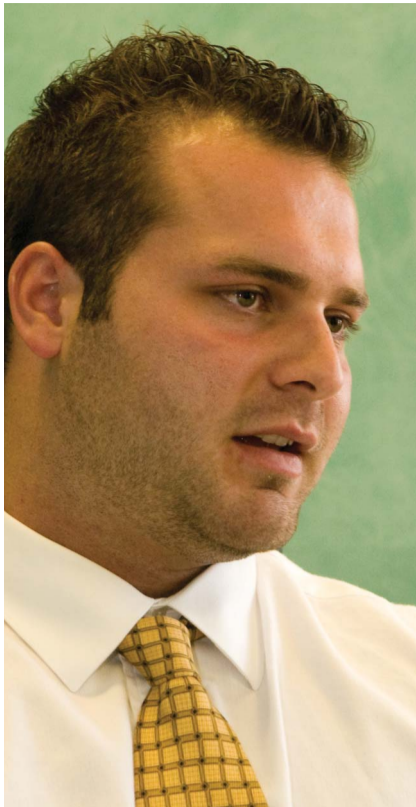
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continued from front cover



Adam Pernasilici, Vice President.

Pinnacle is an Electrocoating (E-coat) job shop, with a focus on automotive parts, with a little decorative work, metal cabinetry, marine components, thrown in. Cleanliness and brightness is something it takes very seriously. Adam Pernasilici, VP of operations explains that they have an “open door policy” and like to bring their customers in to show them how they operate. They therefore installed some drop down lighting in the area that the parts would be unloaded off the rack for inspection by the customer.

Besides its plant in Chatham, ON, Pinnacle has administrative offices in Windsor, ON.

With most of its customer base



Gasoline tank straps heading for the washer.

being automotive, Pernasilici admits that business is “a little slow” but he sees that changing and says he is fortunate to have a “flexible workforce”. He says the employees are also multi-functional and knowledgeable about a variety of jobs within the plant.

“We still consider ourselves as start up,” says Pernasilici. Pinnacle was open for business running parts in February 2006 after spending two

years previous setting up an e-coat system they acquired from Texas.

Pinnacle’s bigger plan is to expand into powder coating, perhaps within the next five years.

#### INTEGRITY CORE

Pinnacle is a family business, two families working together to be exact.

Both Pinnacle Finishing in Chatham, ON, and a trucking busi-

ness Laser Transport, based in Windsor, ON, are owned by Angelo and Suzanne Pernasilici, Adam’s parents, and Jack and Cindy McCourt. Both families own both together. Having the finishing and the transport working together is a bonus.

Adam Pernasilici feels very strongly that, “Our core value is integrity. We are deeply family rooted (the McCourt’s and the Pernasilici’s) and believe that consistency and quality are what make businesses successful.”

He says this focus helps them stand out from their competition.

“We differentiate ourselves on quality. Most e-coaters say ‘black is black’, we don’t believe that,” says Pernasilici. “We also have an open door policy when it comes to our customers.” He says customers are welcome to come in anytime to see how the job is going and hopefully leave with a “warm fuzzy” feeling that the quality they demand will always be there.

“Because of our affiliation with Laser Transport, we can offer customers total program management,” says Pernasilici, “Our fleet of over 90 trucks allows us to pick up raw steel from a mill, deliver it to the stamper, pick the stamped/hydro formed/manufactured product up, bring it to our facility for E-coat and either return it to the stamper / hydro-former / manufacturer or forward it directly to the final customer.”

#### THE PROCESS

The two-stage cleaning is key in



Pinnacle employees racking an automotive bracket.

what Pinnacle feels also sets it apart from the competition. Bob Bruner, Pinnacle Finishing's General Manager, describes Pinnacle's as "one of the largest lines in Southwestern Ontario."

"We are immersion as well as spray," says Bruner. He explains that the immersion part of the cleaning process is good for the deep cleaning of cavities that you can miss with just a spray cleaning.

Pernasilici adds, "Our immersion cleaner (Stage 2 of the pre-treatment) differentiates us from most of the competition. We can better prepare and clean parts of contaminants and lubricants that may have been applied by the stamper." He adds, "We are noticing more and more that customers are coming to us with quality problems that are rooted in cleaning. Without adjustment or modification, our robust system eliminates issues pertaining to poor cleaning.

The e-coat product Pinnacle uses is manufactured by Dupont and the pretreatment chemicals are all made by Henkel.

The stages of the process are as follows:

**Stage 1** - Spray Clean using Parcolene ZX-6

**Stage 2** - Immersion Clean using Parcolene ZX-6

**Stage 3** - Spray City Water Rinse using ultra violet (UV) filtered City Water

**Stage 4** - Titanium Conditioner using Fixodine ZL

**Stage 5** - Zinc Phosphate Polycrystalline Conversion Coating using Bonderite 958

**Stage 6** - Immersion City Water Rinse

**Stage 7** - Non-Chrome Sealer using Parcolene 91

**Stage 8** - Reverse Osmosis (RO) and UV filtered Water Rinse

Stages 1 to 4 are on one side then the line does a 180 turn and stages 5 to 8 are on the other side.

Quality manager of Pinnacle, Todd Van Hal sings the praises for the cleanliness of the plant and the organization of the line saying that in all his experiences it is, "the best I've ever seen." They use "just in time delivery," which Van Hal says is "the way to go."

Pernasilici explains that when setting up the line, Dupont was hands on. "We wanted them to spec out the system to work with their product."

The monorail used on the line is 2200 linear ft. Pinnacle also has a lab in house and is ISO certified.

Bob Bruner sums it up when he says, "It is our immersion cleaning and physical size with 11 docks that sets us apart." They may consider themselves still in start-up, but Pinnacle Finishing is definitely poised for the future. ■

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# How to dramatically reduce your chemical and effluent costs with dry steam

BY MILES COMPTON

**E**nvironmental concerns over wastewater and or water chemical mix disposal are becoming more apparent as metal working companies seek efficiency conservation and environmental compliance in their cleaning and preparation processes. These environmental concerns are primarily in the area of effluent disposal.

Pressure washers are used by many facilities for heavy duty cleaning in a wide variety of applications, such as trucks, bulldozers and other heavy-duty equipment. When these behemoths are covered with heavily laden soils the pressure washer has few equals. The high volume of water combined with detergents removes these soils readily. The large volume of water is not a problem because the material being removed from the equipment is not a threat to the environment. Thus both the washing and the rinsing do not present a problem of effluent disposal.

Also, for many years pressure washers (heated high-pressure water and chemical solution) have been used by metal working fabricators to prepare metal for powder and paint adhesion. This method of preparation requires a considerable amount of water and chemical.

## ANOTHER WAY

In an attempt to be more environmentally friendly, plant owners and managers have sought other methods to produce the same results while reducing their wastewater and effluent.

Preparing metal surfaces for the adhesion of powder or paint can be achieved by an alternate method that will save a substantial amount of water and chemicals - high-pressure dry steam. Dry steam, for this article, is defined as steam whose moisture content is so low that it evaporates instantly.

