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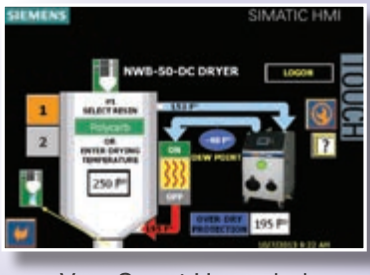

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Canadian Plastics

APRIL 2016

VOLUME 74 • NUMBER 2

contents

LOOKING BACK...

The August 1998 issue of *Canadian Plastics* reported on a cutting-edge injection molding machine recently acquired by parts molder Horizon Plastics Co. Ltd., of Cobourg, Ont. The 750-ton Johnson Controls Springfield I/M machine was equipped with two screws and two injection units, allowing it to make large two-colour, two-material parts in multiple molds. With a platen size up to 130 inches by 100 inches, the unit could use up to 150 lbs of resin in one shot. The net result could be a finished component with a Class A surface finish on top and a structural-web reinforcement underneath. Horizon Plastics planned to use the machine for molding above-ground swimming pool ladders, pallets, water treatment panels, and more.

Number of the month:

$85*

* Average hourly megawatt rate paid by industrial customers in Ontario. (See pg. 13)

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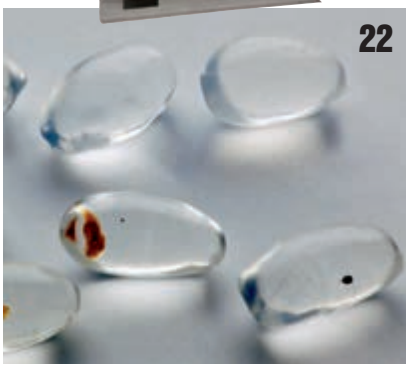
12

16



22

in every issue

cover story

features

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Low loonie helps...and hurts

As devalued as it is, I still wish I had a Canadian dollar for every plastics processor who's told me lately that our weak loonie is a godsend. Especially by manufacturers in Ontario, where electricity rates are on the rise, I've been informed that the falling dollar is helping them stay competitive with other jurisdictions.

But is the low loonie really an unmixed blessing?

Certainly no one would suggest that devaluation benefits everyone in Canada. The weaker exchange rate is making life more expensive for consumers, travellers, and importers, for example.

But the perception remains that the plunging loonie is a gift to Canada's beleaguered manufacturers and exporters. The loonie was last at parity with the U.S. dollar in early 2013. While parity was a boon for consumers, it hurt manufacturers who saw sales decline as their goods became more expensive to sell to international buyers.

Which is why experts such as Craig Alexander, vice president of economic analysis for the C.D. Howe Institute, initially said the current weak dollar was good news for manufacturing exporters. "They sell their products in U.S. dollars, so when they convert it back into Canadian dollars, a weaker loonie helps soften the blow from weaker oil prices," Alexander told news outlets earlier this year. "It means that you end up with fewer job layoffs and job losses."

It's hard to complain about that.

And here's another possible upside: reshoring. A much-discussed trend south of the border that has seen automakers and other global manufacturers bring production back to the U.S., reshoring has not yet spilled over into Canada. The strong dollar was a key reason why, some analysts say; and now, with a weaker currency, Canada could finally begin to benefit.

But granting these positives, here's the thing: More and more economists are now warning that Canada's economy is threatened by "currency instability" as the loonie's rapid and continuing decline against the U.S. dollar begins to damage business and consumer confidence.

The loonie recently fell below 70 cents against the U.S. dollar for the first time in 13 years, and has fallen 33 per cent against the greenback in the past 24 months — a pace that National Bank of Canada's chief economist Stéfane Marion noted is "without precedent." "Currency instability has become a concern, and we think the Bank of Canada must take note," Marion said. "For Canadian businesses, currency depreciation has already sent the price of machinery and equipment — 73 per cent of which is imported — to a new record high." Marion also noted that the loonie has shed 25 cents against the U.S. dollar in the past few months, as opposed to the drop of only 10 cents initially forecast by his team.

The speed of the recent plunge has unsettled some businesses, particularly Canada's global manufacturers, for whom the weaker exchange rate no longer provides an automatic benefit. Take auto parts maker Magna International Inc. Magna is headquartered in Aurora, Ont., does business in multiple currencies, but reports in U.S. dollars. In 2015, the company warned in its annual report that the weaker Canadian dollar would hurt its profits. So it's probably no coincidence that Magna has announced over a dozen expansions since 2014 in the form of joint ventures, new factories, and expanded facilities — and only one of those was in Canada.

In the end, devaluation is both good and bad, depending on your place in the economy. But the notion that a low loonie is a winner for the entire plastics industry doesn't fly.

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Canadian Plastics magazine reports on and interprets developments in plastics markets and technologies worldwide for plastics processors, moldmakers and end-users based in Canada.

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IPL innovates to deliver 1.2 million carts

Canadian injection molder IPL Inc. has used a new technology that utilizes smartphone scanning to push the limits of plastic product manufacturing and distribution.

Back in 2014, Saint-Damien, Que.-based IPL was awarded a whopping $45 million contract to injection mold, distribute, and maintain three kinds of plastic carts — waste carts, organics carts, and recycling carts — for the 1.2 million residents of the Regional Municipality of Peel, the second largest municipality in Ontario.

In only three months, IPL was able to successfully mold over 1.2 million rolling carts and kitchen containers. Normally that would be the end of the story, but IPL still had to deliver them to 317,000 homes in the cities of Brampton, Mississauga, and the town of Caledon in a ridiculously short period of time. The solution involved molding smartphone scanning technology into the finished products. Every produced cart was initialized with a unique chip containing the cart's serial number, GPS coordinates, and home address files. Using RFID technology, the project's delivery team could, just by using a smartphone to scan the cart, know exactly where and how to deliver each cart, which made the delivery process much easier and faster. Using the same technology, the management team was also able to do live monitoring of the delivery process.

Photo credit: IPL Inc.

In addition to making fast, efficient delivery of the carts doable, the technology will also help IPL manage the 10-year maintenance and service agreement that's part of the project. **CPL**

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CCL Industries continues growth with big acquisitions

March definitely came in like a lion for CCL Industries Ltd.

Within the first week of that month, the Toronto-based specialty packager pulled the trigger on two major international purchases, both designed to add to its global footprint.

On March 7, CCL announced the acquisition of expanded content label maker Powerpress Rotulos & Etiquetas Adesivas LTDA of São Paolo, Brazil, for $10.25 million. In a statement, CCL said that Powerpress will be immediately integrated into CCL Label Brazil, led by Luis Jocionis, vice president and managing director. Powerpress reported sales of about $6.5 million last year.

The Powerpress purchase came just one week after the March 1 acquisition of label converter Zephyr Co. (Private) Ltd. for $39 million. Zephyr is headquartered in Singapore and has two subsidiaries in Penang and Johor, Malaysia.

And turning the clock back a bit further, in January CCL also bought Hamilton, Ont.-based Mabel's Labels Inc. Mabel's Labels makes personalized identification labels for children's and family items. **CPL**

Wittmann Battenfeld inks monster supply deal with China's Hayco Manufacturing

Processing equipment maker Wittmann Battenfeld has finalized a deal to supply more than 100 injection molding machines to Hong Kong-based household product and appliance maker Hayco Manufacturing Ltd. for that company's new manufacturing plant in the Dominican Republic and for an expansion of its three existing factories in China.

In a statement, Vienna, Austria-based Wittmann Group said that Hayco plans to purchase the company's SmartPower servo-hydraulic and MacroPower large tonnage injection machines, along with auxiliary equipment, over the next 5 to 10 years.

The value of the contract has not been disclosed.

In August 2015, Hayco announced that it would invest over US$50 million for a new injection molding and assembly plant in the Dominican Republic to expand its global footprint and improve deliveries to North America and Europe. The Dominican Republic facility is scheduled to begin production next year.

Hayco supplies 150 million consumer products a year to companies including Procter & Gamble, Target, Wal-Mart Stores Inc., and 3M. **CPL**

Christopher Hay, Hayco Group CEO (left) and Dr. Werner Wittmann, Wittmann Group president, seal the deal.

Photo Credit: Wittmann Battenfeld

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Axiall business unit sales impact Ontario facilities

In transactions involving two manufacturing facilities in Ontario, Atlanta, Ga.-based chemical supplier and building products maker Axiall Corporation has sold two PVC-related business units.

Axiall is selling its window and door profiles business, a component of Royal Building Products, to Los Angeles, Calif.-based private equity firm OpenGate Capital. The Axiall compounding facility located in Concord, Ont. is included in the window and door profiles transaction. It is a primary supplier to the window and door profiles business.

The purchase price has not been announced. The sale closed on March 31.

