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Canadian Plastics

JUNE 2017
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FROM THE ARCHIVES

The February 1960 issue of *Canadian Plastics* told the tale of a reinforced polyester park bench – the only Canadian entry in a product design competition held during the 15th annual conference of the Reinforced Plastics Division of the Society of the Plastics Industry Inc., staged in Chicago in January 1960. Molded by Polyfibre Ltd., of Renfrew, Ont., the bench was good, but not quite good enough – it placed in the top 10, from a total of more than 350 entries at the show. First prize in the competition went to a local entry: a bowling alley bench and ball-rack combination, manufactured by Brunswick-Balk-Collender Company, of Chicago.

Number of the month:

0.4*

* Percentage increase in the amount of post-consumer plastic packaging recycled in Canada in 2015 compared to previous years. (See pg. 22)

in every issue

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Don't fear the robots

Not since the Terminator ran amok in the famous film franchise have so many people sounded so worried about robotic automation. Robots are indeed everywhere — stocking shelves, pruning trees, delivering room service, and even mixing cocktails. In the industrial sector, meanwhile, they're showing up for work in small, medium-sized, and large factories across the world.

According to a 2016 report from the U.S.-based Robotic Industries Association (RIA), orders for robots in 2016 spiked a whopping 61 per cent in assembly applications, nearly double the number sold to the food and consumer goods industries. Topping demand by market was the automotive industry, with orders growing 17 per cent and shipments rising 25 per cent relative to 2015.

The robotics wave began sweeping into automobile and other plants decades ago, but stopped short of shops staffed with a relative handful of people. These businesses couldn't afford robots, which weren't designed to squeeze into tight spaces or operate close to human beings anyway. Technological advances, however, have now made industrial robots more compact, and collaborative models — called cobots, for short — have sensors to prevent them from harming human colleagues. They're also easier to set up and cheaper, costing as little as $25,000. For small-plant managers, the machines are increasingly hard to resist.

But the perception of a big downside remains. Automation has generally been seen as a drag on low-skilled employment, and some are predicting that robotics will change the future of labour so dramatically that as many as half of the jobs that exist today will be at risk in years to come. For example, economists from the Massachusetts Institute of Technology and Boston University recently concluded that jobs fall in parts of the U.S. where more robots are installed.

But maybe we shouldn't worry quite so much.

First, as a new study by the C. D. Howe Institute noted, the kind of mass job losses foretold in some of the more dire projections are likely to be confined to a very narrow range of industries, representing just 1.7 per cent of employment. In part this is because humans possess certain skills that robots are unable to duplicate, particularly interpersonal skills.

Second, automation is a big driver of productivity, which allows wages in general to rise.

Third, robots perform duties that people either won't or shouldn't. The RIA noted that robots used in assembly applications, spot welding, and in the food and consumer goods industries have taken on routine functions requiring repetitive tasks like picking and placing parts, and handling and assembly, which contribute to carpal tunnel syndrome. Also, robots used in large part molding operations — such as injection molded and thermoformed parts for vehicle manufacturing — can do the heavy lifting so that workers are not at risk of back injuries.

This leads to the fourth point. Some see robots as a threat to traditional production line jobs, but there's another way to look at it: While technological advances kill some jobs, they generate others. A recent Boston Consulting Group study focusing on Germany concluded that intelligent automation will eliminate about 610,000 factory slots, but create 960,000 new positions. In short, robots can free up employees for more creative tasks. After all, there's no fixed amount of work to be done in a manufacturing plant, and I'm betting our industry will find ways to employ people in the future that haven't been dreamt of yet.

As one plant floor supervisor told me recently — and I think it sums up all the positives of job-replacing automation — "We're not giving the good jobs to the robots."

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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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Artificial sausage casing technology smokes the competition

Photo Credit: Tronoplast Technolgies Inc.

It's an old adage that you never want to know how the sausage gets made. But the food industry may want to pay close attention to a new artificial sausage casing technology developed by extrusion film equipment maker Tronoplast Technologies Inc.

The Brampton, Ont.-based firm has just delivered a new high-speed three-layer line designed for manufacturing porous, naturally smokeable polymeric sausage casing to a European customer.

Called HS-Tron, the system will allow the customer to cash in on the growing trend of artificial casings that permit the use of real smoke in the sausage-making process instead of smoke-flavoured additives — an option that, until recently, the food industry could only achieve by using sausage casings made from natural animal tissue.

"The line, which uses a special polymer mix developed by the customer, is aimed at being the most productive line in the industry," said Sergey Kotylev, Tronoplast's vice president of operations. "Depending on the skin casing formulation, it produces about 300 meters per minute, but it can produce up to 400 meters per minute under optimal conditions, making it approximately 25 per cent faster than competing lines. It gives our customer a substantial competitive advantage."

Perfected over several iterations, the HS-Tron system offers very tight control over formulation, stretching, thickness variation, and caliber deviation, Kotylev continued. "Sophisticated line control permits ramping up the line speed at a ratio of up to 10:1 while maintaining the multiple critical process parameters necessary for high-quality casing production," he said.

Tronoplast sent staff members to the customer's operation to supervise the installation process in May.

"We believe we have raised artificial sausage casing technology to a new level," Kotylev said. "And we've also developed a supplementary technology for preparing the customized raw material for breathable casing."

It's a sausage-making process you might actually want to watch. **CPL**

Bad news, good news for Nova Chemicals

In what could be the largest patent infringement damage award in Canadian history, Nova Chemicals Corporation has been ordered to pay a major settlement to The Dow Chemical Company after a recent Canadian court ruling in a case involving PE resins; and just a few weeks earlier, in a bid to grow its U.S. Gulf Coast presence, Calgary, Alta.-based Nova bought a majority stake in infrastructure supplier Williams Partners LP's olefins plant in Geismar, Louisiana for $2.1 billion.

In late April, a federal judge issued a written decision that details how much Dow can claim from an estimated $1 billion in revenue Nova collected while infringing on Dow's Canadian patent 2,160,705, which sets out a method to make the thin plastic packaging used in end products such as garbage bags and food wrappings.

Dow actually won its infringement case in federal court in 2014, when Nova was found liable for infringement of a patent owned by Dow by Nova's manufacture and sale of its Surpass film-grade polymers. Litigation continued on how the parties should calculate the damages, however, and a damages trial was heard in Toronto last December and January. Justice Simon Fothergill issued the public version of his written decision in April.

Justice Fothergill ordered Nova to disgorge profits it made during the infringement. The companies must now use the judge's methodology to figure out how much those profits should be. "The parties' accountants will calculate the sums owed by Nova to Dow based on the conclusions reached by the Court in this stage of the reference," Justice Fothergill wrote.

Steve Garland, an attorney with Smart & Biggar, which represented Dow, told Canada's *Financial Post* newspaper that the result of the case between Dow and Nova could be the largest monetary settlement ever awarded in a Canadian patent infringement case. "I've been litigating IP cases and patent cases for 25 years," Garland said. "This, without a doubt, has been the most complex and interesting case that I've been involved in and that our team has been involved in."

Justice Fothergill's decision is also unique in that it takes into account so-called "springboard" profits, defined as the infringer's excess profits during a post-expiry ramp-up period — in this case, profits made by Nova by entering the market before Dow's patent had expired. "I think it's the first time in Canadian patent history where a springboard award on an accounting of profits has been awarded," Garland said.

On the good news side, Nova's acquisition of an 88 per cent stake in the Williams Partners' olefins plant in Louisiana includes approximately 525 acres of undeveloped land adjacent to the plant, and Williams Partners' interest in the ethylene trading hub in Mt. Belvieu, Tex.

Under terms of the deal, Williams Partners' subsidiaries will enter long-term contracts to supply Nova with feedstock through its pipeline system.

The plant produces approximately 1.95 billion lbs of ethylene annually and is located in the U.S. Gulf Coast region, the largest refining and petrochemical production hub in North America. With riverfront access, the adjacent land represents a significant opportunity for future growth, Nova said in a statement. "This transaction provides us with the opportunity to acquire an operating facility with immediate, positive cash flow, and with access to new customers and the benefits of an experienced workforce," said Todd Karran, Nova's president and CEO. "A key component of our growth strategy is to expand to the U.S. Gulf Coast and leverage next-generation technology to better serve our customers in the Americas. This allows us to benefit from access to significant U.S. shale gas reserves and well-established petrochemical and supply chain infrastructure."