Dry steam is created in a steam generator by pressure. The amount of pressure the steam is under is directly proportional to the temperature of the steam. As the pressure inside the vessel increases, the temperature of the steam increases as well. In a typical steam boiler, the temperature of the steam is 328 degrees F when the pressure inside the boiler is 85 psi. With the use of a dry steam generator, at these conditions, the amount of water and chemical mix used is only one gallon per minute. Since the water and chemical

solution is mixed with dry steam at the point of application (the nozzle of a steam wand or gun) two thirds of this solution evaporates immediately

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due to its high temperature. Under these conditions, time tests have shown that approximately 20 ft squared /minute of metal surface can be cleaned and phosphatized with dry steam. In glaring contrast a standard pressure washer will consume approximately 3-5 gallons of solution per minute during the cleaning cycle. During the cleaning cycle, when using a steam generator, 67 per cent less water and chemical solution will be used.

During the rinse cycle, the generator uses only dry steam therefore generating only a negligible amount of effluent. In contrast the use of a standard pressure washer consumes three gallons of water per minute, and this creates yet another volume of effluent that must be properly disposed. Typically, the effluent created by the pressure washer must be contained in a containment area, and then treated prior to disposal in municipal systems. By using dry steam for cleaning and phosphating metal surfaces for painting and powder coating, a substantial saving is realized.

Two concerns of any work place, especially a production or chemical application facility are

employee safety and insurance costs. Insurance writers as a whole are concerned with volatile fuel-fired machines being used within enclosed areas. Greater concern is that sparks may be present that could ignite flammable fuels. An all-electric dry steamer that has no open flames, generates no fumes requiring ventilation, and is available with explosion proof construction can be used in extremely volatile areas. The lack of flame with an electric steam generator allows many companies to realize lower insurance coverage. More saving can be achieved since extra ventilation is not required.

All-electric dry steam generator cleaners provide a proven method of preparing metal surfaces for excellent power or paint adhesion. The safety and cost benefits of dry steam cleaning remain unchallenged and several large well known companies have been using this method for over half a century. ■

*Myles Compton has 36 years experience working in and with the metal fabrication industry and is currently a consultant with Electro-Steam Generators, Rancocas, NJ. www.electrosteam.com*

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# The Importance of Pretreatment

Pretreating a surface and getting it as clean as possible is crucial. Most problems in a finished product result from inadequate efforts in the pretreating process.

## RINSING

Rinse stages should receive the same amount of care and attention that is given to the chemical stages of a pretreatment process and should never be regarded as an afterthought. Poorly maintained rinses can seriously harm the effectiveness of the other chemical stages. Rinsing is the easiest part of the entire pretreatment line and this smallest effort can result in the largest bottom line. Rapid overflowing and frequent dumping will ensure that every aspect of the finishing operation runs smoothly.

Water quality in the rinse is key and should be tested for hardness and treated and filtered as necessary.

## GET EQUIPPED

Proper pretreatment creates a clean, refined surface essential for adherence and durability of finished coatings. When it comes to equipment there are plenty of options on the market to meet the individual requirements of all substrates — from multi-stage systems including immersion to standard spray washers.

## GETTING TO THE SOURCE

The finisher must determine the sources of contaminants to reduce or eliminate them and must also look at what degree surfaces become contaminated with substances such as oil from machining, dirt from the manufacturing environment and oil from people's skin. Films of dried-on process fluids interfere with the bonding of plating to part surfaces.

## PHOSPHATIZING

Phosphatizing prepares the surface of metal parts for coating. The amount of water used to maintain the phosphatizing bath solution can be reduced by analyzing and controlling each bath's temperature, chemical concentration and pH level; and by recirculating the solution or rinse water to other baths where possible. An added benefit is the potential for reduced chemical use.

Phosphorus-based conversion coatings contribute phosphorus to wastewater loading when process solutions and rinses go down the drain. In many cases, wastewater treatment plants must remove phosphorus (a nutrient which causes excess algae growth) down to 1 mg/L, costing the industry or city for treatment.

Several degreasing and cleaning solvents are marketed as alternatives to chlorinated solvents. In general, these are medium-to-high flash point solvents formulated to remove oil and grease and, in some cases, soldering flux and wax. All have lower rates of evaporation than the chlori-

nated solvent they might replace.

## PLAFORIZATION

The pretreatment process can sometimes be up to nine steps with a tank for each. Carpenter Chemicals, Alexandria, VA, offers one-step and coined the phrase plafORIZATION — an organic phosphating technology designed to degrease and phosphate metal surfaces in a simple one-step operation at room temperature. The processing cycle includes a treatment phase of 60 seconds, a draining phase where excess liquid is recovered, and a drying phase in which fluid flash-off and ferro-organic phosphating polymerization take place.

The PlafORIZATION process, whether for metals or plastics: degreases and phosphates simultaneously; operates at room temperature in a single step; can simultaneously treat mild steel, galvanized steel, aluminum and other metals in one tank or flowcoat operation; converts the metal surface by deposition of an inorganic phosphate layer sealed by a specially-formulated organic polyphosphate; can be used in conjunction with most organic coatings such as varnishes, lacquers, and paints (solvent-based, water-based and powders) and provides safe and efficient operation and is environmentally friendly.

There is no water pollution, because no water is used in the process. There is no solid waste to treat, because no sludge is created. The treatment bath is never changed, so long as average amount of oils on the parts to be treated does not exceed 14 gm/100 sq. ft.. There are virtually no volatile organic compounds (VOCs), and no hazardous air pollutants (HAPs), chemistry chlorofluorocarbon CFCs, ozone-depleting substances, carcinogens or mutagens.

Pretreatment of a surface is the first part of the finishing process, and with all the products in the marketplace, there is no reason why it can't be done right the first time. ■

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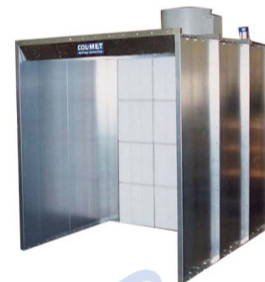
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# Finding the Cure

## TYPES OF OVENS

There is an oven for every need. In any given process for example curing can take place in a three-stage batch-type oven, which is the same oven used for dry-off after pretreatment. In the first stage, the parts are heated and in the second and third stage convection is added. The time each part spends in the oven depends on its mass and weight, but usually varies from 12 to 20 minutes. The oven temperature is automatically controlled and held at a constant 400F. Ovens can be designed with automatic doors to cut down on energy costs.

Ovens come in many standard sizes, in gas or electric heat. Many can be custom designed to suit the line.

### Things to consider:

**Fresh Air Filter**—A low cost replaceable filter can help eliminate contamination and maintain a clean work chamber; gas-fired batch ovens are available with an optional combustion blower inlet filter.

**Proportional Heat Control**—Gas-fired ovens can include a modulating gas valve and electrically heated ovens include an SSR or SCR, which provide accurate temperature control to provide consistent results.

When a gas-fired curing oven for powder-coated parts needs to be updated, a more efficient solution could be to use electric infrared.

Most interior oven designs, rely on two-dimensional heater place-

ment, which cures faces parallel to the emitters faster than faces perpendicular to the emitters.

High-temperature curing can transform the powder coating into a uniform, shiny, scratch-resistant finish.