Axiall has also sold part of its PVC additives business to Galata Chemicals of Southbury, Conn. That business, operating as Solucor, includes a plant in Bradford, Ont. The Bradford facility, which includes approximately 60 employees who will transfer with the sale to Galata, manufactures additives for rigid PVC applications.

The purchase price in the Galata transaction has not been disclosed. The transaction became effective on February 29. **CPL**

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Athena – SIPA relationship expires

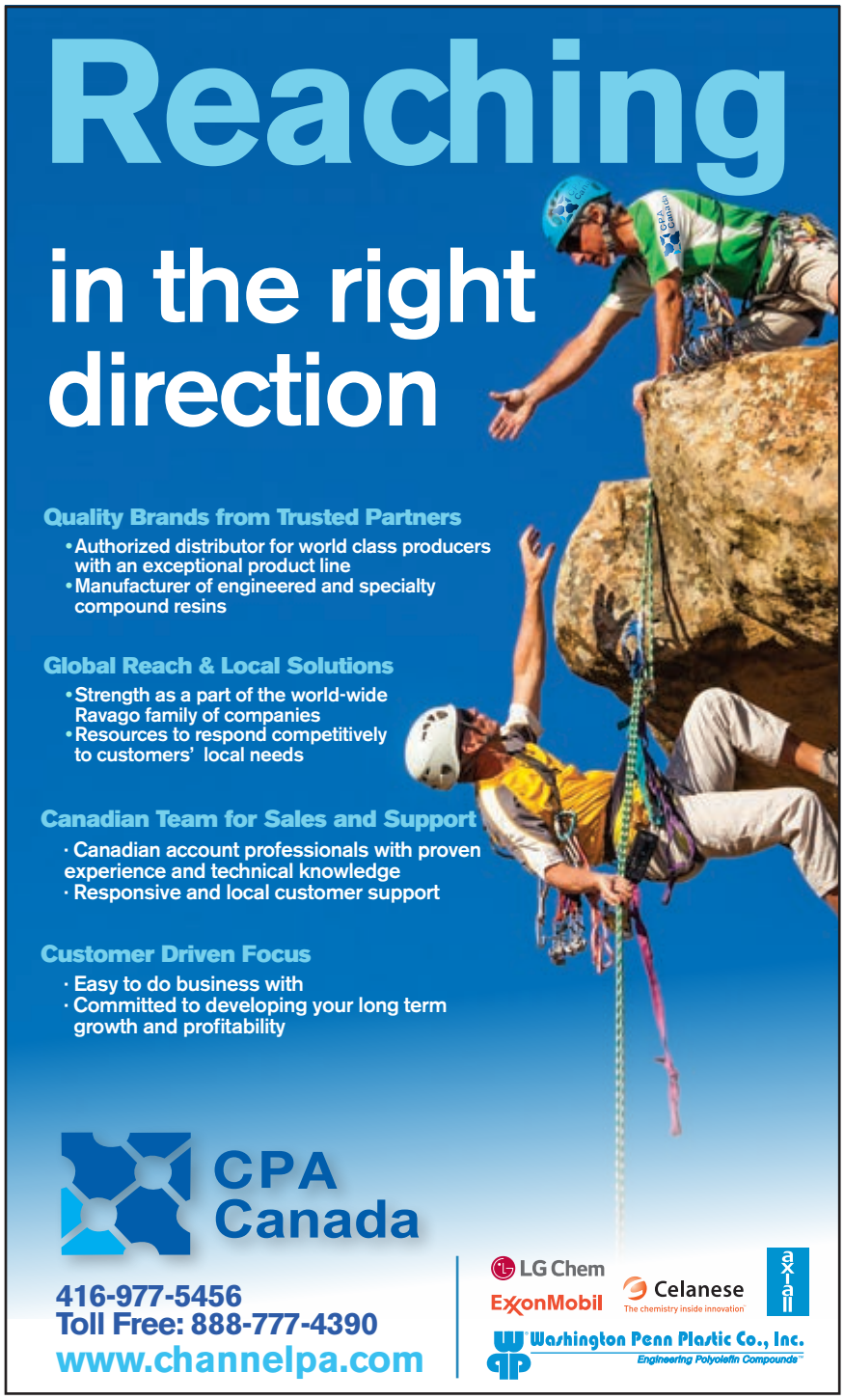
A three-year-old partnership between Athena Automation Ltd., of Vaughan, Ont., and Italy-based SIPA S.p.A. has now expired.

The two companies had partnered in December 2012 to launch new PET preform injection molding machines. Under the terms of the deal, SIPA managed the sales, service, and integration of all Athena PET preform machines on an exclusive worldwide basis, with Athena's support.

Athena will now support SIPA in shipping and servicing the remaining "Athena for SIPA" machine inventory. Going forward, Athena's next-generation PET preform molding machines will be sold and serviced directly by Athena, alongside its non-PET machines.

Athena currently builds 150-, 300-, and 450-metric ton injection molding machines. A new 155,000-square-foot plant being built in Vaughan for just-in-time manufacturing of machines is in the early startup phase. The company's existing 40,000-square-foot building will remain as head office and will include sales and customer services.

Athena was founded in 2008 by Robert Schad, who was also the founder of Husky Injection Molding Systems in Bolton, Ont. CPL



Two industry vets retire


John Effmann


James Nissel

After a combined 77-plus years in the industry, two well-known plastics professionals have retired.

John Effmann, the director of sales and marketing with Lebanon, Ore.-based extrusion equipment maker Entek, retired on March 31. A plastics industry veteran of over 40 years, Effmann worked at Entek since 2005. During his time at Entek he also served in numerous roles at the Society of the Plastics Industry, where as chairman of NPE2012 he helped lead the move of the triennial trade show from Chicago to Orlando, Fla. (See the PEOPLE section on pg. 10 for Effmann's replacements.)

Also on March 31, James Nissel retired after a 37-year career with extrusion systems maker Welex Inc. Son of a co-founder of Welex, Nissel grew up in and around Welex since its inception in King of Prussia, Pa. in 1966. After earning two engineering degrees, he spent his entire career with Welex (now a brand of Graham Engineering Corporation) in roles ranging from field service to design to business development. CPL

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PEOPLE


Julie Beck


Linda Campbell


Tammy Straw


Karen Carter


Greg Jozwiak


Alan Jones


Sylvain Laberge


James Miller


Randy Stone

– Calgary, Alta.-based **Nova Chemicals Corporation** has named **Julie Beck** as its new senior vice president and chief financial officer. Beck will be based in Nova's facility in Pittsburgh, Pa.

– Lebanon, Ore.-based extrusion equipment maker **Entek** has named **Linda Campbell** as its new director of sales, and **Tammy Straw** as its new marketing and development manager.

– Midland, Mich.-based **Dow Chemical Company** has named **Karen Carter** as the new North America commercial vice president of its packaging and specialty plastics unit, and **Greg Jozwiak** as business president of its elastomers and electrical & telecommunications business.

– York, Pa.-based **Graham Engineering Corporation** has named **Alan Jones** as the sales representative for its extrusion businesses of Welex sheet lines and American Kuhne extruders and extrusion systems for the provinces of Alberta, British Columbia, Manitoba, and Saskatchewan.

– Delran, N.J.-based **Actega North America**, a supplier of inks, coatings, and adhesives for packaging and printing markets, has named **Sylvain Laberge** as regional sales manager, Canada.

– St-Jean-sur-Richelieu, Que.-based thermoplastic concentrates supplier **Tech Blend and Co. LP** has appointed **James Miller** to its sales and marketing group. Miller is based out of Minneapolis/St Paul, Minn.

– Wilmington, Del.-based chemical supplier **DuPont** has named **Randy Stone** as president of its performance materials business.

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Flexcool consists of a central drycooler of the **Aryacool line** coupled to a series of thermochillers of the DigitempEvo line. One DigitempEvo for each injection molding machine. In this way, it's possible to achieve the optimum operating cooling temperature, water flow, and pressure for each machine, depending on production specifications instead of equipment limitations. The first improvement, immediately appreciable, is an average electricity savings of 35%. Each DigitempEvo is equipped with a digital scroll compressor and an electronic expansion valve, and these two components allow optimization and stabilization of the water temperature control and reduction of the energy required to cool it, without fluctuations or losses. The Flexcool solution can produce **savings in excess of 50%**, as under normal operating conditions most of the heat load is handled by the Aryacool drycooler, while the DigitempEvo refrigerant circuit is only activated for those molds requiring a cooling temperature lower than that produced by the Aryacool unit.

There are two main components of a Flexcool solution: the **Aryacool drycooler** and the **DigitempEvo thermochiller**. The Aryacool drycooler performs at the highest level of efficiency for a temperature differential between the environment and the cooling water of up to 5°C. The temperature of the water cooled by Aryacool can be higher than 5°C above the ambient temperature, but this condition is sporadic and occurs when extraordinary ambient temperatures are reached. On the other hand, a traditional dry cooler is sized for a temperature differential of 10°C, not 5°C, cutting in half the efficiency of operation. In short, Aryacool guarantees much greater energy efficiency, which allows for a rapid return on the investment.