The transaction is expected to close in the summer of 2017. **CPL**

GN Thermoforming boosts presence in Asia

Chester, N.S.-based GN Thermoforming Equipment is growing its presence in Asia by expanding its agreement with current Chinese agent Vulcan Plastics Technology Co. Ltd. to include key Southeast Asia territories.

Along with its responsibilities in China/Taiwan, Shenzhen Province-based Vulcan, a manufacturer of thermoforming molds and cutting dies, will sell GN's entire thermoforming machine line in Vietnam, the Philippines, Indonesia, Malaysia, Thailand, and Singapore.

"We're excited to announce this expanded partnership with Vulcan and we look forward to broadening our presence in Southeast Asia," said Jerome Romkey, GN's business development manager. "Vulcan has well-established relationships in the thermoforming industry and the necessary resources that will help us grow our position in that part of the world."

Under the new agreement, Vulcan is hiring dedicated staff to sell and service GN's complete line of thermoforming machines, which includes contact-heat and plug-assist thermoformers. "By the late summer of 2017, GN will house a demonstration machine at Vulcan's Shenzhen site for customer testing," Romkey said. "Other demonstration machines could be added later this year."

GN manufactures roll-fed thermoformers for the production of high-quality plastic packaging. The company's operation also includes a technical service and sales centre in Jihlava, Czech Republic. **CPL**

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CPIA members and guests at Merlin Plastics.

CPIA tours B.C. processor Merlin Plastics

The Toronto-based Canadian Plastics Industry Association held a sold-out breakfast meeting for members and guests with the CPIA Board of Directors on April 6, at the headquarters of post-consumer and post-industrial plastic processor Merlin Plastics, in Delta, B.C. The event also featured a tour of the Merlin Plastics facility. **CPL**

Absolute Haitian gets more representation in Ontario

Steve Bell

Absolute Haitian has expanded its sales force in Ontario with the addition of industry veteran Steve Bell.

Bell is teaming with Shadow Automation's Larry Bonehill to represent Haitian and Zhafir injection molding machines in the province. Uxbridge, Ont.-based Shadow Automation has been representing Absolute Haitian for nearly 10 years. Bell will now handle all sales in western Ontario, and Bonehill will be responsible for eastern Ontario.

Bell's experience dates back to 1976, when he worked for his father's company, Molder's Supply. Since then, he has mostly sold injection molding machines.

"I've known Steve for a long time, and I'm very happy to be working with him," Bonehill said. "His experience and passion for the industry have made him a trusted figure."

Headquartered in Worcester, Mass., Absolute Haitian is the exclusive sales and service agent for Haitian and Zhafir injection molding machines in Canada and the U.S.

"Canada is an important market for Absolute Haitian," said Glenn Frohring, president and one of the owners of Absolute Haitian. "Our growth here required us to increase our coverage in Ontario, and we welcome the opportunity to work with Steve." **CPL**

ORBIS picks Toronto injection molding plant for annual award

ORBIS' Toronto staff accepts the award.

ORBIS Corporation, a manufacturer of plastic recycling bins and organic barrels, has named its Toronto injection molding facility as the company's 2016 Plant of the Year.

The Toronto plant was one of ORBIS' 11 manufacturing facilities considered for the award, and was selected primarily for what ORBIS called its "impressive safety record, sustained employee engagement, superior operational performance, and strong customer focus."

"Best-in-class manufacturing is critical to our leadership in the reusable packaging industry," said ORBIS president Bill Ash. "This year, the Toronto plant is being recognized for this level of performance."

The Toronto injection molding plant manufactures bakery trays, distribution totes, environmental bins and carts, and beverage shells. It employs approximately 140 workers. This is the third Plant of the Year award the Toronto facility has received — it previously won the award in 2012 and 2015.

ORBIS is headquartered in Oconomowoc, Wis. **CPL**

Rapid Granulator opens Pittsburgh production facility

As part of the so-called "Trump bump," size reduction equipment maker Rapid Granulator is making one of its biggest investments in decades in the U.S.

Rapid, which is headquartered in Bredaryd, Sweden, has made a multi-million dollar investment in Pittsburgh, Pa. to build a new facility for in-house production of its full range of granulating and shredding equipment. In addition to manufacturing space, the new 65,000-square-foot plant in Pittsburgh also includes a showroom, warehousing, and offices.

"This is an important move for Rapid," said Jim Hoffman, the firm's vice president of sales and marketing. "In the near future, we will have full control over U.S. production, just like we have in Sweden and just like we had here in the past. It's clear that there is a spirit here to favour 'Made in America' and we are going to do our best to give processors in the plastics industry more opportunity to do that."

Hoffman noted that Rapid is returning to its roots, 40 years after it first established operations in the U.S. "Up until 2008, we had our own production in Illinois, but then we became part of a bigger group and production was merged with that of other group members in Pittsburgh," he said. "We have been outsourcing production in the U.S. since 2008, and we have been very successful here. But we are very ambitious: The North American market right now is healthy and growing, but we want to grow even faster."

Rapid was acquired by Swedish company Lifco in 2015. U.S. production has continued uninterrupted at the previous owner's operations, but now Rapid is taking everything back in-house, with production in Pittsburgh scheduled to begin early in the second quarter of 2017. **CPL**

Photo Credit: Rapid Granulator

Rapid opens its new Pittsburgh facility. From left to right: Rapid staff members Dan Boll, Bengt Rimark, Ulf Karlsson, and Jim Hoffman.

PEOPLE


Leo Devellian


Robert Domodossola


Srdjan Mucibabic


Patrick Farrey


Melinda Gordon


Rebecca Hamstra


David Sanborn


Matthew Hellstern


Philippe Mafille


Perc Pineda


Jerry Rex


Markus Richter


John Sproule

– Wilmington, Mass.-based **Trexel Inc.**, the developer of the MuCell microcellular foaming injection molding technology, has named **Leo Devellian** as business development manager.

– Bolton, Ont.-based processing equipment maker **Husky Injection Molding Systems** has named **Robert Domodossola** as president of its medical and specialty packaging business; and **Srdjan Mucibabic** as president of its new customer success management organization.

– Bethel, Conn.-based industry association **The Society of Plastics Engineers** has named **Patrick Farrey** as its new CEO. He replaces Wim De Vos, who stepped down in June.

– Lachine, Que.-based downstream extrusion equipment maker **Custom Downstream Systems Inc.** has named **Melinda Gordon** as territory sales manager for the Northeast U.S.

– Wauconda, Ill.-based mold components supplier **Progressive Components** has appointed **Rebecca Hamstra** as technical sales advisor and **David Sanborn** as regional sales manager. Hamstra is based out of Michigan and Sanborn is based out of California.

– Cuyahoga Falls, Ohio-based colourant and additive maker **Americhem Inc.** has appointed **Matthew Hellstern** as CEO of the Americhem Group of companies, which includes Americhem, Infinity LTL Engineered Compounds, and Vi-Chem Corporation.

– Brampton, Ont.-based injection mold maker **StackTeck Systems Ltd.** has appointed **Philippe Mafille** as its sales representative for Europe, the Middle East, and Africa.

– Washington, D.C.-based industry trade group **The Plastics Industry Association** has appointed **Perc Pineda** to the new position of chief economist.

– Sudbury, Mass.-based machine tools, 3D printing solutions, and automation and accessories supplier **Methods Machine Tools Inc.** has named **Jerry Rex** as president.

– Austrian machinery group **Engel Holding GmbH** has appointed **Markus Richter** as chief financial officer. He replaces Klaus Siegmund, who left the company in March.

– Mississauga, Ont.-based slitter rewinder equipment manufacturer **Deacro Industries** has named **John Sproule** as its sales representative for Ontario, Quebec, and Eastern Canada, as well as for the Northeast U.S.

Alone among plastics processors, blow molders need to exert total control over the entire molding cycle to avoid making bad parts. The latest developments in extrusion blow molding, injection blow molding, and stretch blow molding can help.

UNBOTTLED

By Mark Stephen, editor

Blow molding can make shooting hoops against LeBron James look easy. Blow molding consultants like to describe it as the most technically challenging of the molding processes, and they're probably not wrong. Why? Because in the blow molding world, having a perfect mold isn't enough — that mold can still make an unacceptable part if the molder isn't in total control of the entire process, including the many indirectly controlled variables. Simply put, the blow molding process itself exerts a major influence on the end product.