To cure powder-coated castings, many companies rely on a gas-fired oven. Proper curing means that operators have to run the conveyor line at the slowest possible speed. In winter months, drafts from an opening a bay door, which many plants have, can drop the oven temperature 100 degrees in seconds and ruin an hour's production.

All of this needs to be taken into consideration when selecting an oven.

An electric infrared oven offers a lower overall cost than gas.

The first issue crucial to oven design is to determine how to give all faces of the part being coated equal exposure in the curing oven. Typically, heaters lining the interior walls of an oven cure a casting's parallel surfaces much faster than surfaces passing through the oven perpendicular to the heaters. Another advantage of electric infrared, is temperature consistency.

Some ovens have accordion-style orientation of the vertical emitters



At Soucy Group in Drummondville, QC, the final cure is done using a polymerization oven with a Sunkiss Thermoreactor, which uses infrared to heat and polymerize the powder. The IR technology reduces curing time by as much as 50 per cent compared to standard convection ovens. At a line speed of 5 fpm, parts spend 18 minutes in the curing oven. At 2 fpm, parts spend close to 45 minutes in the curing oven. Cooling time is also reduced because the IR technology heats only the surface of the part. Parts under half an inch thick typically cool in 20 minutes while thicker parts take up to 50 minutes to cool. Photo by Réjean Morin of Soucy

## THE CURE

The ability to rapidly adjust curing temperatures in each zone gives operators the flexibility to quickly change what items are being cured.

Curing is when a thermoset powder is exposed to elevated temperature, it begins to melt, flows out, and then chemically reacts to form a higher molecular weight polymer in a network-like structure. This cure process, called crosslinking, requires a certain degree of temperature for a certain length of time in order to reach full cure and establish the full film properties for which the material was designed. Normally the powders cure at 200° C (390° F) in 10 minutes. The curing schedule varies according to the manufacturer's specifications.

Many polymeric or plastic materials are subject to considerable change in dimension during the production or curing process caused by shrinking and volume contraction. This applies in particular to coatings that contain a polymeric binder and solvents. The shrinkage is, in most cases, not directly observable in the comparatively thin paint films. The volume contraction is often only distinctly visible at coating layers of more than 0.5 mm.

One curing process doesn't use an oven at all is ultraviolet (UV) processing to cure or dry a coating on wood, metal or plastic products. Ultraviolet cure coating — also known as UV cure coating — is increasingly used in place of conventional high heat processing to produce coatings with improved properties, cut the overall cost of coating operations (especially the natural gas costs to bake cure) and reduce the environmental impact of the coating. In a UV cure coating process, the ultraviolet light spectrum generated by a UV lamp interacts with special coating chemistries to produce a high-quality, durable coating. In many applications, UV curing can achieve the coating faster, and therefore at a lower total cost than many other coating processes.

Depending on a finisher's needs, there is an oven and curing process to meet any application requirement.

that direct radiant heat not only to parallel faces of each part, but also to leading and trailing perpendicular faces.

Ovens can be designed with several controllable curing zones. A "recipe" of power settings for each zone can be automatically logged. The application of energy to the product to be cured can be accomplished by convection cure ovens or infrared cure ovens.

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*Photo by Jacqueline Brand*



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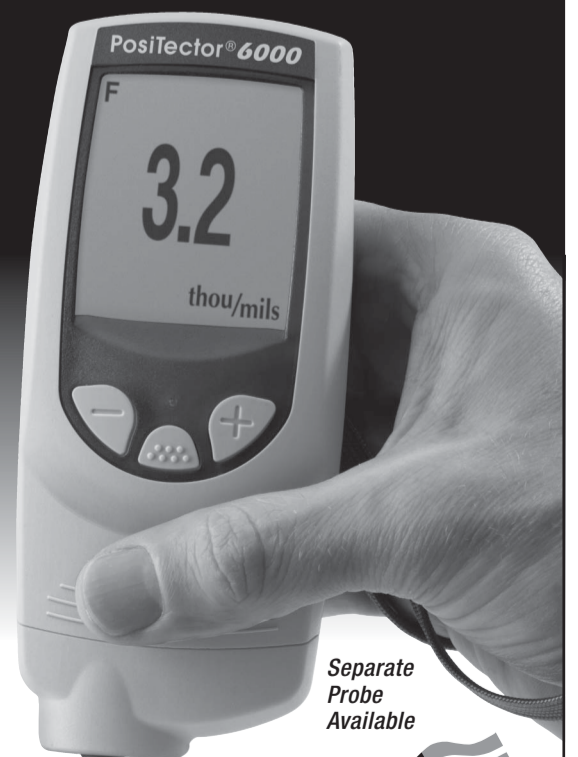
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# Small Yet Strong

A nanostructured metal overlay is giving finishers more choice when it comes to composites and other applications

**T**hin but strong metallic coatings used to prolong life in applications have been around for awhile and several technologies exist.

In Canada, Integran Technologies Inc., Toronto, ON, is in the business of developing metallic technologies and creating solutions, such as the recent work it has done with the composites industry for tooling and part applications... prolonging tool life by forming a relatively thin, durable metal "skin" over the surface of a carbon/epoxy composite tool.

Integran began in the early 1990s as a spin-off from research at the University of Toronto by Uwe Erb and Queen's University by Karl Aust. Then Integran partnered with Hydro One Inc. Markham, ON, to make of one of the first large-scale industrial applications for nanostructured metal materials, the "electrosleeve process" for nuclear steam generator pipe and tube repair.

Integran wanted to use its experience and success with the nanostructured electrosleeve repair process and Nanovate CR hard chrome alternative coating to make a similar metallic coating technology, bringing the benefits of a hard metal coating to composite tooling. Integran's program manager for business development, Rich Emrich, says that a metal alloy coating that has low coefficient of thermal expansion can extend the lifespan and reduce the lifecycle cost of a carbon fiber/epoxy tool by making it more durable. The company

spent four years researching and developing a solution it calls Nanovate NV (previously Nanovar). It is a low-temperature, wet chemical immersion technique done in a tank, similar to electrodeposition. It creates an extremely fine-grained ferrous/nickel alloy coating similar to Invar on the tool face, 0.006 to 0.008 inch/150 to 200 microns thick. Unlike steel or chrome, which have crystalline grains of 10 microns to 100 microns in size, the nanostructured Nanovate NV coating has a grain size of 20 nm or less, or 1,000 times smaller. The treatment, is applied to the tool surface underneath the coating, creating physical/mechanical "grips" for a strong bond between the metal and the polymer-based composite. The coating process takes several hours, not counting preparation and post-process quality inspection. Material tests showed coating hardness, adhesion, scratch and impact resistance. Hardness of the Nanovate NV material was measured with the Vickers hardness test, which employs a square-based diamond pyramid with a 136° point angle pressed against a sample under load, typically 50 kgf/110.2 lbf, for 30 seconds. The resulting hardness value is the applied load divided by the area of the permanent impression or dent in the material in square millimeters. Nanovate's Vickers hardness (or HV) of 450 is nearly six times higher than Invar 36 material and 18 times higher than typical cured carbon/epoxy,

says Emrich. Because the Nanovate coating has essentially the same composition as Invar 36, its CTE is a similarly close match with the CTE of carbon/epoxy composite. Aggressive thermal cycling tests showed good adhesion between the coating and the substrate because their expansion and shrinkage rates are very similar. The adhesion strength of the nanostructured coating was measured in accordance with ASTM D4541-02 "Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers." Nanovate-coated carbon/epoxy, uncoated carbon/epoxy and conventional Invar were scratch tested with Nanovate results far superior to the others.