The DigitempEvo thermochiller, meanwhile, controls the flow and pressure of the cooling water, with the additional ability to simultaneously control two different temperatures, for two separate circuits, that can be adjusted between 5°C and 90°C. Normally, a mold is composed of a fixed part and a moving one, which require two different temperatures. DigitempEvo manages these temperatures using a single device, since each DigitempEvo line is equipped with two circuits, two pumps, and two temperature controllers.

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POWER FAILURE!

Rising electricity prices, courtesy of Canada's most ambitious green energy plan, are threatening to turn out the lights on Ontario's plastics processors.

By Mark Stephen, editor

We all know what the road to Hell is paved with. And when it comes to good intentions, Ontario's landmark Green Energy and Green Economy Act — commonly known as the Green Energy Act or GEA — takes a back seat to nothing.

Introduced in 2009 by Dalton McGuinty's Liberal government, the GEA represented one of the most significant energy policy overhauls in Canadian history. The goal was to clean up the province's polluted air by shutting down coal-fired generating plants and replacing them with cleaner solar, wind, and bioenergy power kick-started through generous subsidies or Feed-in-Tariffs.

It was a noble idea but, with the benefit of hindsight, the whole thing seems to have been about as well-considered — and well-implemented — as a game of pickup hockey. As Ontario's provincial auditor-general said in a highly critical 2011 report, the province plunged in "without conducting any business-case evaluation of the impacts of the program." Which might explain why the GEA has been marred by problems and controversy almost from the beginning.

ILL WINDS BLOWING

In accordance with the GEA, Ontario closed its coal-fired power plants over the last decade and built a rapidly expanding portfolio of contracts with other generators, including renewable energy companies producing power from hydro, wind, solar, and biomass. Which is where the trouble started. Because wind and solar power tends to be produced at times when it's least needed, the province is actually paying a mandated premium for power that it then has to dump to other jurisdictions. The reality was laid bare in a 2013 study from the Fraser Institute. "Eighty per cent of Ontario's generation of electricity from wind power occurs at times and seasons so far out of phase with demand that the entire output is surplus and is exported at a substantial loss," the think-tank said.

To make up the difference of these higher-than-market-value prices for energy, the Ontario Power Authority is forced to slap an extra charge — called the "global adjustment" — on the electricity bills of Ontarians. Since 2007, the global adjustment has risen six cents per kilowatt hour in inflation-adjusted terms, pushing up the commodity portion of bills by as much as 50 per cent. As noted by Ross McKitrick, an economics professor at the University of Guelph and a senior fellow of the Fraser Institute, the impact is significant. "The rising global adjustment is by far the biggest driver of the

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resulting 21 per cent increase in the overall average cost of power in the province over the period 2007-2015," he said.

And the bulk of the price increase is being paid for by the manufacturing sector, which runs during the on-peak times (mornings and afternoons) when the cost of energy is at its highest. Which is why, according to the Association of Major Power Consumers of Ontario, industrial customers are now paying approximately $85 per megawatt hour in Ontario — more than double the $40 average paid in the neighbouring provinces of Manitoba and Quebec, and the state of Michigan.

In short, soaring electricity rates in Ontario are now threatening industries and businesses across the province, with one in 20 reporting they expect to shut down in the next five years, according to a major 2015 study by the Ontario Chamber of Commerce. And an untold number of these are plastics processors.

BEARING THE BURDEN

Intergrated Packaging Films (IPF), an Ayr, Ont.-based maker of recycled plastic sheet for packaging, could be a case in point. The company's co-owner, Bill Mechar, first noticed something was seriously wrong when he received his electricity bill for December 2012. Notwithstanding a 10-day shutdown for Christmas, IPF's bill was actually higher that month than for the previous month of November. "Our kilowatt hours were down considerably because we had powered down completely for 10 days, but our bill had gone up, which obviously didn't make sense," Mechar said.

Digging into the issue raised more questions than it answered, as Mechar was alarmed to discover that his hydro costs had been rising sharply since 2009. After contacting his electricity supplier, Cambridge and North Dumfries Hydro, Mechar was told that much of the increase went for global adjustment. "The short answer to my questions was that province was selling surplus wind and solar energy at a loss and upcharging us," Mechar said.

IPF's four extruders are the main hydro users in the plant, Mechar said, and they must run 24 hours a day, seven days a week for the company to turn a profit. "Shutting our extruders down for part of the day to save hydro costs isn't an option," he said. Efforts to cut IPF's bill through other means, such as installing energy-efficient lighting, have resulted in savings of about 10 per cent. But it's not enough: Mechar estimates that the cost of his hydro has risen by 50 per cent since 2009, and is heading towards an annual bill of $600,000.

As a result, Mechar has pondered moving his company to the U.S. — specifically Kentucky, where state representatives have guaranteed him a rate low enough to save $500,000 per year. "I'm stuck between a rock and a hard place," Mechar said. "The cost and the disruption of moving are considerable, but so is the cost of continuing to do business in Ontario. If I'd known when I established the company 20 years ago what the electricity rates were going to be today, I would never have set up in this province. We're paying three times more for electricity, for example, than a much bigger manufacturing company I know of in Quebec. Our electricity bill is making us less competitive by draining money that we could otherwise use to expand."

OPTIONS AND OPPORTUNITIES

As bad as the situation in Ontario seems, there are opportunities available for plastics processors to take bites out of their rising electricity bills. "There are many companies within the marketplace who are qualified to perform energy efficiency studies," said Chris Armstrong, an analyst at Waterloo, Ont.-based consultant GoEnergy. "The process begins with examining a company's current electricity rates; once we've established this baseline, the processor can make intelligent decisions about investing to cut power usage."

Some of Ontario's various industry associations are there to help, too. In partnership with energy services provider 360 Energy, Canadian Manufacturers & Exporters Ontario is offering its members the CME 360 Energy Coach Program. The program brings trained consultants into a client company to analyze its workflow and areas of potential energy savings; and also includes training client staff members to serve as energy coaches who develop, recommend, and implement energy saving policies and changes on an ongoing basis. The Canadian Plastics Industry Association, meanwhile, has partnered with Bruce Power to provide an energy management service for CPIA member companies. "Member companies can sign up for an exclusive bulk wholesale purchasing plan that utilizes Bruce Power's pricing model, with the potential to

ANATOMY OF A FAILING POLICY

We all know that it's not exactly working out, but why did the GEA go pear-shaped so quickly? After all, the Ontario act was based on a successful German program which began in the 1990s that paid a guaranteed price for power produced without adding greenhouse gases to the environment. But as Jason Langrish, president of Calgary, Alta.-based private sector forum The Energy Roundtable, wrote in a 2015 paper, Ontario made a number of errors that the Germans had avoided. First, he noted, the province overestimated the demand for power, leading it to commit to higher Feed-in Tariff (FIT) rates than were necessary. "Ontario also sole-sourced by far the largest contract under FIT to Samsung, effectively blocking access to the energy grid for other companies," he said.

Second, the province failed to create an energy grid that would be capable of handling these new, varied, and often remote sources of power — which is why it now finds itself paying producers for power that can't be used by ratepayers.

And third, the local content provisions were so high that they acted as a barrier to green energy imports, ensuring that Ontario's trading partners would reciprocate and close their markets to Ontario products. "Investors are hesitant to establish their green energy research and development centres in Ontario because they would not be able to commercialize the products on a necessary scale without export opportunities," Langrish said.

deliver significant savings by locking into a bulk or wholesale electricity rate lower than what they could get on their own," said CPIA president and CEO Carol Hochu. "Bruce Power also offers an electricity bill verification program for our members. They examine your bill, recalculate every item on it, and will work with the utility company to correct any errors; and they can also identify opportunities for potential savings."

LIGHTS OUT?

But as Craig Bolton, president of Fort Erie, Ont.-based customer molder Peninsula Plastics can attest, even the best energy saving program only achieves so much. "Our hydro provider, Canadian Niagara Power, offers many programs to help reduce electricity usage, but some of them are very expensive to implement," he said. The company's lengthy experience in purchasing a new energy-efficient processing machine is instructive. "We bought a new 500-ton servomotor press that qualified us for a rebate from the Independent Electricity System Operator; but a representative from Canadian Niagara Power had to come and study the old machine, which took some time, and then return to examine the new machine, which took more time. We were also responsible for having the old machine destroyed, and for proving that it was destroyed," Bolton said. "We received a $6,900 cheque but the machine cost $200,000, so the return on investment will be slow." In December 2015, Peninsula Plastics also received a $7,800 Electricity Retrofit Incentive Program cheque from Canadian Niagara Power in recognition of the electricity savings it achieved through a lighting retrofit at its facility. "The money was helpful, but given that our hydro bill has still doubled over the past three years, it's really just a drop in the bucket," Bolton said. "Electricity has now become a huge component of my costs and it hurts my competitiveness. I've seen the hydro bills of my injection molding customers in states like Michigan and they're much lower than mine."