Which is why it's crucial for the machinery makers to keep improving their equipment and technologies. With that in mind, here's a look at some of the latest developments in extrusion blow molding, injection blow molding, stretch blow molding, and automation.

RADICAL REDESIGNS

Amsler Equipment Inc. has redesigned its four-cavity, linear stretch blow molding machine for PET. Like its predecessor, the L42, Amsler's new L42X can blow bottles up to two litres in size using four cavities, and bottles up to five litres in two cavities; but in the new machine, the maximum neck diameter is 63 mm, compared to 48 mm in the prior version. Improved features include upgraded drives, heating lamps, oven controls, and control software and hardware. Additionally, all machine motions now are servo-controlled, giving the operator a better handle on all motions within the machine, including rotation of preforms through the oven. The L42X individually controls the heating of the four preforms before they're moved into the molding area. The clamp is double-acting, so that both mold halves move away from the centreline upon opening; clamp compensation acts on both sides of the mold.

Designed for producing packaging — especially canisters — the new Eblow 37 hybrid blow molding machine from **Bekum Machinenfabricken GmbH** is based on the company's hydraulic BA 34.2 units. The Eblow 37's closing unit and mold closing functions are electrically driven, though a servo-hydraulic system handles closing pressure buildup. The machine has a closing pressure of about 42 tons and a mold width of 700 mm. The Eblow 37 boosts canister production by up to 15 per cent over comparable hydraulic systems, Bekum said, and can produce 240 canisters per hour. With its spiral distributor blow heads, the machine is designed for easy material changeovers and maintenance. It can handle both single- and multiple-layer structures.

New to the blow molding business, **Dr. Boy GmbH & Co.**, the German parent of Boy Machines Inc., has introduced an injection blow molding system that utilizes a Boy 60 E horizontal injection press with a four-cavity, hot runner mold with an index plate that rotates 180° to transfer injection molded preforms to the blowing station. At the K 2016 trade show in Germany last year, the system produced eyedropper bottles that were dropped onto a conveyor belt for immediate packaging. Using a manifold system developed specifically for that application, the preforms were injected without sprues, so that no waste was produced in bottle production. And unlike with traditional blow molds, the bottle was finished at the end of the blowing process, with no material used to seal the mold body needing to be cut and removed.

FOAMING IT IN

Extrusion technology supplier **Davis-Standard LLC**, which manufactures large industrial blow molding machines, recently played a big part in helping a

blow molding customer develop new lightweight parts. The customer, Bowling Green, Ohio-based Pinnacle Plastic Products, is successfully using a hybrid process called Foamcore to mold parts with a solid skin and foam interior as a lightweight, economic, high-performance alternative to PU foams and carbon fibre parts. "Developed by Direct Link Solutions, Foamcore combines extrusion blow molding with a high-pressure steam chest molding process to produce a skin on a solid foamed part," said Mark Panaro, product manager of Davis-Standard Blow Molding Systems. "Pinnacle is using Davis-Standard accumulator head blow molding machines and controllers that use our own proprietary software to support this technology. The company is already producing parts for wheel chock applications, and is evaluating making automotive parts, including bumper systems, step assist rails, rear seat backs, load floors, and covers."

Kautex Maschinenbau GmbH recently unveiled the latest versions of its KBB series of extrusion blow molding machines, which the company said are well-suited for manufacturers of food packaging. The KBB200 and KBB400 all-electric models are specifically designed to produce stackable containers with hollow handles for holding everything from milk to oil. The two models, described as the first all-electric machines for this type of blow molded container, come standard with simple controls that are Industry 4.0-ready. Since the machine and auxiliary equipment are designed as plug-and-play modules, downstream components can be changed or added when necessary. Optional networked modules incorporate downstream equipment as an integral part of the primary machine.

New from **Milacron Holdings Corp.**, the third generation Uniloy M series all-electric shuttle blow molding machine is designed to produce bottles, containers, and technical parts, and can make products with capacities ranging from 100 ml up to 20 litres. Users can adjust clamping forces from 13.5 to 45 tons, strokes from 15.7 to 41.3 inches, and neck-cutting forces from 1.7 to 4 tons. The machines feature a new Mosaic+ touch interface — the first Uniloy machine with a larger touch-screen operator interface that will eventually be common to all Milacron injection and blow molding presses — a statistical processing control to manage production parameters, and a zero-backlash precision gearbox driven by an AC brushless actuator with an absolute encoder for high repeatability. The system's new motion design combines reliability with fast cycle times. Also, it uses only 0.12 kWh per lb of plastic processed.

Nissei's new ASB-70DPH/DB one-step injection stretch blow molding machine is designed for producing heat-stable containers for hot-fill applications. The unit is capable of molding a variety of containers, including jars and bottles, using a wide range of materials. Clamp daylight measures up to 27.6 inches. The model is a hybrid of some of the characteristics of Nissei's ASB-70DPH and HSB series machines; the new unit is based on the ASB-70DPH, but has been heavily modified to incorporate two sets of blow molds mounted on a servo-driven shuttle system. The ASB-70DPH/DB uses servo-driven hydraulic pumps to offer versatility, energy savings, and clean, quiet operations, Nissei said.

Photo Credit: Kautex Maschinenbau GmbH

Kautex Maschinenbau GmbH's KBB400 all-electric blow molding machine.

WRAP IT UP

Proco Machinery Inc. has introduced a new collaborative robotic half-cube palletizing system that automatically palletizes blow molded containers with minimal operator involvement. The system is described as a totally integrated packaging module, and is supplied with a six-axis collaborative robotic arm; infeed conveyor; pallet lift magazine; and slip sheet/tray pick-and-place magazine on a common sub-frame, which is fitted, in turn, with levelling pads and caster wheels. The system has a maximum height of 55 inches. "The only manual operation occurs when an operator places the trays in the magazine," said Siva Krish, Proco's vice president of sales. "The half-cube palletizer can be easily and quickly adapted to a variety of packaging and repetitive manufacturing situations, working alongside existing workers or working independently, and can be configured to pack all necks up or all necks down. And in situations where a standard configura-

Photo Credit: Proco Machinery Inc.

Proco Machinery Inc.'s collaborative robotic half-cube palletizing system in action.

tion doesn't suit a particular application, our engineering team can develop a custom-designed system to provide an efficient, cost-effective solution."

Sidel Inc. has upgraded its latest generation Matrix Combi blow molding machine line with the ability to apply the ACTIS plasma-coating barrier technology on PET bottles. Also known as Amorphous Carbon Treatment on Internal Surface technology, the barrier coating system deposits a thin layer of hydrogen-rich carbon inside a PET bottle that can triple shelf life and help reduce bottle weight by up to 20 per cent. The barrier solution was designed for smaller size or single-serve PET containers (typically less than 700 ml), and is especially useful for containers that will hold carbonated beverages or oxygen-sensitive substances such as beer and sauces. The upgraded Matrix Combi offers blowing, filling, and capping processes in one machine, Sidel said, optimizing the production line layout with a smaller footprint; and by offering faster changeovers with savings in power consumption, labour, raw materials, maintenance time, and spare parts, the Combi can lower operating costs by up to 12 per cent.

Taken as a whole, there's enough innovation here to cause LeBron to toss an airball or two. **CPL**

RESOURCE LIST

Amsler Equipment Inc. (Richmond Hill, Ont.); www.amslerequipment.com; 905-707-6704

Bekum America Corporation (Williamston, Mich.); www.bekumamerica.com; 517-655-4331

Boy Machines Inc. (Exton, Pa.); www.boymachines.com; 610-363-9121

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

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

Kautex Machines Inc. (North Branch, N.J.): www.kautex-group.com; 908-253-6012

Nissei Plastic Industrial Co. Ltd./En-Plas Inc. (Toronto); www.en-plasinc.com; 416-286-3030

Proco Machinery Inc. (Mississauga, Ont.); www.procomachinery.com; 905-602-6066

Sidel (Canada) Inc. (Laval, Que.); www.sidel.com; 450-973-3336

Uniloy Milacron Inc. (Tecumseh, Mich.); www.milacron.com; 517-424-8900

When it comes to drying mild to moderately hygroscopic materials, desiccant dryers are the undisputed champions. But within the desiccant world, the battle still rages between dual bed and twin tower designs or rotating "honeycomb" wheel models.