Integran has yet to determine the life expectancy and long term adhesion of the composite substrate beneath the Nanovate coating and must also develop the means to manage coating deflection in large tools. The company's existing process can accommodate a tool of moderate geometry, no more than about 4 ft by 4 ft (1.2m by 1.2m). They are looking at expansion such as a second plant in the U.K. according to Emrich, with alliances and partnerships formed to make the technology more accessible. Price is also a concern with the Nanovate coating adding 30 to 40 per cent to the cost of the tool, but Emrich points out that it extends tool life by two to three times.

Nanocrystalline metal/polymer hybrid technology was developed to build strong yet extremely lightweight components. DuPont Engineering Polymers offers MetaFuse nanometal/polymer hybrids technology utilizing a process in which an ultra high-strength thin metal layer is precisely applied to molded engineering polymers to create lightweight components in complex shapes with the stiffness of magnesium or aluminum, and higher strength. The metal layer in this hybrid system is unique in that it is based on a nanocrystalline microstructure in the metal, which creates high strength that cannot be matched in other traditional metal deposition processes. The first metal available in this process was nickel. The microstructure of these metallic alloys are controlled during material processing.

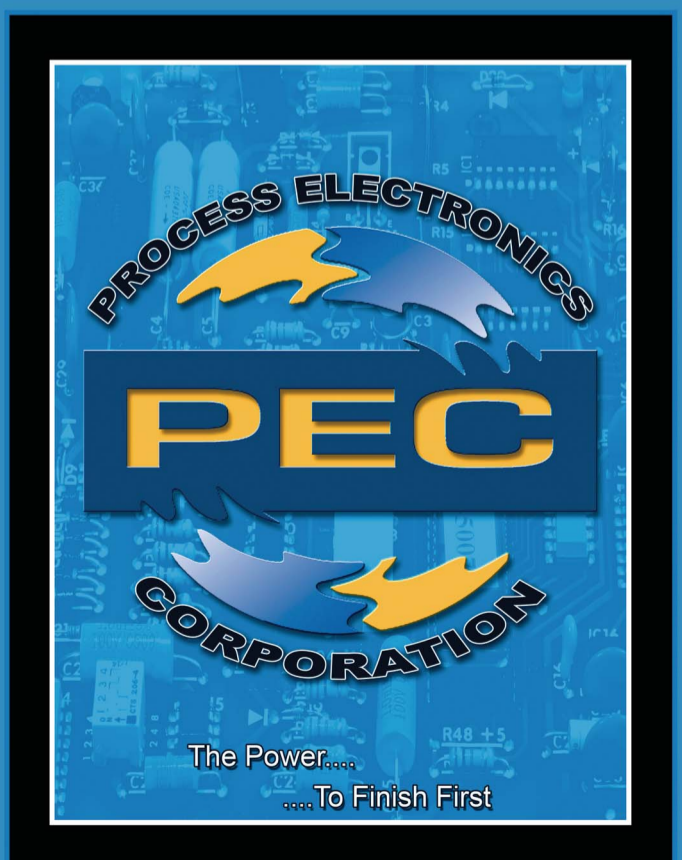
## HALL AND PETCH

Nanostructured metal refers to the crystal size of the metal itself. A nanostructured metal coating creates the Hall-Petch effect named after researchers E.O. Hall and N.J. Petch who back in the 1950s found that by decreasing the grain size and increasing the number of grain boundaries, dislocation movement is minimized, hindering the onset of plasticity and improving the yield strength of the metal.

Metals have polycrystalline microstructures made up of groups of individual small crystals known as grains. Various metals exist that have identical chemical compositions, but widely varying physical properties. These differences are brought about because of changes in the microstructure. Grain size is one of the factors that influences the properties of a material. The empirical Hall-Petch relationship describes the variation of the yield strength of a material with its grain size:  $\sigma_y = A + B/\sqrt{d}$ . Where  $\sigma_y$  is the yield strength, A and B are material constants, and d is the average grain size. This equation shows that smaller grain sizes increase the yield strength. Other properties, such as tensile strength, hardness, wear resistance, and coefficient of friction are also enhanced by reducing grain size. The nanocrystalline metal has an average grain size of approx. 20nm, roughly 1000 times smaller than conventional metals, and two to three times stronger than typical steels and decorative nickel-chrome.

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# Clarification via Sedimentation #2

## Or Measuring Performance Efficiency

**WATER FACT: "THE 'FACT' THAT A PERSON SHOULD CONSUME EIGHT GLASSES OF WATER PER DAY CANNOT BE TRACED BACK TO A SCIENTIFIC SOURCE."**

### INTRODUCTION

In our first discussion of clarifiers we addressed Coagulation and Flocculation using metal salts and/or polymers as a means of improving settling of suspended solids. In clarification, the goal is to remove unwanted (excessive) suspended solids from a waste stream, allowing the clarified waste stream to discharge to sewer or receiving stream.

Continuing on this theme we look at measuring a clarifier's design specifications, removal efficiency and discuss getting settled solids out of the clarifier now that you have them settled.

### KNOW YOUR CLARIFIER'S HYDRAULIC LIMITS

A clarifier may be characterized on its Hydraulic Retention Time (HRT), Surface Overflow Rate (SOR) and Weir Overflow Rate (WOR).

Hydraulic Retention Time is the time that it takes to fill an empty clarifier to overflowing at a measured flow rate, usually measured in hours. Often the rate of flow is stated at two levels - such as the Average Daily Flow (ADF) of expected to be fed to the unit and at a maximum (or Peak Design, PD) flow rate. The latter is typically a factor of 2.5 times the former and reflects a period(s) of peak flow occurring within the normal ADF.

The dimensions of your unit should be readily found from a set of as built drawings and the designed HRT values in the engineering report supporting the construction of the clarifier.

For an ADF of 1800 M<sup>3</sup>/day, a PD flow rate of 4500 M<sup>3</sup> /day and a clarifier with a capacity of 30 M<sup>3</sup>, the respective HRT's may be calculated as the following:

- HRT, ADF: (30 M<sup>3</sup> capacity/ (1800 M<sup>3</sup>/daily flow/24 hours/day) = .40 hr.
- HRT, PF: (30 M<sup>3</sup> capacity/ (4500 M<sup>3</sup>/daily flow/24 hours/day) = .16 hr.

Compare their values with the HRT calculated with existing daily or instantaneous flow rates. Table #1

below summarizes the ADF and PD HRT's examples completed above with two arbitrary instantaneous rates of 1200 and 2400 M<sup>3</sup>/day, showing how the four compare. At 1200 M<sup>3</sup>/day, you have a longer HRT than the ADF HRT design rate (usually working in your favour), at 2400 M<sup>3</sup>/day, you have a lower HRT than the design rate for ADF, adversely affecting settability as time spent in the clarifier is too low. Regularly check your daily HRT with your own, specific HRT design values. Record this information against date taken and look for changes over periods of time.