In the end — and barring a near-miraculous public policy reversal — ever-rising electricity prices may be the new normal for Ontario's plastics manufacturing sector. "If the province wants to contain electricity rate increases it needs to halt new hydroelectric, wind, and solar projects," said Ross McKitrick. "In order to reverse rate increases, the province should seek opportunities to terminate existing contracts between renewable energy companies and the Ontario Power Authority."

But given the fact that the province just signed up to buy a lot more renewable power in mid-March, that option doesn't seem to be on the table. **CPL**

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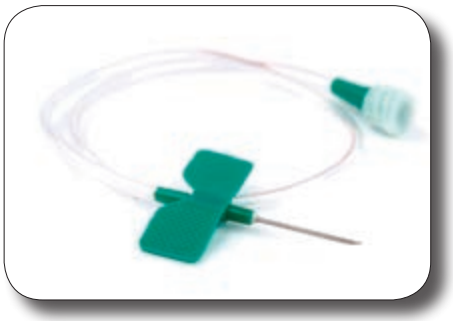

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HOT developments in COOLING

Photo credit: Mokon

As summer temperatures heat up, plastics processors can't afford to let their systems melt down. Which means paying attention to chillers and TCUs. And there's a lot of new technologies you might have missed lately.

By Mark Stephen, editor

Springtime in Canada means a few clearly defined things: if you're a hockey fan, the Toronto Maple Leafs are out; and if you're a plastics processor, chillers and temperature control units (TCUs) are in. For this latter group, it's simple: as the temperatures start to swelter, you've got to make sure your processes don't. By removing the heat from one element (water/glycol/air) and depositing into another (ambient air or water), chilling systems cool the hot plastic that is injected, blown, extruded or stamped; and also cool down the processing equipment, saving on energy and on the wear and tear of the machinery itself.

But the name of the game these days is cooling your process with both less and more: less energy usage and capital costs, more efficiency and flexibility. It's a tall order, but the equipment suppliers aren't sweating it.

STONE COLD OFFERINGS

New TCUs from Conair are designed to save processors a bundle in annual pumping energy costs. "We did extensive testing of the performance of the new design versus our previous-generation pump," said Tim Miller, product manager, heat transfer with Conair. "Averaging the results in all the different TCU sizes, we determined that users could save $740 per year in energy costs." The new units also have a high-temperature option that can reach 300°F (149°C) leaving water temperature, allowing molders to achieve higher mold temperatures without needing to use oil as the heat-transfer medium. The new TCUs offer a maximum heater size of 48 kW, which is twice the heating capacity previously available in a standard-sized cabinet, Miller said. All the new TCUs have the same basic mechanical design and features, but molders can choose between Value, Standard, and Premium control platforms. "The Value unit comes preconfigured with just two pump sizes and no options in order to keep prices low," Miller said. "The Standard and Premium configurations are available in more pump sizes and offer a higher level of customization. The Premium offering allows the highest level of customization, although both Premium and Standard platforms offer more functionality than the previous generation of TCUs."

The goal of the new 3PR intelligent control system from Frigel is to provide processors with easier and more precise control over their Frigel cooling systems. Featuring a seven-inch, full-colour touchscreen interface, 3PR allows processors to achieve better closed-loop process cooling system accuracy with more data points at their fingertips. "The 3PR allows processors to gain more control of the process cooling system with an intuitive HMI that relays information in the

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language specific to the user, versus software codes," said Al Fosco, Frigel's global marketing manager. "The controller is also easy to use, and it allows for more efficient tracking of real-time data to ensure optimal system performance." Troubleshooting features, combined with remote access capability, help operators quickly resolve issues and minimize downtime associated with routine maintenance, Fosco continued. "The controllers' onboard memory assists troubleshooting and uptime by continuously storing key operating conditions, which can be downloaded for detailed analysis," he said.

Mokon has completed the redesign of its Full Range temperature control system, meanwhile, reducing overall cabinet size and floor space requirements to free up valuable real estate on the shop floor. "The Full Range system combines a circulating water system and an Iceman chiller to provide heating and chilling from a single compact, self-supporting unit," said Alan D'Ettorre, Mokon's engineering manager. The system is available in standard heating capacities up to 96 kW, pumping capacities up to 120 GPM, chilling capacity up to 40 tons, and a temperature range of -20°F to 300°F (-29°C to 149°C).

From Aquatech, one of the recently established companies of Italy's Piovan Group, the new Flexcool solution combines the company's DigitempEvo thermochiller range with its line of Aryacool dry cooler units. "By coupling an Aryacool central dry cooler to a series of DigitempEvo units, the water is distributed through a single circuit at ambient temperature, instead of through a large and insulated pipeline required from the central cooling plant," said Giorgio Santella, Piovan's chief marketing officer. "In this way, it's possible to achieve the optimum operating cooling temperature, water flow, and pressure for each machine." The Flexcool solution can produce savings in excess of 50 per cent, he continued, since under normal operating conditions most of the heat load is handled by the Aryacool drycooler, while the DigitempEvo refrigerant circuit is only activated for those molds requiring a cooling temperature lower than that produced by the Aryacool unit. "The digital compressor, with which each DigitempEvo is equipped, modulates its capacity between 20 and 100 per cent, depending on the thermal load," Santella added.

And Wittmann Battenfeld recently expanded its Tempro C120 series TCUs by introducing two particularly compact models: Tempro primus C120 and Tempro basic C120. The dimensions of the Tempro basic C120 are about 9 by 27 by 25 inches, and the unit handles flow up to 200 litres per minute with a heating capacity of either 12 or 18 kW and a pump capacity of either 1 or 2 horsepower. Additional heating

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FREE AS THE AIR

It's not exactly new, but taking advantage of free cooling — an economical method of using low external air temperatures to assist in chilling the water for industrial processes — seems to be on the rise among processors. And for good reason. "When the ambient air temperature drops to a set temperature, a modulating valve allows all or part of the chilled water to bypass an existing chiller and run through the free cooling system, which uses less power and uses the lower ambient air temperature to cool the water in the system," said Ziggy Weibe, president of Chillers Inc., which represents Advantage Engineering Inc. in Canada. "During low ambients, a processor can bypass an existing chiller by shutting the compressors off, for significant energy savings without compromising on cooling requirements. It's a system we recommend to our customers whenever possible."

Berg Chilling Systems is another free cooling proponent. "More and more customers are asking about free cooling, since it's an excellent way to cut energy usage," said company president Don Berggren. Which is why Berg also actively works with utility providers to help its customers qualify for energy rebates. "The Save on Energy rebates that are available in Ontario are pushing many of our clients towards investing in new energy-efficient chilling systems," Berggren continued. "We often initiate the process by assessing the customer's existing chilling system and then providing the solution that satisfies the Save on Energy requirement."

In the end, it's not difficult: Pay attention to your chilling technology and you won't melt down beginning this spring. So what's the Leafs' excuse? **CPL**

RESOURCE LIST

Advantage Engineering Inc. (Greenwood, Ind.); www.advantageengineeering.com; 317-887-0729
Chillers Inc. (Newmarket, Ont.); www.chillersinc.com; 905-895-9667

Berg Chilling Systems Inc. (Toronto); www.berg-group.com; 416-755-2221

The Conair Group (Cranberry Township, Pa.); www.conairgroup.com; 724-584-5500
Dier International Plastics Inc. (Unionville, Ont.); www.dierinternational.com; 416-219-0509
Industries Laferriere (Mascouche, Que.); www.industrieslaferriere.ca; 450-477-8880
Turner Group Inc. (Seattle, Wash.); www.turnergroup.net; 206-769-3707

Frigel North America (East Dundee, Ill.); www.frigel.com; 847-540-0160

Mokon (Buffalo, N.Y.); www.mokon.com; 716-876-9951
En-Plas Inc. (Toronto); www.en-plasinc.com; 416-286-3030

Piovan Canada (Mississauga, Ont.); www.piovan.com; 905-629-8822

Wittmann Canada Inc. (Richmond Hill, Ont.); www.wittmann-canada.com; 866-466-8266

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BIG MACHINES, SMALL HASSLES

What's it like working in a plastics processing sector where short-run production is the norm and foreign competition is almost nonexistent? Just ask a rotational molder.

By Mark Stephen, editor

Where would we be without rotational molding? There would be no pink plastic flamingos on front lawns to celebrate milestone birthdays and new babies, for one thing. But it goes beyond that. Storage tanks, playground equipment, furniture, toys, garbage cans, airplane parts, helmets, road cones, canoes and kayaks — they're all made by rotomolding, as are almost all other hollow parts. But despite its ubiquitousness on the consumer goods market, rotomolding is still considered the simplest of the primary plastics processing methods, in large part because, as a casting process, it uses low pressure compared to injection or blow molding.