DESICCANT DECISION

By Mark Stephen, editor

A typical desiccant wheel.

Photo Credit: Novatec Inc.

Life is full of choices. Some are bad either way, like having to give up a bought and paid for seat with United Airlines or getting dragged off the plane. When it comes to resin drying, plastics processors have much better options. Molders have a range of dryers to choose from, including hot air, compressed air, infrared, and vacuum drying styles.

And then there are desiccant dryers. Desiccant is the magical material that filters the water molecules out of the drying air. Desiccant dryers pass hot air through a hopper full of resin to heat it and carry away moisture from the pellets to the desiccant bed, where moisture is adsorbed. The desiccant must be regenerated after each resin batch has dried, first by heating to around 350° to 400°F — or 175° to 200°C — to drive off moisture, then cooling to recover full adsorption capacity. Desiccant dryers can achieve the -40˚F dewpoint considered adequate for drying any hygroscopic resin — from mild to moderately hygroscopic materials such as ABS, acetal, acrylic, PC, and some TPOs, TPEs, and TPUs to strongly hygroscopic and difficult-to-dry materials like bottle-grade PET and nylons — which is why they account for about 80 per cent of the dryers in use, period, with typical drying residence times of between one to four hours, depending on the resin. They come in two basic styles: dual bed or twin tower designs with two or more desiccant beds, or models with rotating "honeycomb" wheel desiccants.

So if you're running moisture-absorbing resins, choosing a desiccant dryer is a textbook no-brainer. Less obvious, however, is which of the two styles to go with. We asked some of the experts to give us the pros and cons of each.

BED TIME

Dual bed and twin tower dryers were the workhorses of the desiccant drying world for decades, and were the most commonly purchased types of resin dryers by far, and there are thousands still in use today. The units consist of two beds (or towers) of desiccant beads, process and regenerative blowers, process and regeneration heaters, and valves to redirect the airflow. "While one bed of desiccant supplies dry process air to flow through the drying hopper, the other bed — with saturated desiccant — is regenerated by forcing hot air through it," said Mark Haynie, dryer product sales manager with Novatec Inc. "When the regeneration is complete, that bed becomes the one supplying the dry process air and the first bed goes into the regeneration mode." Dual bed dryers, which use molecular sieves in ball form with about 30 per cent clay binder, were typically used because they attain the all-important -40˚F dewpoint and generally do a good job of drying most hygroscopic resins. "Dual bed and twin tower dryers are reliable and work well, and we have customers that are extremely loyal to them and would never consider buying a desiccant wheel dryer," Haynie said.

A particular strong point of dual bed dryers, Haynie continued, is that they are not overly sensitive to excesses of dust and other volatiles in the air. And not just dust from a messy shop floor environment. "Volatiles can come off of some resins during the drying process," Haynie said. "Resins such as

PET, nylons, and PBT can emit significant amounts of these over time, and dual bed and twin tower dryers are more forgiving of these."

Dual bed and twin tower dryers may have been around for a long time, but critics say they have their weaknesses, beginning with high energy usage. "A dryer's regeneration system should minimize the energy used to heat the desiccant material while dedicating most of the energy to removing the moisture gained during the drying process," said Jamie Jamison, drying product manager with Conair Group. Conair has abandoned selling a desiccant bed dryer in favour of the wheel; the company's latest offering, the MedLine Micro-Wheel dryer, is said to be one of the smallest desiccant wheel dryers available. "Dual bed dryers are not very energy-efficient because they use beaded desiccant with a 30 per cent clay binder, which absorbs a lot of energy in the regeneration process," Jamison continued.

Makers of dual bed dryers dispute this. "The regeneration heater on a wheel dryer stays on almost constantly, which is a big energy draw," said Charlie Sears, president of Dri-Air Industries Inc. "With dual bed and tower systems, the regeneration heater is only running, on average, for about one-third of the cycle, so they use less energy." They also note that today's dual bed and twin tower dryers offer additional energy savings and better performance compared to earlier models. Wittmann's DryMax series dual bed desiccant dryers, for example, are said to offer reduced energy costs by particularly fast dehumidification of the desiccant beds during the regeneration phase.

Second, the critics say, dual bed and twin tower units have relatively high maintenance due to the number of moving parts and desiccant replacement. Here again, companies such as Wittmann have tried to streamline maintenance by eliminating almost all moving parts.

Third, critics charge that dual bed and twin tower dryers are subject to spikes and deviations in temperature and dewpoint during bed changeover or as the towers switch; and that these prevent the dryers from reaching the ultimate goal: a continuous process. "These spikes are inevitable to some extent with multi-bed dryers, and can have negative impacts, depending on the pellet," Jamie Jamison said.

But some manufacturers of dual bed and twin tower dryers have now developed features that can reduce the spikes to which older desiccant beds were prone. "Today's dual bed dryers have monitoring technology that ensures

that, when they do shift from one desiccant bed to another, the temperature variation is negligible: only about 1˚F," said Charlie Sears. Desiccant bed suppliers like Dri-Air Industries, Una-Dyn, and Wittmann also offer closed-loop regeneration and cooling — either standard or optional — with dry air to prevent preloading the desiccant with moisture from ambient air. New from Una-Dyn, the U.S. arm of Piovan SpA, the Vantage dual bed desiccant dryer is said to virtually eliminate temperature spikes, for example. "The off-line bed is cooled so that process temperatures are not affected during bed changeovers," Una-Dyn said.

And when it comes to dewpoint spikes, the problem might be exaggerated in the first place. A low dewpoint reading is good, but this doesn't mean your resin is dry — just that the air is dry and has the ability to dry your resin. "Some dryer makers have units that can reach a dewpoint of –131ºF, but it's very expensive to do so and almost always unnecessary," said Mark Haynie. "Dewpoint is only important when drying PET or PETG, because these materials require moisture levels of between 20 to 50 parts per million instead of 200 parts per million for other resins. But PET and PETG molders almost always use desiccant wheel dryers."

WHEEL OF FORTUNE

Dual bed dryers employ two desiccant beds to limit the batch drying process to the roughly four hours required to extract moisture. Wheel dryers, by contrast, use molecular sieve desiccant formed into a continuously rotating wheel that constantly brings fresh desiccant on-line while the rest of the wheel is being regenerated and cooled. This continuous process means there is less variation throughout the drying cycle because there is internal cooling after desiccant regeneration and bed changeover is eliminated — which is why des-

Photo Credit: Piovan SpA

The new Vantage dual bed desiccant dryer from Una-Dyn.

iccant wheel dryers have become popular picks for many applications.

A big advantage to desiccant wheel units, some say, is lower energy consumption. "The energy efficiency of the wheel dryer is the result of having three times the amount of pure desiccant per minute than in a twin tower dryer," Mark Haynie said. "On average, we estimate that a Novatec wheel desiccant dryer uses 25 per cent less power than a conventional system." A recent improvement is Piovan's "Intelligent Material Drying" system for its HR series wheel dryer that optimizes and adjusts energy utilisation to prevent material thermal degradation or over-drying. As we've seen, however, lower energy usage is a point that dual bed and twin tower dryer makers dispute.

A second benefit of the wheel, some dryer makers say, is longer desiccant life — up to 7.5 times longer. "The desiccant beads in conventional dryers are only 70 per cent desiccant, and the heating and cooling that beads undergo each time the desiccant is regenerated cause expansion and contraction that break down the binder; ultimately the beads are reduced to dust and must be replaced with fresh beads while the dryer is offline, usually every two years," Mark Haynie said. "By contrast, Novatec guarantees a 5-year working life for its desiccant wheel, and the lifetime can extend to as much as 15 years."

Third, wheel dryers are typically compact units with few moving parts. "Depending upon the model size, wheel dryers use between 40 to 60 per cent less floor space than dual bed dryers of comparable throughputs, primarily because of the compact design of the wheel and the elimination of the need for a second supply of desiccant," Jamie Jamison said.

In the end, it's a safe bet that the coexistence between dual bed and twin tower desiccant dryers on the one hand, and desiccant wheel dryers on the other, will continue in the future, with each supported by its base of loyal users. It's a customer satisfaction story that United Airlines could take a lesson from. **CPL**

RESOURCE LIST

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

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

Novatec Inc./Maguire Canada (Vaughan, Ont.);

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

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

Wittmann Canada Inc. (Richmond Hill, Ont.); www.wittmann-group.com; 905-887-5355

Are you ready for RECYCLING 4.0?