**TABLE #1: FOR A SINGLE CLARIFIER: EXAMPLES OF HYDRAULIC RETENTION TIME (HRT)**

Flow Type	M <sup>3</sup> /day	Tank Vol. M <sup>3</sup>	HRT, hours
Peak Design	4500	30	.16
Instantaneous A	1200	30	.60
Instantaneous B	2400	30	.30
Average Daily	1800	30	.40

Two other measures, Surface Overflow Rate (SOR) and Weir Overflow Rate (WOR) may also be calculated and be compared to existing design parameters.

To calculate the SOR, the clarifier's surface (open water surface) needs to be known. For a circular clarifier this is calculated as  $\pi r^2$ , where  $\pi = 3.14$  and  $r =$  the radius of the clarifier; a rectangular clarifier would use length times width for the unit's

surface area. The SOR is recorded as flow rate per unit area of surface per unit of time.

Where  $r = 4M$ , Area = (3.14 X (4<sup>2</sup>)) M<sup>2</sup> = 50.2 M<sup>2</sup>

The SOR for the ADF would equal = (1800 M<sup>3</sup>/ 50.2 M<sup>2</sup>/24 hours) = 1.5 M<sup>3</sup>/ M<sup>2</sup>/hour

Table #2 summarizes SORs for the same four flow values found in Table #1.

**TABLE #2: FOR A SINGLE CLARIFIER: EXAMPLES OF SURFACE OVERFLOW RATE (SOR)**

Flow Type	M <sup>3</sup> /day	Tank Surface Area. M <sup>2</sup>	SOR, M <sup>3</sup> /M <sup>2</sup> /hr
Peak Design	4500	50.2	3.7
Instantaneous A	1200	50.2	1.0
Instantaneous B	2400	50.2	2.0
Average Daily	1800	50.2	1.5

For SORs exceeding the value calculated for the ADF becomes an area of concern. That is, flow coming to the surface more rapidly than the ADF may be a signal for operating concerns.

Weir Overflow Rates (WOR) may be calculated where the length of the overflow weir is used. For a circular clarifier this is calculated using  $2\pi r$  (or  $\pi d$ ); for weirs with straight weirs, the total weir length is summed. WOR is calculated as flow rate per unit length of weir length per unit of time.

Typically, the weir is inside the overall width of the circular clarifier and the radius reflects that. Consider a

radius of 3.3 M. The circumference for the weir would equal:

Circumference =  $2\pi r = (2 \times 3.14 \times 3.3) M = 20.7 M$

The WOR for the ADF would equal = (1800 M<sup>3</sup>/ 20.7 M/24 hours) = 3.6 M<sup>3</sup>/ M/hour

Table #3 summarizes WORs for the same four flow values found in Tables #1 and #2.

**TABLE #3: FOR A SINGLE CLARIFIER: EXAMPLES OF WEIR OVERFLOW RATE (SOR)**

Flow Type	M <sup>3</sup> /day	Weir Length M	WOR, M <sup>3</sup> /M/hr
Peak Design	4500	20.7	9.1
Instantaneous A	1200	20.7	2.4
Instantaneous B	2400	20.7	4.8
Average Daily	1800	20.7	3.6

Comparing a clarifier's operating HRT, SOR and WOR to a unit's design values provides an invaluable insight as to whether the clarifier's hydraulic loading is within the unit's design specifications. Recording it regularly will provide a daily trend analysis that may highlight problems with flow through rates.

### CLARIFIER OPERATING EFFICIENCY

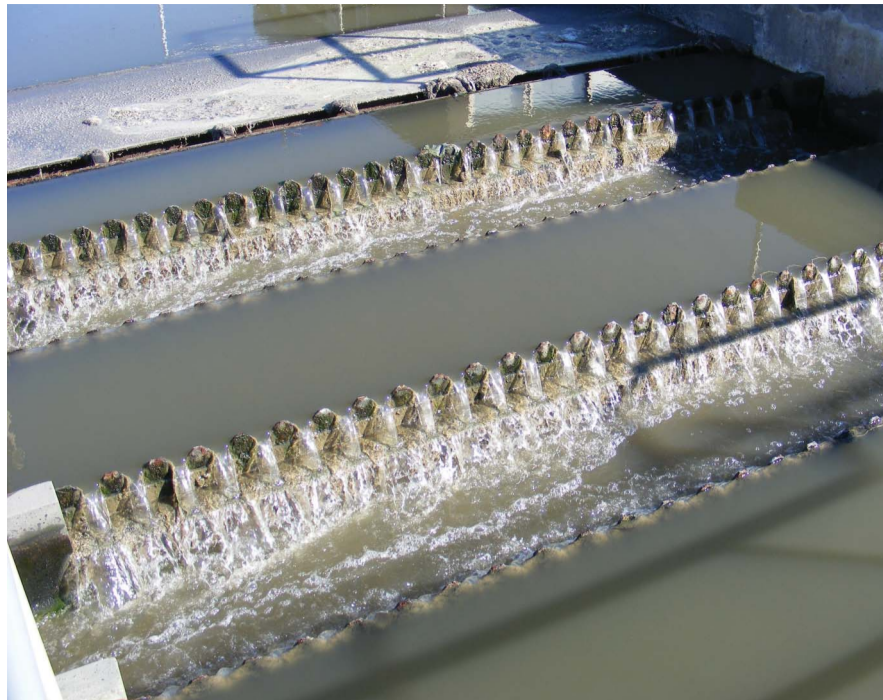
The above parameters provide an excellent insight as to whether or not the flow to your unit is within the design engineer's specifications. In particular, exceeding these limits raises concerns that the unit may not be operating acceptably as the flow is too high and there is insufficient time for the clarifier to do its job - which is to allow suspended solids to settle out and be captured as sludge in the bottom of the clarifier.

### CLARIFIER OVERFLOW

The overflow may discharge to sewer or a receiving stream or to additional treatment processes before being discharged from the facility. Again the design manual should indicate what is acceptable for suspended solids (and any other number of parameters in the water stream, such as metal content, phosphorus etc.) in the discharge. Sampling clarifier effluent - in particular, the combined waste stream



Surface area and Weir length.



Weir length.

after the collection weir – should provide a good indication of whether or not you are successfully meeting (or exceeding) the design parameters. How well, how frequently and the type of sampling combine to give you a perspective of the unit's performance.

Sampling is analogous to the old phrase used for computers – “Garbage in, garbage out.”

How well you sample often reflects the need to observe the basics in sampling. For a “grab” sample, is your sample receiving bottle clean and uncontaminated? For a sample taken with a suction line, is the line clean, uncontaminated and clear of debris? Is the right type of receiving container being used? That is, is plastic acceptable or do you need to use glass? Are you selectively sampling by location or does the sampling site represent a complete mix of flow from the clarifier, prior to any additional treatment? Can the sample be taken so as to not interfere with the clarification process. The design manual for the unit may

indicate the quality of effluent expected based on a specific type of sampling – in general either a “grab” sample or a “composite”. These are self explanatory. Regardless, a simple grab sample taken from the flow at some time of the day, reflects only the quality of the effluent at that particular moment. A “grab-composite” where the sample is made up of a number of aliquots taken over a period of time provides a more comprehensive picture of effluent quality. There are numerous automatic samplers that will provide either of these types of samples.