In fact, the whole industry can seem a little bit low pressure — remarkably free, in particular, of cutthroat competition, both domestic and foreign. Welcome to the unique, relatively placid world of rotational molding in Canada.

MACHINES, MOLDS, MATERIALS

The principle of rotational molding of plastics isn't complicated. Basically the process consists of introducing a known amount of plastic in powder, granular, or viscous liquid form into a hollow, shell-like mold, and then rotating that tool biaxially in an oven until the resin melts and coats the inside of the mold cavity. The tool is then cooled, and the part is removed from the mold. And that's it. If you're counting on your fingers, that's a mere four steps: mold charging, mold heating, mold cooling, and part removal.

The equipment is a bit more complicated, and rotational molding machines themselves are made in a wide range of sizes. Rotomolding units normally consist of molds, an oven, a cooling chamber, and mold spindles. The spindles are mounted on an arm biaxially rotating the mold or molds, which provides a uniform coating of the plastic inside each mold as it's heated. There are two types of turret rotational molding machines commonly used: independent-arm and fixed-arm. In fixed-arm turret machines, all of the arms — typically three — index at the same time. This requires that heating, cooling, and servicing operations must be done at the same length of time for each arm. Independent-arm machines, by contrast, provide process flexibility by allowing one arm to index while the other arms can remain stationary.

There are other popular machine configurations, as well. Carousel machines, which require the largest amount of floor space, consist of three or four arms on which the molds are mounted; these arms rotate the molds biaxially and move from station to station on the machine being loaded, heated, cooled, unloaded, and loaded again ready for another cycle. Shuttle machines, which generally require a smaller amount of floor space, may have one or two carts on either side of the oven on which molds are mounted. These carts will move into and out of the oven in turn. If two carts are used, one cart is in the oven heating while the other cart can be unloaded and loaded again for the next cycle. Clamshell machines, which are smaller still, are usually single-arm units that run one part at a time, and are not as productive as multi-arm and two-cart rotomolders. A final design is the rocking oven — also called the rock-and-roll rotomolding machine — which is used primarily for making long, thin parts like kayaks.

The industry was semi-revolutionized about 15 years ago

Photo credit: Ferry Industries Inc.

A rotomolding machine made by Ferry Industries. Can you spot the person in this photo?

when Italian machinery maker Persico introduced the Leonardo, the world's first completely automated rotomolding system; but in North America, only a handful of the expensive machines, with highly engineered molds, have been sold, and those to companies producing high-volume parts. In 2013, Persico unveiled the Smart system, which it billed as a more flexible, but still automatic, rotomolder.

The most common types of molds used in rotomolding are cast aluminum, fabricated aluminum, and steel and stainless steel. "Historically, almost all rotomolds were cast aluminum made in a foundry or sheet-metal molds," said Bruce Muller, president of Plastics Consulting Inc., a rotomolding specialist based in Palm City, Fla. "The acceptance of CNC molds has grown lately, especially in Europe. These molds are stronger, have a longer life, conduct the heat faster, and potentially offer more precision."

And the most common type of material to be rotomolded is PE, hands-down. "Ninety per cent of all rotomolded parts are made from PE," Muller said. "The rotomolding process is relatively long and therefore aggressive on polymers, and only PE and a few other resins — including PVC (plastisol), nylon, PP, Hytrel, PC, and cross-linked PE — are suitable."

Since most rotomolding parts are generally not mechanically conveyed away from the mold, there is very little post-molding equipment necessary. Before loading the mold is a different story, however. "Since rotomolding primarily uses powder instead of pellets, it requires an additional piece of equipment to pulverize the resin," Muller said. "This can be done by the resin supplier or in the rotomolding plant." On a related note, a new automatic weigh powder dispense system with PLC was developed for the rotomolding industry by Wittmann Canada Inc. just last year. Called RotoLoad, the system is available in 50-, 150- and 300-lb models, with identical controls for each.

OFFSHORING? OFF LIMITS!

We mentioned above that rotomolding doesn't have much in the way of competition, but that's not entirely true. Blow molding and twin-sheet thermoforming are the competing technologies since all three make hollow parts. Choosing between these processes usually comes down to product volume. "Rotomolding is very slow, which makes it ideal for low-volume production and product testing," said Dave Carter, president of Newmarket, Ont.-based custom rotational molder M.B.C. RotoMould Inc. "Achieving high volumes in rotomolding requires a large capital investment in tooling." Part size is a second determining factor. "Blow molding and twin-sheet thermoforming can only make parts up to a certain size, whereas rotomolding goes much larger — even as large as 22,000-gallon tanks, which are about the size of a semi-trailer truck," said Bruce Muller.

The ability to make extremely large parts is a definite advantage of rotomolding, but not the only one. "Since rotomolding is a casting process that doesn't use pressure, the tooling costs are low, which means molds are inexpensive," said Dave Carter. "Rotomolding also offers tremendous design flexibility, the ability to do short runs economically and in multiple custom colours, and it makes complicated shapes easily. It also accommodates production complexities such as stiffening ribs, molded inserts, and different surface textures; and achieves consistent wall thickness with corners tending to be thicker, which increases product strength and integrity."

And from a business perspective, it's definitely nice to work in a product sector that isn't directly threatened by overseas competition. "Competing products do come in from Asia — mainly goods that can be stacked or nested — but it's not as big a concern for us as for the injection molders, since it generally doesn't make economic sense to ship hollow parts across the ocean," Carter said.

A FEW DRAWBACKS

That's not to say rotomolding doesn't have its downsides. "The industry is constantly trying to reduce cycle times, but the physics of the process and the molecular structure of the materials involved limit how fast we can go," Carter said. "Raising oven temperatures to try to bond the materials faster, for example, doesn't work."

Another limitation lies in the molds themselves. "Unlike other processes where only the product needs to be cooled before being removed, with rotomolding the entire mold must be cooled," Bruce Muller said. "While water-cooling processes are possible, there is still a significant downtime of the mold."

The process is also labour-intensive, and it can be difficult to find good workers. "Most people don't have the skill set that we require, even if they have experience in other kinds of plastics processing," said Dave Carter. "Our workers don't just stand at the end of processing lines breaking off bits of plastic; we change a mold every 45 minutes on average, and they're all involved with that."

At the end of the day, though, it's still a good time to be a rotational molder in Canada. "It's a challenging, interesting industry," Carter said. "Also, startup shops are few and far between — mainly because the Canadian market isn't big enough to lure in many entrepreneurs — so there's enough work for everybody, which keeps it from getting cutthroat."

Just the environment you'd expect from the makers of pink flamingos. **CPL**

Black specks in tubing or pipe are one of the most irritating problems plaguing the plastic extrusion industry. And also one of the most common. Here's how to eliminate them.

SPECKS OF TROUBLE

By Mark Stephen, editor

There's no silver lining to black specks in tubing and pipe extrusion. Especially in clear or light-coloured parts, black specks cause rejects, wasted resin, unscheduled downtime, and ticked-off customers.

Black specks are everywhere in the plastic extrusion industry, alas, but at least there's no mystery as to their source: either they were part of the incoming raw material, or the processor manufactured them in the extrusion system.

If you have specks, how do you find out which of the two possibilities is to blame? Start at the beginning with the resin by examining statistically representative samples of the raw material. "A variety of commercial instruments are available today that allow analysis of millions of pellets," said Chris Rauwendaal, head of consulting firm Rauwendaal Extrusion Engineering Inc. "Pellets can be scanned and sorted not only for discoloured specks, but also for irregular pellets such as pellets with tails."

The good news these days is that contaminants within virgin raw materials are increasingly rare. The bad news is that virgin resins are still susceptible to some harmful outside influences. "Virgin material can become contaminated with fibre from packaging and coated with dust created during resin conveying," said Alex MacGregor, manager of process engineering with Davis-Standard LLC. Regrind, meanwhile, is a major potential trouble source. "Post-industrial recycled material is less forgiving, as the material has seen multiple heat histories where degradation may already have started to occur," MacGregor continued."

MAN-MADE DISASTER

If you've determined that the source of the problem isn't your material, then it's time to face an unpleasant fact: you're making the specks yourself somewhere in your extrusion process. "Specks are introduced during process-

Photo Credit: Optical Control Systems

ing in several ways, the first of which relates to temperature," said Martin Mack, vice president of research and development, extrusion division, with KraussMaffei Corporation. "Small amounts of polymer might be overheated, exposed either to high temperatures for a short time or to moderately high temperatures for longer periods. Generally, the hotter your run, the less time you have before material starts to degrade." When an area of very high temperature occurs in the barrel, downstream plumbing, or die, Mack continued, the problem could be caused by a failure in the control system, such as a faulty thermocouple or a runaway heater band. "Any material passing through the affected zone is potentially vulnerable to degradation," he said.