It took a while, but the plastics recycling industry is finally joining the smart factory revolution.

By Mark Stephen, editor

Industry 4.0 gets almost as many headlines these days as Trump. Heralded as the fourth industrial revolution, in which equipment will be given the ability to share information and generate data, it's meant to bring a major step forward in manufacturing productivity, on par with the Industrial Revolution of 200 years ago.

And it's not just hype. In our own industry, manufacturers of plastics processing machines and related equipment in Europe and North America have been adding advanced controls, sensors, and easier-to-use software to their products, allowing machines of all types to pump out data that can be accessed by everyone involved in keeping a plant running.

Except, it seemed, for plastics recycling equipment, which remained stubbornly outside the smart factory loop. Until now, that is. Recycling machinery manufacturers, and suppliers of related size reduction technologies, have recently begun offering their customers Industry 4.0 enhancements. So let's all salute the coming of Recycling 4.0.

INTEGRATION IS IN

Erema is one of the first companies in the plastics recycling industry to present a smart factory package for both recyclers and producers. "Traditionally, recycling has been looked on as part of waste management and kept separate from processing," said Martin Baumann, Erema's vice president of sales for North America. "This philosophy is changing, and recycling equipment is now becoming part of the production flow. With our smart factory package, we want to give customers the chance to integrate recycling into the manufacturing process, with the ability to monitor it and share data with processing machines." Erema's Industry 4.0 enhancements consist of four components, with its established Intarema system forming the basis for the further smart factory applications. In addition to the previous machine data, specially integrated sensors — the QualityOn package — can be used to record and evaluate melt volume flow rate and colour. "The QualityOn package enables recyclers and producers to make their recyclates with consistent quality in accordance with the requirements of their customers, and document them transparently using online data acquisition and analysis," Baumann said. "Recipes recorded electronically can be compared with each other and modified."

In order to make use of the vast amount of machine, quality, and process data in a worthwhile and user-friendly way, Baumann continued, Erema has developed a new manufacturing execution system called re360. "With re360, recyclers can keep track of the productivity of an entire range of machinery in five modules," he said. "The system can be used on machines furnished by suppliers beyond Erema." Additionally, re360 displays in real-

time any upcoming maintenance work and the replacement of individual parts. "A key benefit of re360 is that it works independently of the plant manufacturer," Baumann said. "Customers can integrate not only different systems, but also their global production locations."

EQUIPMENT MAKERS GET WITH THE PROGRAM

Some of the processing and auxiliary equipment manufacturers that embraced the spirit of Industry 4.0 years ago, with equipment that shared information and generated data, are now adding recycling to their newest smart factory packages. For example, Wittmann's "Plug & Produce" interface, which is part of the "Wittmann 4.0" communication system, uses a uniform software platform that allows recycling equipment to be integrated with a processing machine and the other peripheral systems in a production cell; the working cell can then be integrated into a customer's network via a single IP address, Wittmann said.

Manufacturers of traditional size reduction machinery that cross over into recycling are also introducing smart factory adaptations. Available in Europe, Vecoplan LLC's LIVEService provides the ability to monitor and control – sometimes automatically – PLCs, HMIs, and VFDs, and by establishing communication between control points, achieves optimized online error analysis, detection, and elimination. LIVEService employs online features, such as specific analysis tools, l-cam, AlarmManager, SmartGlasses, remote online connections, chat, a conference centre, data analysis, cloud platforms, apps for Apple and Android devices, real-time data collection, and Internet-of-Things compatibilities. "LIVE-Serivice allows analysis, identification, and resolution of errors online," said Bill Davidson, Vecoplan's vice president of operations. "It maximizes uptime, minimizes downtime, and ensures and optimizes ongoing production processes. As an online tool, the Vecoplan LIVEService is tailored to the requirements of complete implementation of Industry 4.0."

And because the tool is based fully online, Davidson added, Vecoplan's service team can provide quick support anytime and anywhere in the world. "We're currently investigating the needs of the North American market to determine which LIVEService features will provide value to our customers here," Davidson said.

Additionally, Vecoplan has been partnering for years now with shredder and granulator maker Rotogran International Inc. to merge size reduction equipment into a two-stage smart factory approach, and this carries over into recycling. "Both the Vecoplan and Rotogran units in a two-stage system use sensors to self-adjust to process the right amount of material, and they also communicate with each other to make sure the size reduction of recyclate runs efficiently, without either underfeeding or overfeeding," said Rotogran president Mike Cyr.

So the odds are good that the plastics recycling industry at large will continue adding more Industry 4.0-themed systems to their equipment. As Trump and his supporters demonstrated, it's almost impossible to stop a revolution once it gets going. **CPL**

RESOURCE LIST

Erema North America Inc. (Ipswich, Mass.); www.erema.com; 978-356-3771

Rotogran International Inc. (Toronto); www.rotogran.com; 905-738-0101

Vecoplan LLC (Archdale, N.C.); www.vecoplanllc.com; 336-447-3573
Greg Parent; 416-678-0154

Wittmann Canada Inc. (Richmond Hill, Ont.); www.wittmann-group.com; 905-887-5355

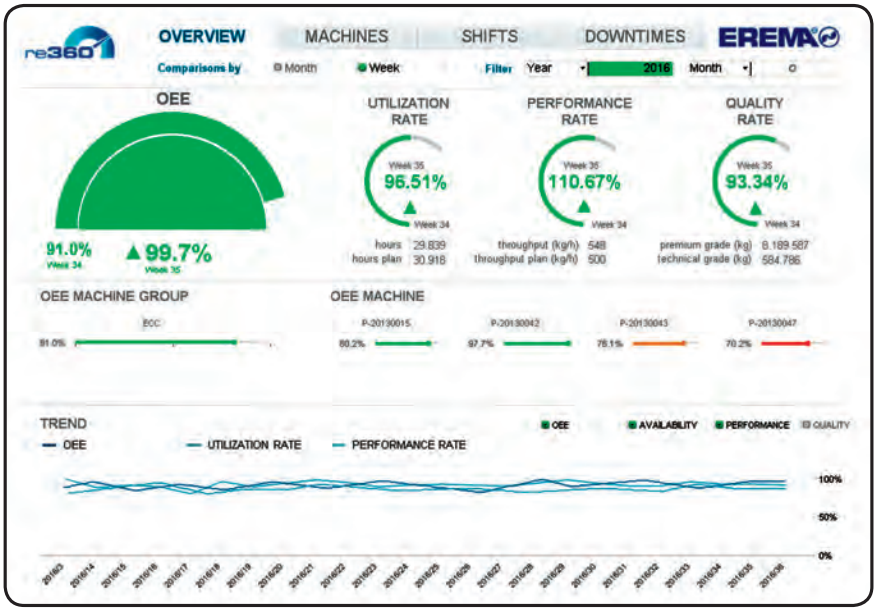


Photo Credits: All photos courtesy of Erema

Erema's re360 manufacturing execution system doing its thing.

Getty Images

PLASTICS RECYCLING IN CANADA rises slightly

Post-consumer plastics packaging recycling in Canada is increasing, albeit just slightly, according to new statistics.

The results of a new survey by the Canadian Plastics Industry Association (CPIA) show a 0.4 per cent increase in the amount of post-consumer plastic packaging recycled in 2015 compared to the previous few years.

At least 322 million kgs (710 million lbs) of post-consumer plastic packaging were collected for recycling in Canada in 2015, CPIA said. That's up 1.3 million kgs (2.9 million lbs) from the year before.

The results come from a voluntary survey sent to reclaimers, exporters, brokers, material recovery facilities, and others that handle recycled plastics, the Toronto-based trade group said.

The increase was driven by HDPE bottles, which increased by 5.7 million kgs (12.6 million lbs), and which offset a decrease of 4.4 million kgs (9.7 million lbs) in all other categories combined, CPIA reported.

The types of plastic packaging covered by the report include bottles; non-bottle rigid plastics such as deli, dairy, bakery, and produce containers; and flexible film.

The report, available at www.plastics.ca, was prepared by Moore Recycling Associates, which recently changed its name to More Recycling. **CPL**

Evan Goodwin on the Vector Injection shop floor.

VECTOR INJECTION is worth the drive to Acton

When it comes to making small machines, this Ontario-based injection molding and assembly technology supplier has some big ideas.