What sampling is characteristic for your unit may be determined by the equipment design specifications or by regulatory authorities who set what sampling is acceptable for them to evaluate your compliance with a sewer-use bylaw. This may be as simple as a grab sample once a week, taken during a production period.

Further, once the sample is obtained, is it stored in a fashion

appropriate for ensuring the analyses to be carried out reflects the sample as taken? This may require storing the sample in a cool environment and/or the addition of appropriate conditioning chemicals to the bottle prior to sampling. For example a sample being used for (a total) metal analysis may be required to be acidified.

Finally, is the sample properly labeled and have the appropriate worksheets been filled out to show the “chain of command” for the handling and transport of the sample to an approved lab. Indeed, is the lab performing the analyses certified by regulatory authorities and/or through an industry association?

When the analytical results are obtained from sampling, record them again by date and look for a trend analysis. If possible record the results – such as suspended solids – against a known production rate for the date the sample was taken. Now you can review the data not only from a time dependent perspective, but from the production rate of a particular product (or a number of products).

If the analyses show levels of contaminants exceeding those expected in the design report or required by the regulatory authorities, then you need to begin an investigation as to why the acceptable limits are not being met. The first place you may start is in the clarifier influent stream.

## EFFICIENCY – RATE OF CONTAMINANT REMOVAL FROM THE INFLUENT STREAM

A wastewater clarifier's efficiency should also be addressed in its Basis of Design data, hopefully found in its design manual or specified by its manufacturer, generally tied to rate of flow. Find this value(s).

Your clarifier's suspended solids efficiency is measured by the difference between the influent and effluent suspended solids, stated as a percentage of the influent value. A representative influent sample needs to be obtained that corresponds to an effluent sample. The analytical results of the two samples can then be used to determine the clarifier's solids removal efficiency. Consider an influent sample with a suspended solids level of 100 mg/l.

for a flow of 50 cubic meters/hour:

- Compare the measured suspended solids value, in mg/l, with the design level used to construct the clarifier, paying attention to any qualifications regarding flow rate so that you are comparing apples and apples. Is the measured value within the design limits?
- Calculate the suspended solids loading in kilograms (kg) for a particular metered flow – again

say, 50 cubic meters an hour.

That is, suspended solids loading to the clarifier is equal to:

- $10 \text{ mg/l} \times 50 \text{ M}^3/\text{hour} \times 1,000 \text{ l/M}^3 \times 1 \text{ X}10^6 \text{ mg/kg} = 0.5 \text{ kg/hour}$ .

- Compare this solids loading rate with the unit's design specifications.

Primary clarifiers used at municipal wastewater treatment plants are expected to remove between 40 per cent and 60 per cent of influent suspended solids. In an industrial setting, often there is just one unit and the efficiency must be considerable higher..

With an influent suspended solids value of 100 mg/l and an effluent value of 7 mg/l the efficiency of the unit is:

- $((100-7)/100) \times 100 \text{ per cent} = 93 \text{ per cent}$ , at a stated hourly flow rate, say 50 M<sup>3</sup>/hr.

- Compare the removal efficiency found to the unit's design parameters.

This is where we will leave you today and where we will pick up for the next article in this series which addresses the sludge captured by the clarifier and its handling.

Remember when it comes to addressing a clarifier's efficiency:

1. Seek the original Basis of Design values from the original engineering report or the clarifier's manufacturer's specifications. These are invaluable.

2. Determine the needed effluent quality from this unit; it may be dependent on how it feeds the next process or whether or not it meets regulatory requirements.

3. Measure and record basic operating criteria such as Hydraulic Retention Time, Surface Overflow Rate and Weir Overflow rate. Plot these results against time and do a trend analysis. Compare the results to the unit's design expectations.

4. Measure and record the unit's removal efficiency for the parameters of concern in the influent stream – such as suspended solids – and compare the results to the those projected in the original design manual. ■

## NEXT TIME – SOLIDS REMOVAL.

References:

1. Wikipedia encyclopedia/water /eight/Water/For Drinking – July 25, 2008



Surface area.



*John Seldon is president of Temporary Operations & Maintenance Inc., Port Burwell, ON, and has 35 years experience in the industry.*





Poraver, Innisfil, ON.

# True Blue Green

## PORAVER LOCATED IN INNISFIL, ONTARIO, HAS TURNED WASTE GLASS INTO AN ENGINEERED FILLER, AND EXTENDER WITH ENDLESS USES

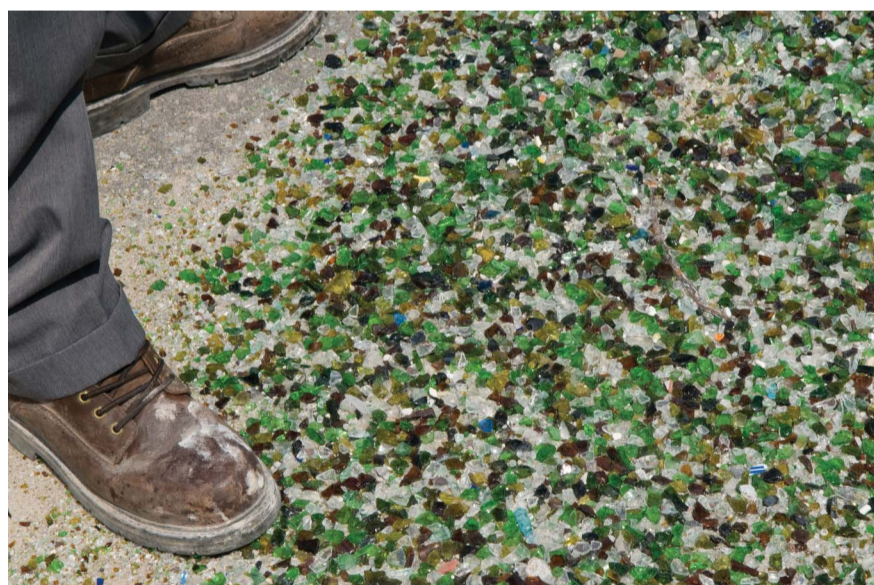
STORY BY SANDRA ANDERSON  
PHOTOS BY PETE WILKINSON

It is true that one man's garbage is another man's treasure. They call it "the ball that does it all," namely Poraver. This innovative company takes waste glass that has been rejected by recyclers and turns it into Poraver glass spheres, which are finding uses as a lightweight filler and non-combustible insulator in a broad spectrum of products including cement, gypsum, resin, rubber, plastic compounds and even paint and coatings.

There are thousands of tons of used mixed coloured glass with no home that could potentially end up in landfill, but with Poraver's technology there are so many diverse applications, and the opportunities seem endless. This is how company founder and CEO Nesha Solesa sees it.

"What I love about this product," says Solesa, "is its versatility, and if one industry starts using it they soon discover many new applications."

Solesa stumbled upon the Poraver process in 2000 when he was looking for some light weight filler for ceiling tile. He was so intrigued with the product that 48 hours after finding it he flew to



Multi coloured glass and ceramic that is rejected by glass recycling plants.