> **Complex dies for multi-layer parts are possible sources of black specks, especially if they contain low-flow areas where polymer can stagnate and overheat.**

A second culprit is a small amount of polymer that gets hung up and exposed to normal process temperatures for too long a period of time, often caused by a worn or pitted screw, barrel or die, or in cracks in chrome plating. "This material degrades over time, breaks loose with thermal cycling and the drag of polymer flow, and can result in black specks," Mack said.

Screw wear is perhaps the most frequent cause of this problem. "Screw wear is a fact of life, so the question isn't whether or not screw wear occurs, but whether it has progressed to the point where it starts causing unacceptable problems," said Chris Rauwendaal. As it relates to black specks, screw wear can create a thicker insulating melt layer at the barrel surface that inhibits heat transfer between the barrel and the melt in the screw channel. "This reduces the control of the melt temperature and makes it more likely that the temperature gets too high, which increases the chance of degradation," said Antonio Pecora, the vice president of sales and business development with Custom Downstream Systems Inc.

At this point the worn screw needs to be replaced with a new or refurbished screw — but how, exactly, do you determine when this point has been reached? "The processor has to measure the outside diameter of the screw over the entire length, and special tools are available for this," Chris Rauwendaal said. "In a typical extrusion operation the screw and barrel should be measured at least once a year."

Complex dies for multi-layer products are also trouble spots, especially if they contain low-flow areas where polymer can stagnate and overheat. Once you've identified them, keep these areas clean at all costs. "Cleaning a die may require local use of higher temperatures plus chemical purging compounds," said Martin Mack. "Purging won't eliminate the root cause of the degradation, however, so it might be necessary in more extreme cases to redesign the components that are providing the degradation areas."

And even if you've ruled out imperfections in the feedstock resin as the source of black specks, the material can still come back to haunt you, especially if it's heat-sensitive. "Heat-sensitive materials like PVC, EVA, EVOH, adhesives, and most resins that contain a polar functional group are more likely to degrade and cause black specks than more heat-tolerant polyolefins," said Alex MacGregor. "PVC is especially heat-sensitive, and it's important that residence times are not excessive and melt temperatures are below critical levels."

START ME UP

A final step towards eliminating black specks is to perform shutdowns and startups with care, since stoppages often extend residence time and cause material degradation. The material left in the extruder also acquires heat history, which you definitely don't want. "When a system is being shut down, make sure that any thermally sensitive material is pushed out, and then leave the extruder with an antioxidant in it — or at the least, a material that's stable — to help avoid startup problems; and if you're using a purging compound to remove materials, use it during shutdown, not days later before startup," MacGregor said. "When starting the system back up, bring the machine up to temperature, heat soak, and then begin production quickly to minimize the time the idle material is degrading in the system."

Black specks are all-too-frequent in extrusion, as we've seen, but it's the goal of the equipment suppliers to make them less so. "We continue to do work on the screw design, for example, and if we know a customer is going to be running heat-sensitive materials, we design the screw channels and mixers to be streamlined with large channel radii to prevent the material from stagnating," said MacGregor. "In the rest of the machine, we try to eliminate corners by keeping the flow channels round for as long as possible. We want to provide the best geometry for purging the system because once the metal is cut, the customer has to live with it."

Which might be as close as we get to a silver lining. **CPL**

RESOURCE LIST

Custom Downstream Systems Inc. (Lachine, Que.); www.cdsmachines.com; 877-633-1993

Davis-Standard LLC (Pawcatuck, Conn.); www.davis-standard.com; 860-599-1010

Auxiplast Inc. (Ste-Julie, Que.); www.auxiplast.com; 866-922-2894

KraussMaffei Corporation (Florence, Ky.); www.kraussmaffei.com; 859-283-0200

Rauwendaal Extrusion Engineering Inc. (Auburn, Calif.); www.rauwendaal.com; 530-269-1082

All photos courtesy of Intex Tooling Technologies

INTEX TOOLING TECHNOLOGIES is cutting into the market

Establishing a new tooling shop immediately after a major recession sounds like the business equivalent of a kamikaze mission, right? But this Toronto-area startup is too busy growing to worry about that.

By Mark Stephen, editor

Coming out of the Great Recession, Canada's manufacturing sector looked like scorched earth after a massive forest fire. But scorched earth sometimes encourages new growth. In post-recession Southern Ontario, one group of entrepreneurs surveyed the landscape and saw opportunity. The result is Intex Tooling Technologies, a tooling supplier incorporated in 2012 and headquartered 30 miles north of Toronto in Aurora. "Our owners saw the need for a complete tooling and engineering services provider in the Greater Toronto Area, since so many tool shops in the region had gone out of business during the financial crisis," said Mark Hoeflich, Intex's senior business development manager. "It was a bold move at a time when very few startups were being established."

Located in a 35,000-square-foot facility with over 25 employees, Intex offers tooling for both low and high-volume molds; complex sequentially valve-gated multi-cavity tooling; gas-assisted tooling; complex multi-component tooling, including two-shot; and advanced development tooling.

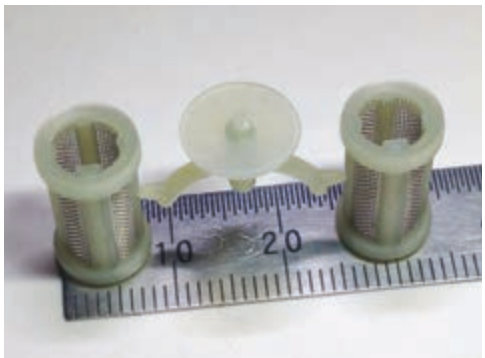
But the company's solutions often begin well before that. "We offer black box product development, and also collaborate on more traditional product research and development," said Blair Spencer, Intex's co-general manager, engineering. "Our engineering services include rapid prototyping, advanced mold flow analysis including fill/warp/cooling, FEA simulations, and predictive modelling. We're able to supply insight into a customer's tooling requirements because most of our employees have been on the other side of the relationship, as mold shop customers running plastics through their own processing machines and providing direct solutions to OEM-level customers."

Which is another way of saying that Intex definitely brings more experience to the table than its brief four-year history would lead you to believe. "We may be a newer company but our workers aren't new; they have an enormous amount of collective experience, a lot of it gained at some of the premier tooling and processing shops," Spencer said.

WELL-EQUIPPED FOR SUCCESS

The company didn't waste any time in acquiring a wide range of tooling equipment, either — new and cutting-edge for the most part, as opposed to picked up on the cheap at auction. "Some of our newest investments include a 3D printer, a large

gantry EDM with 32-piece tool changer, a wire EDM and two CNC EDMs, a large gantry vertical machining centre, two high-speed graphite vertical machining centres, large precision grinding and drilling capabilities, state-of-the-art tooling and CNC programming, and a 20-ton crane," Hoeflich said. One thing you won't find on the shop floor is injection molding machines. "We made the decision to leave the part molding to our customers; we don't want to be seen as competing with them," Hoeflich said.



A filter screen made with insert molding.

Working on a two-shot sequential injection mold.

And on the subject of customers, most of Intex's are automotive molders at present. "Ninety per cent of our business is automotive," Hoeflich continued. "We've also had success working with clients in other sectors such as medical and consumer products, and we're expanding in those areas."

As well as keeping them busy, the auto parts sector is responsible for some of Intex's most complex tooling projects. "We recently designed and developed a complete two-shot rotary component tool that had to satisfy global platform requirements," Spencer said. "The tooling complexity and part design was one of our more significant engineering project challenges, with a goal of complete part production and assembly process of less than 40 seconds in cycle time efficiencies." A second challenging project was for a compression set fabric overmolded plastic wheel liner. "We had only eight weeks to engineer the part, build two aluminum tools, and deliver it to the customer — which we did, on time and on budget," Spencer said.

It helps that Intex has no qualms about aluminum tooling. "We're comfortable working with all of the aluminum alloys, including QC-10," Spencer continued. "But most of our molds are still cut from traditional steel, such as P20 and the hardened materials for running filled engineering resins."

GETTING COMPLICATED

At the risk of overstating it, Intex is busy. The company's recent projects range from an overmolded microscreen running in a 40-ton rotary press to the aforementioned compression set fabric overmolded plastic wheel liner, which was a 2-cavity tool running in a 1,500-ton press. And they're busy in part, they believe, because the owners' and employees' wide-ranging experiences have given them a blueprint for what to do and — just as importantly — for what not to do. "We've laid out our manufacturing facility so that it has engineering at the front of the plant, a CAM programming office next, followed by viewers on the plant floor where the toolmakers can see the tools," Hoeflich said. "If they have any questions about the tooling — what they're building, the sizes they require — they can actually go into the solid model itself and retrieve a dimension."