By Mark Stephen, editor

A celebrated advertising tagline in Southern Ontario for the Olde Hide House leather emporium says it's worth the drive to Acton.

A new injection molding and assembly technology supplier located in the same town, about 70 kms northwest of Toronto, wants to make the trip worthwhile for plastics processors too.

Vector Injection was founded in 2014 by Evan Goodwin — a mechanical engineer with almost 20 years of experience in the medical part molding and hot runner industries — with a very specific goal: to design custom injection molding machines and mold-mounted injection units for processors that want a more personalized touch than large, volume-driven machinery makers can deliver.

"In my previous jobs, I saw many applications in which part design was forced to fit with existing equipment that was actually oversized for the part and not ideal," Goodwin said. "I wanted to take the opposite approach: to start with the finished part and then design the best and most efficient machine possible to produce it."

And the more complicated the part design, Goodwin continued, the more benefits this part-centric strategy can deliver. "With a two-component part, for example, we'll ask ourselves which part it makes sense to shoot first," he explained. "We might determine that the best approach is to mold a small TPE shot first and then shoot the hard substrate underneath as the second step."

It's an audacious new paradigm, for sure, and Vector has a two-pronged approach to implement it. "On the one hand, we're building our own stand-alone all-electric machines according to each customer's requirements," Goodwin said. "On the other, we're building standard, compact mold-mounted injection units for integration with existing larger machines — such as a smaller 100-gram-shot-volume 5 ton injection unit to integrate with a 2,000 ton press, for example. In these instances, our unit is small enough to fit within the existing machine guarding, which is a key benefit for smaller custom mold shops where floor space is at a premium."

UNIQUELY CANADIAN

Small injection units are one of Vector's hallmarks, in fact. "All of our injection units are half the weight and half the size of what's available on the market now," Goodwin said. "We

Photo Credit: Vector Injection

Injecting secondary shot material with a mold-mounted injection unit allows for maximum manufacturing flexibility with minimal use of floor space. The mold in this photo, with an X-40 mounted injection unit, can run in any single-screw injection molding machine with the entire assembly positioned inside the molding machine guarding.

can also get away with smaller, more efficient molds by strategically placing one or two injection units. The entire molding cell therefore becomes more manageable. It's a modular, flexible approach that allows us to deliver whatever configuration the customer requires."

Vector's staff size is small, too, but that doesn't mean the firm is lacking in resources. "We outsource whenever possible, which gives us access to the right people while allowing us to remain lean," Goodwin said. "At the end of the day, however, all of our injection molding machines are assembled on-site by our team."

To date, Vector has supplied machines to American customers for molding automotive parts, consumer goods, and medical devices. "We've had a narrow, export-driven focus until now, selling equipment exclusively into the U.S., but we're now looking to break into the Canadian market — it's the natural next step for us," Goodwin said.

The company has already achieved a first in Canada. "There are only two other companies in the world that I know of that are building small custom injection molding machines and automation in the manner that we are, and neither is Canadian," Goodwin said.

Having found its niche and exploited it south of the border, Goodwin is confident Vector can satisfy the requirements of injection molders closer to its home turf. "We're a young team with a lot of vision and growth potential," he said. "The big injection molding machine makers are focused on volume, and don't give much attention to custom machines. We have the solutions to help molders with special needs."

So now it's *really* worth driving to Acton. **CPL**

ADVERTISEMENT: TIPS

Recently a technical challenge was presented to us. The Customer had built a mold for polycarbonate. The parts were sticking in the mold and were cracking @ the weld lines upon ejection. Using ASTM D1238 (300°C 1.2 kg.) we compared the flow of the virgin pellets and the molded part. The molded part has to be nibbled/cut up to make "pellets" pieces small enough to enter the orifice of the melt index machine. ASTM International evolved from the railroad industry in 1898. At this time the there was a need to create a standard for the steel to make the rails for the railways. After 1961 the acronym ASTM stood for the American Society for Testing and Materials. In 2001 the name was changed to ASTM International. This entity has test methods that are published that include plastic testing. ASTM D1238 is a standard test method for Melt Flow. Since it is a regimented test the test can be duplicated from lab to lab across the world.

D1238 uses a Melt Index machine. The temperature is accurate and the cylinder diameter and orifice precise. A Melt Index machine is a precise instrument.

The melt flow of the virgin pellets was 20 grams per 10 minutes. In the case of virgin pellets we like to dry the material @ 250°F for 2-4 hours to a moisture content of 0.3% by weight. The rationale here is to ensure that we are on an even playing field. Moisture can affect the flow of polycarbonate. This doesn't mean we dry the polycarbonate today and run the test tomorrow. After drying polycarbonate in lab conditions of a relative humidity of 50% and a lab air temperature of 23°C the polycarbonate will absorb moisture. We have to take the dried polycarbonate from the oven and charge the melt index machine straight away. The Melt Index machine is charged with dried polycarbonate. The piston with the precise weight (in this case 1.2 kilograms) is loaded above the "charge". The material will commence flowing from the orifice @ the bottom of the cylinder. Simultaneously the extrudate is cut and a stop watch is started. After 10 minutes the extrudate is cut and weighed; hence grams per 10 minutes. However in reality the test is run for a minute and then the weight of the extrudate is multiplied by 10. The test is run several times to obtain an average.

The test was replicated with the cut pieces from the molded part. The resultant melt flow was 44 grams per 10 minutes.

This tells us that there has been a change between the virgin pellets and the material in the molded part. Is this change significant? There is a direct relationship between the flow of polycarbonate and molecular weight. The term molecular weight means the weight of the molecule. It also means the length of the molecule. Note that the Polymer Chemist when he/she refers to molecular weight they are referring to the molecular weight average. In a given pellet there will be different molecular weights or lengths of molecules. Manufacturers of polycarbonate try to keep the molecular weight average range as tight as possible. Molecular weight is used versus molecular length to describe the molecule as often polymer molecules are branched. Polymer molecules are not linear. Under a very powerful microscope such as an electron microscope the polymer molecules may look like helical coils/springs. In the molten state, the longer the polymer molecules the more entanglement. This entanglement gives rise to resistance to flow. Longer molecules don't flow as well as shorter ones.

In the "frozen" state the longer the polycarbonate molecules the tougher the molded part. In other words there is a direct relationship between molecular weight (length), flow and toughness. For example a part made from a 10 melt polycarbonate is tougher than a part made form a 28 melt polycarbonate. Cooler polycarbonate water bottles are made from branched 3 melt polycarbonate. This polycarbonate is very tough and has very high resistance to flow in the "melt" state.

The Customer's parts were not tough. The Customer's parts were sticking in the mold. The Customer dried the material @ the recommended temperature and time. Since polycarbonate will suffer hydrolytic attack @ process temperatures if moisture is present; meaning water will react with the polycarbonate @ process temperatures and cause chain scission; breaking of the molecules or a reduction in molecular weight/length. This is a random event. The resultant molecules are not uniform in length. Very small molecules flow easier than the longer ones. Subsequently the part was packed, really packed and believed to be the reason for parts sticking. The resultant polycarbonate caused by hydrolytic attack has variations in flow. Shot to shot the material will exhibit different flows.

In the cited case the moisture is not due to lack of drying. Where is the moisture coming from? Polycarbonate is a hydrocarbon like gasoline is a hydrocarbon. When gasoline is burnt water is produced. Observe tail pipes of a car in the winter time. When polycarbonate is burnt water is produced. The burning is caused by shear. Polycarbonate is very shear sensitive. The degradation may not exhibit discoloration. The mold needs to be designed with sprues and runners that are relatively large in diameter. Let's say relative to nylon. Polycarbonate is in the thermoplastic category of amorphous. Nylon is in the thermoplastic category of semi-crystalline.

Nozzle tips need to be "dressed" for polycarbonate. The nozzle orifice needs to be 0.030 inches smaller than the sprue bushing opening. The land length should not be longer than 3/16th of an inch. The inside of the nozzle (orifice body) should not be tapered for polycarbonate. The transition from body to land smooth. The intersection between the start of the land and the orifice body should be bull nosed. A nozzle should be designed for the mold. It should stay with the mold. It is important as the sprue. It can be unique to the particular mold. When you buy a nozzle tip you need to "dress it" or get the Manufacturer to give you the desired tip internal configuration. Viscosity is very sensitive to shear rate. Changing from one diameter of pipe (large) to another diameter of pipe (smaller) (essentially body of tip to land of tip) results in a velocity increase and a temperature increase. Too much temperature and degradation occurs.