Germany, and not long after had the licensed technology rights for North America. The first Poraver North American facility opened in June 2007 with plans for more in the near future. Bob Rumbolt, Director of Sales and Marketing for Poraver North America, joined the company recently and brings a wealth of experience gained from the industrial filler and gypsum industry. He leads a sales force that is based in various locations across the U.S. and Canada.

### THE GLASS SPHERE

Poraver is porous glass spheres made with 99.997 per cent recycled glass. It is lightweight, silica free, non-toxic, non-combustible, structurally robust, does not contain solvents and will not attract mould or fungus. It is also resistant to acid, alkali, intense heat/cold and compression, vermin proof, odorless, chemically stable and unaffected by moisture. It has undergone many successful tests in manufacturing and is drawing a tremendous

amount of industry interest especially as a paint and coating filler. Poraver also creates no structure-activity relationship (SAR) reaction in cement formulas.

Solesa's original sales strategy was to go after similar markets that were a success for Germany, such as exterior insulation and cement, but he quickly realized that Poraver has such a wide potential of applications that it is limited only by your imagination. Construction blocks can now be made 30 per cent lighter. Poraver can equally be used to replace sand as a filler, which will result in a much lighter product.

In paint and coatings, Poraver offers reflectant qualities and UV resistance. In many cases Poraver would be a more economical choice as a filler. And of course it is inorganic and "green". The product is round, porous and multi-cellular. Poraver products can also potentially be used as a replacement for polycarbonate and foam. Poraver could displace a lot of other fillers such as  $TiO_2$ , talc, calcium carbonate in any application with density issues.

Poraver is slightly off-white in

colour and is available in seven base sizes starting with .04-.125mm being the smallest up to 4-8mm being the largest.

In this state of the art automated plant the waste glass is ground to a powder, agglomerated and expanded to what is known today as the Poraver sphere. The fully equipped R&D lab at the facility not only insures quality control, but works closely with customers developing new formulas and applications. Poraver recycles all waste from their process.



Bob Rumbolt, Director of Sales and Marketing stands in front of mountains of post consumer glass that is diverted from landfills and converted into porous glass spheres.

Poraver can be considered an economic solution for many diverse applications when considering its many attributes.

The large silos at the back of the plant were designed for Poraver and each houses a specific size of the product.

## EXPANSION

Nesha Solesa feels this technology has nowhere to go but up. He has built in his creative vision a facility that is a cookie cutter plant that can easily translate into quickly built new Poraver facilities in areas such as California that crave green products and praise recycling efforts. Solesa has recently returned from the Green Tech Expo in Southern California and met with 10 Governors including Governor Schwarzenegger to discuss the future rollout of Poraver in North



CEO Nesha Solesa explains the multiple uses of Poraver as an engineered filler and it's environmental mission.

America. The Poraver plant is currently capable of producing over 30,000 metric tonnes a year with the future capability of 80,000 tonnes per year within the existing building on its 13 acre site. Interest in Poraver is steadily building in manufacturing and industry. The product is currently distributed through direct sales and distributors across North America.

Poraver North America's vision is very simple and clear, "Poraver North America will become the leader in providing innovative solutions to diverse industries and will be the catalyst that brings positive change."

Solesa concludes, "We view our customers as partners, and along with our product, provide full technical and formulation support, making our customers more productive, efficient, environmentally friendly and profitable." ■



No product leaves Poraver before going through extensive quality control by lab and R&D technician Lisa Landry.



Special sized bags of Poraver ready for shipping, labeling emphasizes that it is a Canadian Product.

## WHAT TO CONSIDER WHEN CHOOSING FILLER OR EXTENDER FOR YOUR PRODUCT

BY SANDRA ANDERSON

I just watched Al Gore's An Inconvenient Truth the other day and feel that award winning movie, as well as recent government legislation, is making industry really pay attention, even more than before when it comes to manufacturing product that is safe for the environment. When it comes to fillers and extenders used in the manufacture of paint and coatings, organic substances, for the reasons I just mentioned, are in most demand.

### THE RIGHT ONE

With all the choice diversity, it really depends most on what you want the filler or extender to do in order to achieve the end result.

When choosing the filler or extender to use in a paint or coating, determine the physical properties of a material you want to adhere to your end product.

Do you want to:

- Extend without absorbing expensive active ingredient
- Reduce or increase weight
- Introduce non-slip or texture characteristics, as in flooring and wall coatings
- Add anti-sag characteristics
- Increase strength
- Increase flexibility or rigidity
- Change sound absorption characteristics

Then quantify the attributes in the filler or extender, such as specific gravity, absorbency, particle shape, reactive or inert, sound deadening, melt temperature, ignition temperature, strength and hardness in order to achieve the desired result.

Here are some popular examples.

Plastic media is mixed with paint for non-skid flooring surfaces, such as for decks, tub and shower stalls, surf & skate boards, ramps for loading trucks, and factory floors. Customers usually demand clear or specific colour choices.

Wood Flour, either hard or soft wood is kiln dried. Benefits of using wood flour as an additive include increased dimensional stability, reduced thermal expansion, controlled shrinkage and

warpage, superior bulk-to weight ratio, improved wood surface appearance, low volumetric cost, and reduced mold abrasion. Suitable for injection, extrusion, compression, and rotational molding of both thermoplastics and thermosets. Used in loadings from 10 to 70 per cent in various resins including phenolic, melamine, polyester, PS, PE, PP, and PVC.

Walnut Shell Flour in various grades is used in construction, resin, plywood, laminated veneer lumber, furniture, rubber, paint and cosmetic industries.

Rice Hull Flour is used for extender applications that need high silica content.

Cellulose is filler and extender for industrial applications. As a primer filler it provides a very fast drying undercoat that adheres well and provides good protection to steel substrates.

Leather Fiber is used for reconstituted leather board and specialty papers and polishing applications.

Corn Cob Flour is used for lightweight extender applications.

Ground Rubber is used as filler for sealants and fabricated mats.

In paint and coatings, many extenders and fillers have the same density as the coatings they are being added to, therefore, they remain in suspension after mixing and can be painted on the surface. Currently, most non-skid additives are broadcast after painting. This is more expensive and often produces a lower quality surface.

Other fillers include: pecan shell flour; rice hull ash; rice hulls; rice flour; wheat flour; hollow glass beads (see Poraver story, this issue); aluminum tri-hydrate.

There is also thermoset plastic flour including urea, melamine and poly-allyl di-glycol carbonate.

Powders for fillers and extenders include zinc, steel, aluminum and rubber.

Depending what the desired result is, there is a filler and extender for every application.

# Competition, Cost and the Consumer Demand for "Green"

**Surfactant manufacturers are continually searching for diverse new multi-functional product ideas to meet customers' needs**

The market for surfactants used in the process to create latex weighs in to the tune of several tens of thousands of tons worldwide. Competition is high with an annual growth rate of some 2 per cent. With continuing pressure in areas such as Volatile Organic Compound (VOC) reduction, polymer suppliers are continuously developing new technologies for use in protective coatings, paper coatings and adhesives, with a emphasis on waterborne resins and polymers.

## NECESSARY EVIL

Surfactants have been described as a necessary evil.