And on the what-not-to-do front, the company has put a lot of lessons-learned into its business philosophy. "We've taken the better aspects of our collective experiences and used them to plan for how to move forward," Spencer said. "The chief lesson we've learned is that you can't be stagnant — you have to move beyond doing the simple tools. If a tool is easy to build, the odds are that it's being built cheaper offshore."

A 2-cavity fabric insert wheel liner 12-drop sequential system.

In other words, if it's being built in Canada, it's by definition complicated. Not that there's anything necessarily wrong with that. "It's a different world for tooling suppliers than it was 20 years ago, and this is offering new opportunities for Canadian shops," Hoeflich said. "Many customers are now looking for a shop that can bring product development expertise to the table. This is the approach that Intex takes to tooling, and it's an area where we believe we excel: what does the customer need, what challenge has to be solved, and how do we provide the solution?"

Sounds like a good way to take root in scorched economic earth. **CPL**

AUXILIARY EQUIPMENT

Filterless vacuum receivers in two different styles

Novatec Inc. is introducing two distinct styles of filterless vacuum receivers designed to eliminate the necessity of cleaning filters and the filter replacement costs.

The *VR-FL* models are their standard "removeable-lid" receivers that require a separate vacuum sequencing valve, while the *VRH-FL* models have hinged lids with a built-in sequencing valve (except on four-inch line sizes).

A filter is not required because these models use a cyclonic action to separate the material from the air flow. The necessity of an optional blowback feature is also eliminated.

The hinged lid models are popular because the lid swings up and locks in place, allowing the interior of the receiver to be safely cleaned after material changes. They also have a local on/off switch, so the operator does not have to walk to a central control to turn the unit off.

When conveying particularly abrasive materials, either style is available with extended-wear ceramic-coated options that are bolted in place and can be replaced when necessary.

The VR-FL models are available in capacities of 1/3 to 3 ft3, while the VRH-FL models are available from 1/3 to 2 ft3. Machine-mount styles are available with multiple glass sizes for most models.

Maguire Canada/Novatec Inc. (Vaughan, Ont.); www.maguirecanada.com; 905-879-1100

Barway Plastic Equipment Inc. (Vaudreuil-Dorian, Que.); www.barway.ca; 450-455-1396

INJECTION MOLDING

Energy-efficient, all-electric machines

Available in North America from **Maruka USA**, the exclusive North American distributor of Toyo and FCS, the new Toyo *Si-6* series of energy-efficient, all-electric injection molding machines are designed to help molders increase efficiency, improve quality and repeatability, simplify machine setup, and reduce energy consumption.

Compared to Toyo's Si-5 series, the Si-6 is more compact, runs 33 per cent faster, and has a redesigned clamp unit for easier maintenance. Larger tonnage machines also feature Hitachi servos and redesigned injection units. Sizes range from 55 to 1,050 tons, making them well-suited for medical, packaging, automotive, appliance, general purpose, and high-speed molding applications.

The units come standard with the new System 600 controller, which runs 10 times faster than the previous unit and offers greater functionality.

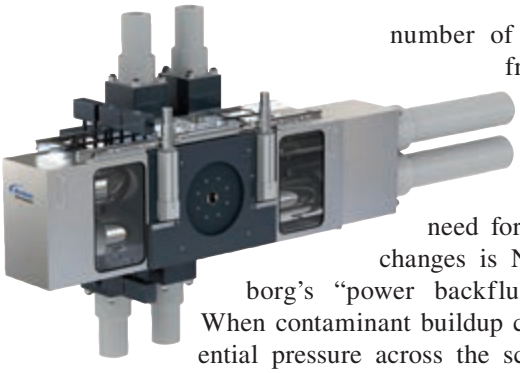
All systems are backed by Maruka's nationwide network of service and support.

Maruka USA (Pine Brook, N.J.); www.marukausa.com; 973-487-3800

EXTRUSION

Automatic self-cleaning screen changer boosts output

The new *V-Type* screen changers from **Nordson Kreyenborg** are automatically self-cleaning, and can reduce the



number of screen changes from several times per hour to only once a day.

The key to eliminating the need for frequent screen changes is Nordson Kreyenborg's "power backflush" technology. When contaminant buildup causes the differential pressure across the screen changer to reach a pre-set level, the backflush sequence begins automatically, with hydraulic pistons compressing some of the already filtered molten polymer and discharging it in the reverse direction, back through the screen, to carry away contaminant for removal from the system. The V-Type screen changer purges even heavy contaminant from the melt filter element while maintaining extrusion throughput, minimizing operator intervention, and avoiding downtime.

In the V-Type screen changer, melt flow from the extruder splits into four streams for filtration in two pairs of screen cavities, then the streams rejoin with no significant change in melt flow. Each pair of cavities is mounted in a piston which positions both cavities so that they can filter their respective melt streams, or removes one of them from the process to remove contaminant buildup by means of backflushing.

The process for changing screens is initiated when a predefined number of backflushes is reached. This triggers the outward movement of the screen-bearing piston so that the screen pack can be removed and a new filter element put in its place. Three of the cavities remain in the process while a new screen pack is installed in the fourth.

Nordson Extrusion Die Industries (Chippewa Falls, Wis.); www.extrusiondies.com; 715-726-1201

SIZE REDUCTION

Innovative, versatile granulator

The new *LM/SM* series of granulators, manufactured in-house by **Weima America Inc.**, is designed to tackle applications that only require a granulator and do not require a pre-shredder for initial size reduction.

The LM/SM granulator series boasts a number of innovative features. The machines come standard with adjustable knives and cross-cut action, which produces a very uniform granulate size. The cutting chamber is easy to access and makes preventative maintenance and cleaning more efficient, thus reducing any downtime. A customer can specify the desired particle size of the shredded material and Weima can then customize the granulator with the correct screen size to make that possible.

Screen sizes range from 3 mm to 50 mm, making this line of equipment both versatile and reliable.

Weima America Inc. (Fort Mill, S.C.); www.weimaamerica.com; 888-440-7170

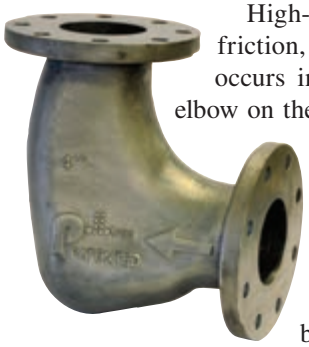
RAW MATERIAL HANDLING

Elbow design with soft-impact zone protects piping

Pelletron's new *Pellbow* elbow design can extend the life of

advertising index

the pneumatic conveying pipe elbows, significantly reducing your maintenance budget.



High-velocity conveying results in high friction, and the majority of that friction occurs in the pipe bends. Unlike any other elbow on the market, the Pellbow creates a soft-impact zone with no grinding action to protect your piping investment by reducing the velocity in the bend to minimize friction and the resulting damage to piping.

Made from ductile iron, the Pellbow is self-cleaning to prevent cross-contamination during material changes, requires no additional air for the purge cycle, allows for installation in all orientations, and is abrasion-resistant.

Pelletron Corporation (Lancaster, Pa.); www.pelletron.com; 717-293-4008

MATERIALS

Styrenic TPEs for auto exteriors

Teknor Apex Company has expanded its "polymer-neutral" product offering for automotive exteriors by developing styrenic TPEs with alternative cost/performance profiles to those of widely used thermoplastic vulcanizates.

The new *Sarlink ME-2200* series styrenic TPEs exhibit higher flow than comparable TPVs, enabling molders of exterior components such as gaskets, seals, and trim to process complex, intricate designs while shortening cycles through reduced packing and cooling time. In applications where TPV compounds are over-engineered, these new TPE compounds can provide a cost savings while still meeting the performance requirements of the part.

Like TPVs, the Sarlink ME-2200 series compounds are less dense than EPDM and PVC, yielding weight savings of up to 15 and 23 per cent, respectively.

Offered alongside Teknor Apex's Sarlink TPV compounds, Sarlink ME-2200 series styrenic TPEs are available in hardnesses from 65 Shore A to 40 Shore D. They exhibit superior UV stability, provide good flexibility over a wide temperature range, and yield a Class A surface appearance. The compounds are readily coloured and, unlike many TPVs, do not require pre-drying prior to molding.

Teknor Apex Company (Pawtucket, R.I.); www.teknorapex.com; 800-556-3864

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COST OF ELECTRICITY

The following was prompted by a recent visit and conversation with one of my injection molding customers. The conversation moved to the cost of electricity in the province of Ontario, specifically the "Global Adjustment" added to his electrical bill monthly. The customer stated that every month $8-12,000.00 is added to his electrical bill under the term "Global Adjustment." He went on to say that it wasn't fixed but varied, and it was not defined as a tax.