For additional information on Polycarbonate processing please don't hesitate to contact Richard Pounds.
rpounds@ poundsofplastic.com or 905-286-9894 ext. 22.

POUNDS of PLASTIC

IPL'S CART BUSINESS KEEPS ON ROLLING

IPL's organic wheeled cart.

Top: On the shop floor in the Saint-Damien plant.

This Quebec-based injection molder exited the auto parts molding business and, led by its production of wheeled carts, is now killing it as one of North America's leading suppliers of products for the environmental, bulk food, and retail sectors.

By Mark Stephen, editor

It's not easy to reinvent yourself. Arnold Schwarzenegger has pulled it off, going from Austrian bodybuilder to California governor to his current role as TV pitchman, but he's the exception.

IPL Inc. is another exception. Go back less than 20 years and the Saint-Damien, Que.-based firm was big into molding parts for the automotive and non-automotive transportation markets. Fast forward to today and IPL has completely exited the automotive market and transformed itself into one of the leading North American producers of injection molded plastic products for the environmental, bulk food, and retail sectors. It employs more than 800 people across five separate facilities in Canada and the U.S., and manufactures over 400 products for the North American market.

And it's a metamorphosis that's been accomplished with a clarity of purpose that might surprise you, given the fact that IPL has had several ownership and management changes along the way.

CHANGING HANDS

Established in 1939 as a family-owned firm, IPL molded parts for Tier 1 and Tier 2 automotive suppliers and also snowmobile components for Bombardier until the mid-2000s, when it started shifting its focus to manufacturing products for the food and industrial sectors. The company remained family-owned until 2010, when it was purchased for $94 million by Quebec-based private equity firm Novacap and Quebec provincial capital investment fund Fonds de solidarite FTQ. By this time, IPL had four plants — three in Quebec and one in New Brunswick — and its newfound focus on environmental, bulk food, and

Photo Credits: All photos courtesy of IPL Inc.

retail continued under the new ownership. And it remained the focus after Dublin, Ireland-based environmental services and plastics operator One51 bought a controlling stake in IPL for $280 million in 2015.

Today, IPL consists of two segments. "The first is our retail packaging division, which is supported by two plants: one in Edmundston, N.B. and one in Missouri," said Paul Palazzo, vice president, sales and marketing of IPL's environmental division. "The second is our industrial division, based out of Saint Damien, which manufactures our environmental and bulk packaging products." The two exist as surprisingly distinct business units. "There is definite separation between the retail packaging and the industrial divisions," Palazzo said. "We're vertically integrated on both sides, with support groups for each, but have many synergies between both. We share corporate resources, but are separate as far as strategic planning and customer focus are concerned."

In the two years since One51 assumed majority ownership, IPL's footprint in both the retail packaging and industrial sectors has expanded dramatically. The industrial segment in particular is lighting it up. In November 2016, IPL acquired U.S.-based rigid plastic packaging supplier Encore Industries Inc. for US$35 million, in a bid to boost its industrial product offerings by drawing on Encore's strength south of the border. "Encore has facilities in Ohio, Georgia, and Minnesota, and bringing the firm into IPL provides expansion opportunities in the growing North American plastic industrial packaging market, and delivers a high-quality and complementary customer base that will provide cross-selling opportunities for IPL and Encore's products," Palazzo said. "The acquisition makes us the third largest player in America in the plastic injection molded products market."

More recently still, in May 2017, IPL acquired rigid plastic bulk bin manufacturer Macro Plastics Inc. for US$150 million. Headquartered in Fairfield, Calif., Macro operates three manufacturing facilities in California, Washington, and Kentucky. "This acquisition gives us our first significant presence on the U.S. West Coast, and also expands our geographic reach, product portfolio, and customer base across the growing South American market," Palazzo said.

FROM CARS TO CARTS

Since before IPL was sold to Novacap and Fonds de solidarite FTQ, it was making a name for itself as a molder of HDPE wheeled carts for municipal, commercial, and industrial recycling and solid waste and organic management for a variety of Canadian municipalities. "The environmental

segment of IPL's industrial division began making carts for various municipalities in Quebec in 1992," Palazzo said. "As more cities started to move towards single-stream recycling and source-separated organics, we saw an opportunity for growth, and this was the main reason we exited automotive parts production in the mid-2000s. We've now evolved from being a small player to a major supplier of carts, and are the only cart manufacturer in Canada."

It's a market segment that has spurred IPL towards some of its biggest contracts and most innovative achievements. Last year, IPL pushed the limits of manufacturing and distribution in delivering an important $45 million project for the Regional Municipality of Peel, the second largest municipality in Ontario. In only three months, IPL delivered over 1.2 million rolling carts and kitchen containers to 317,000 homes in the cities of Brampton and Mississauga and the town of Caledon. In order to efficiently distribute the carts to the 317,000 homes in such a short time, IPL used a new technology utilizing smart phone scanning. Every produced cart was initialized with a unique chip containing the cart's serial number, GPS coordinates, and home address files. By using radio-frequency identification technology, the delivery team knew exactly where and how to deliver each cart, and the management team monitored the delivery process in real-time. "The project allowed us to position ourselves a notch above any North American competitor," Palazzo said. "Not only were we faster and more efficient, but the technology used in this project will also help us manage the region's ongoing growth and the maintenance and service agreement that's part of the project."

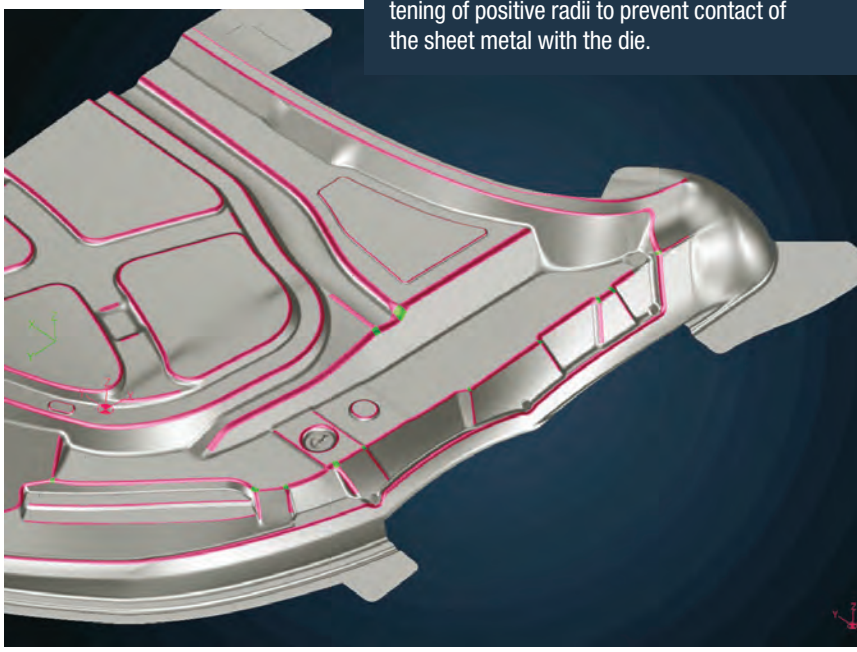
And in April 2017, IPL won a major contract for providing organic wheeled carts to the city of Calgary. The contract, worth $13 million, includes key production and delivery of 325,000 organic rolling carts intended for the implementation of a new composting program beginning in the summer of 2017 in all single-family homes in the city.

If IPL industrial division's recent successes with its contracts with Peel region and the city of Calgary are any indication, its goal of pushing into the U.S. and beyond is definitely doable. "We've been winning bids in the Canadian market because of our approach, which is very customer-oriented," Palazzo said. "And since we're not the biggest player in the market, we can be more flexible; we're very nimble and responsive, and we don't have a large bureaucracy to slow us down."

So don't be too surprised if IPL makes as big a splash in America as Schwarzenegger. **CPL**

Software STEPS UP

Design and engineering are key to building a better and more cost-effective mold with shorter lead times. And moldmakers don't exactly have to wing it. The latest CAD/CAM and data management software can help overcome the challenges faced with data, quoting, designing, programming, and CNC machining.



Tebis America Inc.'s Version 4.0 Release 2 CAD/CAM software has an extended "Act-Surf/Reduce" function for convenient flattening of positive radii to prevent contact of the sheet metal with the die.