They are necessary for controlling the colloidal stability of the dispersion during synthesis, storage, compounding, application, film formation storage and use of emulsion polymers. They control the particle nucleation stage, affecting latex particle size, stabilizing monomer pre-emulsions, and preventing particle growth by way of agglomeration. Surfactants are wetting agents, stabilizing pigment dispersions, and controlling foam formation. The main function of surfactants is to reduce the surface tension of a solution.

Surfactants can be evil because they tend to increase the water sensitivity of the final coating and affect gloss and adhesive properties. Also, the surfactant may fail to adequately stabilize the latex in difficult conditions, such as if applied at high speed or when mixed with other colloidal systems. The root cause of poor surfactant performance is the inherent weak hydrophobic interaction between the surfactant and polymer phase.

## AREAS OF CONCERN: APPEARANCE, PROTECTION AND STABILITY

With the issue of stability, external stresses cause the latex particles to

flocculate. Conventional physically adsorbed surfactants could fail to protect the colloidal system in extreme conditions, such as freezing during storage, or from stresses produced during pumping, formulating or high-speed application. Also in complex formulations, such as pigmented or plasticized coatings or tackified adhesives, surfactant desorption and preferential redistribution will leave interfaces unprotected. This results in partial or complete coagulation. The root cause for surfactant failure is the incompatibility between the surfactant and the polymer matrix. The presence of surfactants reduces the gloss of the dry film, enhances dirt pickup and whitens the film in humid conditions. Leveling of the film surface is hindered and a rough, cratered surface is left after the surfactant is washed off. In addition, excess surfactant at the upper film layer causes plasticization of the surface and a tacky film results. Rapid whitening or blooming of the dry film in humid conditions, due to water absorbing in microvoids in the bulk of the film, is also observed.

## NEW SURFACTANTS

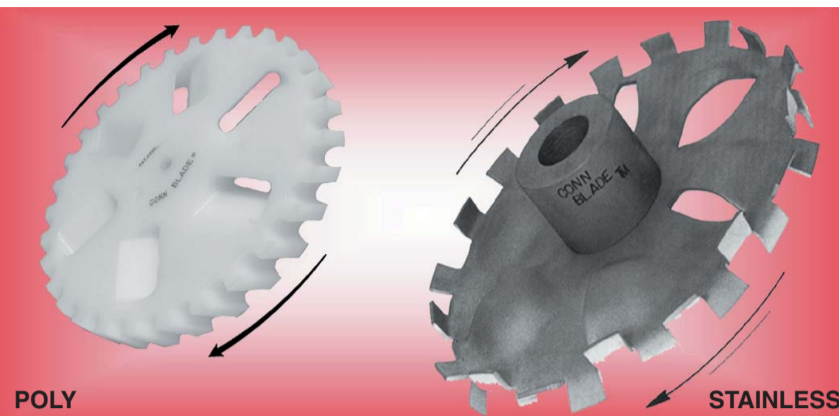
Minimizing the negative effects of surfactant presence in waterborne polymer systems has prompted tremendous research effort in recent years.

With a focus on diversity, and consumer demand for VOC-free product, manufacturers are intently focused on research and development.

Dow Coating Solutions for example has recently introduced ECO-SURF(TM) SA surfactants made from seed-oil to meet most environmental and handling safety standards in high-performance paints and coatings. These new surfactants apparently have low odor, no aqueous gelling, rapid dissolution (even in cold water), fast foam collapse,

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great wetting properties, with low equilibrium surface tension and rapid dynamic surface tension reduction and favorable formulating and handling properties. They are especially suited to pigment wetting and stabilization.

If a surfactant allows for faster dissolution and reduced cycle times it can help reduce overall costs.

There is heavy competition in the surfactant field and manufacturers are continually introducing new products. Please see the all-new CFCM Buyers Guide, printed July 2008 and online at [www.cfcmercuryemail.com/](http://www.cfcmercuryemail.com/) for a detailed list of surfactant suppliers in Canada.

### SURFACTANT TYPES

Various different surfactant chemistries have been developed over the years to provide highly specialized performance parameters. The structure is typically comprised of a hydrophobic and hydrophilic portion. Cationic, anionic, and zwitterionic surfactants are charged species and obviously can only be used in formulations where the charge can be tolerated. Anionic surfactants include alkyl sulfates, alcohol sulfates, fatty alcohol ether sulfates, sulfonates and sulfosuccinates, and various blends. Alcohol sulfates account for the largest volume due to their lower price. However, as demand for higher performance increases, interest in more complex anionic surfactants is growing.

Nonionic compounds are neutral and therefore have wider applications. They offer effective performance characteristics for wetting, emulsification, and dispersing applications. Typical products include fatty alcohol ethoxylates, alkyl phenol ethoxylates (APEO), alkyl polyglycosides, and various nonionic blends. Currently, APEOs are the largest class of nonionic surfactants, but their use is diminishing as they become more widely regulated.

**“With a focus on diversity, and consumer demand for VOC-free product, manufacturers are intently focused on research and development.”**

Defoamers are typically either polysiloxanes or mineral and paraffin oils. Polysiloxanes offer better compatibility and lower surface tension, while mineral and paraffin oils have a lower price. Fluorosurfactants, fluorocarbon modified polyacrylates, along with polysiloxanes, are gaining increasing interest due to their enhanced performance capabilities.

In coating formulations, the surfactants form micelles when the critical micelle concentration (CMC) is reached. In pigment dispersions, the surfactants coat the pigment particles causing them to repel one another, providing increased stability to the dispersion. The surfactants also help determine the size of the particles, which affects color intensity, shade, and light fastness.

Innovation seems to be the key to success for manufacturers, while

keeping a close eye on markets and customers needs.

### CRYSTAL BALL

Speaking to surfactant manufacturers in North America, the following key trends and concerns arise:

- surviving off-shore competition
- rising price of raw materials and energy
- managing costs
- the changing environmental climate and volatile organic compound (VOC) regulations
- consumer demand for “green”

Innovation seems to be the key to success for manufacturers, while


keeping a close eye on markets and customers needs.

The future sees using existing chemistries for an increase in “multi-functional” surfactants according to manufacturers, with a demand for materials that combine best emulsification with lowest foaming tendency during manufacturing and application of a coating. Some feel that dispersants controlling rheology or non-migrating materials without negative impact on water or chemical resistance of a coating are needed. New products are focusing on special functions of dispersants making them “similar” to commonly used pigments.

Nanoparticle technology receives a lot of press and as the cost of them comes down, there is a large opportunity for R&D. Also on the wish list are super non-foaming wetting agents that are effective at low-use levels.

Manufacturers expect the surfactants market to grow approximately 3.5 per cent in the next few years, with stronger growth in environmentally friendly products. Competition in the market will intensify along with commoditization. To maintain market share, the leaders will have to diversify. ■

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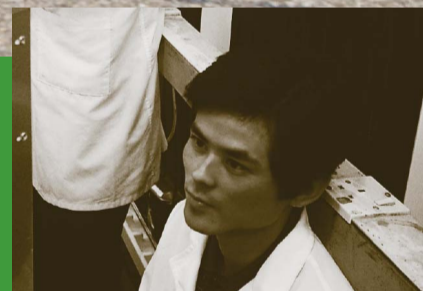
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