I decided to do some investigating. As it turns out, the "Global Adjustment" is a wee bit complicated. I read a "Hydro One" explanation of "Global Adjustment." It stated that "the Global Adjustment can be a credit or a charge to the customer to account for the difference between the spot price of electricity and the rates paid to various regulated and non-regulated generators across Ontario." In my opinion, "Global Adjustment" is directly related to wind and solar initiatives that have led to an increase in electricity and its costs. We have a surplus of electricity in Ontario. According to a Financial Post article, the wind and solar projects account for about 4% of the electricity in the province and yet these sources of power contribute to 20% of the cost to the consumer. The Ontario government retrofitted coal generation stations with pollution controls that made the coal-fired generation as clean as natural gas generation. Yet the Ontario government closed the last coal generation plant in Thunder Bay in 2014. Premier Kathleen Wynne stated the government has banned the use of coal to make electricity. There is a cost to do this, isn't there? I assume the logic was to build natural gas-fired plants to replace the coal-fired ones. If all is equal regarding effects upon the environment, why would you spend funds to build new plants creating electricity from another fossil fuel? It is estimated that the cancellation of the two gas-fired plants – a famous Ontario Liberal scandal – cost the taxpayers $1.3 billion. Is this the cost to build two gas-fired plants? This undoubtedly will be paid for via the "Global Adjustment" – more specifically, by the taxed Ontarians.

Recently I read an article entitled "Electricity exports cost Ontario taxpayers $200 million in June". The "June" referred to is June 2015. According to the article, the vice president of "Wind Concerns" estimates 1.9 terawatts of Ontario's electricity production was exported to Michigan, New York, and **Quebec** in June 2015. 1.9 TWh is 15.2% of Ontario's demand of 10.6 TWh. Therefore Ontario has a surplus of electricity. Note that there are differences in demand for the summer months versus the winter months. Ontario exported the power at the hourly rate Ontario Electricity Price (HOEP) of $15.31/megawatt hour (1.53 cents per kilowatt hour) for $29.1 million. The article goes on to say that the cost to produce and transmit that 1.9 TWh was $131.43/MWh or (13.14 cents/kWh) – or in terms of dollars, $249.9 million of them. The difference is $249.9-29.1 = $220.8 million.

On September 11, 2015, the Ontario and Quebec provincial governments also signed a joint agreement to expand electricity trade with each other. Ontario will provide five megawatts of electricity to Quebec in winter, when demand in that province peaks.

In summer, Quebec will be prepared to offer five megawatts of electricity to Ontario as its demand peaks in hot weather. June can be warm. Last June Ontario had a surplus and this June we will buy power from Quebec? Math doesn't appear to be Ms. Wynne's strong suit.

Ontario's prices are now dangerously out of sync with neighbouring jurisdictions. The average price paid by large industrial power users in Toronto is nearly 11 cents per kilowatt hour, according to Hydro Québec's 2013 survey. That compares with 4.8 cents in Montreal, 5.45 cents in Chicago, and 8.12 cents in Detroit. Note: Detroit is bankrupt.

The cost of electricity in this province is impairing manufacturing. Why would a would-be manufacturer build a plant in Ontario? How does an Ontario plastics processor put together a plan or budget in the face of this rising cost? Why are manufacturing plants leaving Ontario, duh?

As manufacturers, we should be OUTRAGED! And there are other things Ms. Wynne's government has done to impair manufacturing.

I think it is time to **BREAK WYNNE.** The bad, bad smell is all around.

At the time of this writing, the Ontario debt is over $300 billion. If you are a taxpayer in Ontario, your share of this $300 billion dollars is over $22,000. When did you see a "Global Adjustment" on your electrical bill that actually lowered your bill?

If you are **OUTRAGED**, if you want additional information on "Global Adjustment," and/or if you want to suggest, contribute or simply vent to the **BREAK WYNNE** campaign, email us at:

breakwynne@poundsofplastic.com

For additional information regarding the science of plastic products please don't hesitate to contact Richard Pounds, Bob Milojevic, Leon Desrocher @ 905-286-9894. Email us @ rpounds@poundsofplastic.com.

Seven issues that plague I/M

By Steven Silvey, Silvey Plastics Consulting

Snow White had her Seven Dwarfs; injection molders have seven common problems that most of them fight at one time or another, any one of which can cost time and money.

NOT ENOUGH DATA

Too many times a molder uses his/her own knowledge to set up the job, or just wings it and hopes for the best. Having data and using it streamlines and minimizes downtime and issues with processing.

Here's what you need: a setup sheet; a process/results sheet for verifying the setup; a material processing sheet from the material manufacturer; mold flow data that spells out setup data for tool, fill times, material temperatures, cooling time and steel temperatures; results data for the tool if it has previously been processed; and water lines hook-up, with lengths, flow, and temperature settings included.

NO PYROMETER

Not having a pyrometer in the shop and/or having one and not using it can lead to many issues in the processing and troubleshooting of the process. Since molding is a thermal process, it only makes sense to use a pyrometer to check that everything is at the temperature suggested or listed in the data set.

The melt temperature of the material should be checked after stabilization and so should the steel temperature of the tool. In addition, the part temperature can be checked and recorded so as to create a reference to your process. If you're not using a pyrometer, you're basically guessing that everything is correct and calibrated.

NOT UNDERSTANDING MACHINE FUNCTIONS AND SCREENS

The screens and functionality of various machines are different, and machine operators don't always understand these functions — which means that when an issue comes up, they're not able to solve it because they don't know the proper way to set the machine. In short, a good comprehension of what the screens are and what they set, control, and monitor is essential.

INSUFFICIENT PROCESS REPEATABILITY

In injection molding, the ideal is a repeatable process that manufactures the same identical parts all the time. In many cases, though, the parts coming out of the process aren't identical, a problem usually caused by the molder not having set the machine to a robust process to eliminate some of the variables. Using pressure to change the speed of injection is one of the big issues, along with not monitoring actual temperatures. The fill time, plastic pressure on pack, and melt and mold temperature should be monitored, along with the cycle time and screw recovery time.

A tip: Using machine setpoints is not an ideal way to guarantee that all parts are the same; monitoring the results of those setpoints, however, is.

NOT KNOWING YOUR MATERIALS

Understanding the two basic families of materials — semi-crystalline and amorphous — is essential to successful injection molding. But many molders don't know, for example, that semi-crystalline materials don't process the same as amorphous materials. With semi-crystalline, the material actually melts, resulting in a high level of shrinkage — a high packing pressure, therefore, helps. Amorphous materials, meanwhile, can be processed with much lower packing pressure. Warpage and shrinkage issues are very common with semi-crystalline materials, but not with amorphous materials.

ISSUES WITH DRYING

Though simple in theory, the issue of air dryness as measured by dew point is not widely understood among processors, nor is airflow over the pellets or uniform temperature of the pellets in the dryer hopper. If material is not properly dried, the results can cause issues with the processing and properties of your plastic parts.

The data for proper drying of material can be found in many publications, but also in the material supplier's processing conditions. Moreover, having a dryer is only part of the solution — maintaining the dryer and its components is also important, and failing to do so is a source of trouble.

ISSUES WITH TOOLING

In many cases, molders will attempt to solve tooling issues with the process, thus minimizing the molding window to produce good parts. Some of the most common tooling issues are jetting, gate blush, flash, and size.

Other issues are unbalance in a multicavity tool or family tool, warpage, burns, and windowing. It's important for the molder to understand what a tooling issue is, and to approach the solution so as to get the largest process window possible, even when this requires a tooling modification.

In the end, the solutions to these seven problems all boil down to one thing: having the right knowledge. In too many instances, the machines are upgraded only to be run by the same operators making the same mistakes. Education should be a never-ending process. Along with the right equipment, it's the best way to achieve quality part production. **CPL**

Steven Silvey is the owner of Vancouver, Wash.-based Silvey Plastics Consulting. The company provides a range of solutions for OEMs and plastics manufacturers, including troubleshooting, training, education, and project management. Contact them at silveysplastics@hotmail.com, or visit www.silveysplasticconsulting.com.

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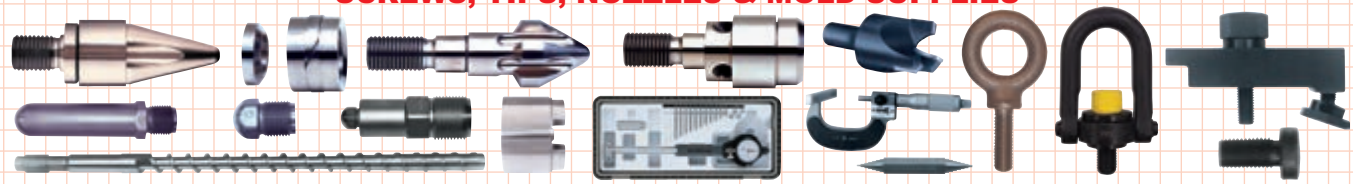

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