Image Credit: Tebis America Inc.

By Mark Stephen, editor

Machining a mold without the right software to guide you is like building a skyscraper without a blueprint. If you don't want to have to guess about data, quoting, designing, programming, and CNC machining, consider some of the latest engineering software tools for moldmakers.

A big development in the software world occurred last year, when **Autodesk** brought together Delcam, HSM, Netfabb, and Majestic Systems as a portfolio of solutions for both additive and subtractive manufacturing, spanning CAM, additive manufacturing, composites, robotics fabrication, factory layout, inspection, and modelling. Within the portfolio offerings are cloud-connected capabilities that give customers improved support for global manufacturing operations with universal access to software and data, and the cloud also enables fast and frequent software upgrades. The manufacturing portfolio contains Autodesk HSMWorks, which is a fully integrated CAM solution for SolidWorks that allows users to get up to speed and become productive within minutes using familiar tools and workflows; Autodesk Inventor HSM, which can assist CNC programmers, designers, and engineers to rapidly produce machined parts designed in virtually any CAD system; Autodesk Netfabb, which contains all the software necessary to reduce costs, increase efficiency, and improve part performance in additive manufacturing and 3D printing; and Fusion 360 — the centrepiece of Autodesk's cloud-based product innovation platform — which combines CAD/CAM and CAE in a single package, allowing users to take their designs all the way to production with 3D printing capabilities and HSM-powered toolpath technology for two- through five-axis milling machines, turning centres, and waterjets.

Vericut 8.0 from **CGTech** features several new enhancements designed to increase the user's ability to analyze, optimize, and document CNC programming and machining processes. Self-guided training sessions launch from the welcome screen and automatically open the associated sample files. The software can translate models by selecting solid model features, which eliminates the need to create coordinate systems for positional information. It offers enhanced modelling options that provide greater control and flexibility over moving individual models, assemblies, and component origins, reducing time to model machines, especially from 3D CAD model assemblies. A new "ribbon bar" allows users to quickly select a desired function, and updates to show the options available for any given tab. And users can now also optimize "Air Cuts Only" (off-part milling cutter motions) as a capability included with the software's base verification license; this new method is intended as an easy-to-use, entry-level method of optimizing NC programs.

FRENCH CONNECTION

France-based **Missler Software** recently introduced the new 2017 version of its TopSolid'Cam CAD/CAM software. In addition to improved performance for large molds containing more than 2,000 parts, the program has a new "pre-study" mode that enables the overall job of creating the mold design to be split among multiple designers, with one

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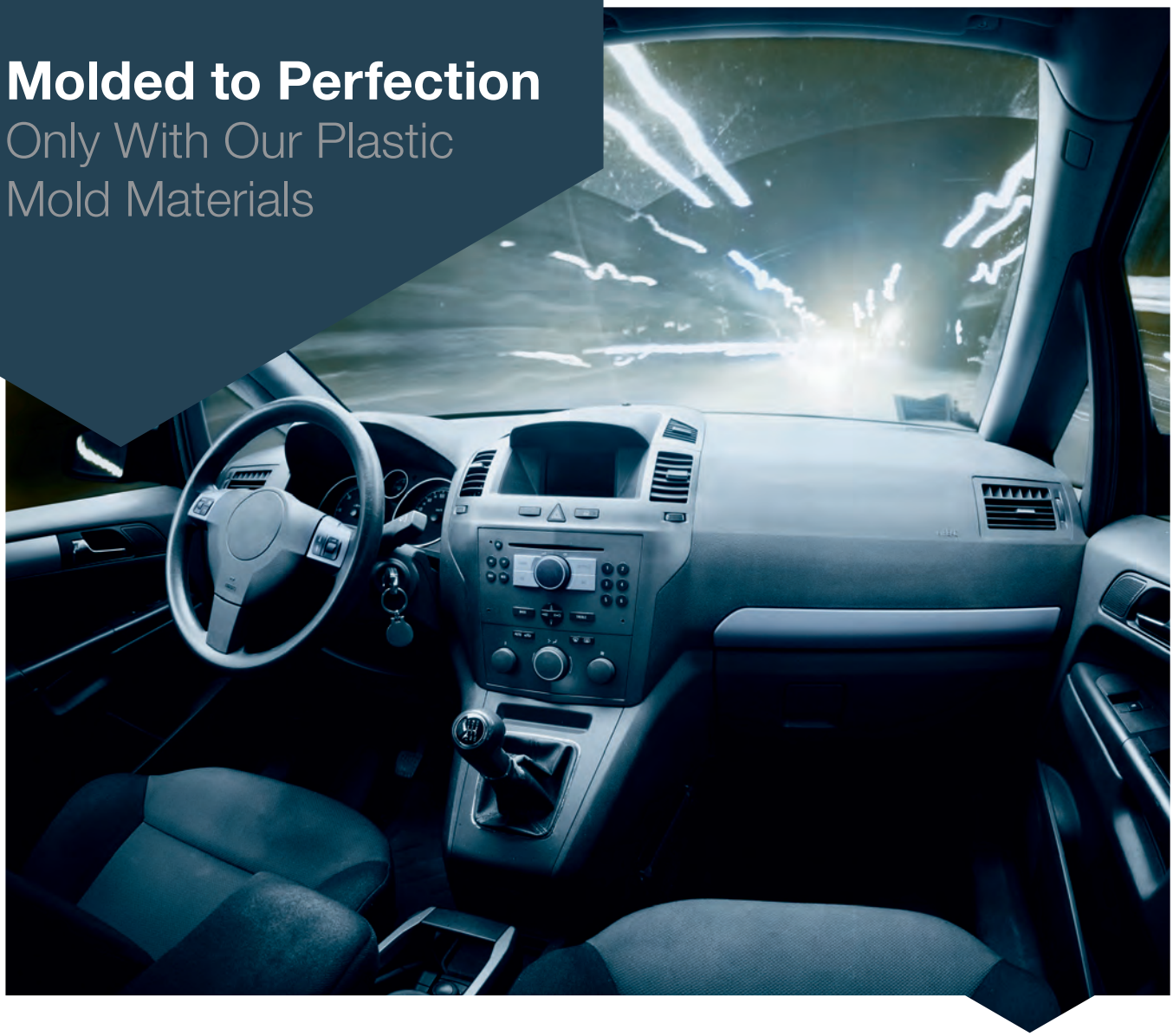

With over 160 years of steel production experience backing their brands, SCHMOLZ + BICKENBACH is not only a pioneer, but also a market leader in specialty steels. Their comprehensive range of products allows you to choose the ideally suited mold material for your application. In addition, an extensive range of value added services provides you with more alternatives from one source, SCHMOLZ + BICKENBACH.

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designer working on the parting lines, parting surfaces, and general core/cavity splits, while another designer works on the mold base and cooling layout. The integrated product data management environment keeps all tasks in perfect synchronization, the company said. This version provides access to an expanded standard library that now includes Misumi, Futaba, Pedrotti, and Progressive Components. Additionally, in an effort to allow more freedom during the design process, it's now possible to directly define the bill of materials numbering sequence directly from any level of the design, which speeds up the documentation side of mold design.

Designed for tracking the performance, maintenance efficiency, and repair costs of tooling, **MoldTrax** software — originally updated in 2014 — is now available in a cloud-based platform, enabling maintenance managers and technicians to more easily report, store, and access critical data through virtually any internet-connected device. Users can select from drop-down boxes to describe issues and fixes, and can also attach images to the documentation. Features include a parts inventory system, a tips section for easy access to manifold maintenance and repair instructions, and a report that provides reminders about upcoming and overdue maintenance.

Version 2017.1 of **Open Mind**'s hyperMill CAM software includes enhancements to the Maxx Machining finishing module, allowing combined semi-finish and finish passes, and also providing more control over the contact point location on conical barrel cutters. This version also provides a new adaptive pocketing routine as an extension to the optimized roughing cycle. With this option, the software identifies embedded circles or rectangles within general pocket shapes; these regions are then optimally machined, and remaining regions are treated as automatic rest areas. According to the company, toolpath motion is improved, machining cycle times are reduced, and impact on the machine tool is lessened. The new release also offers a number of new functions and expansions for 2.5D and 3D machining, including supporting cutter radius compensation when using 2D thread milling and 2D helical drilling strategies. If the tool radius changes, hyperMill automatically adjusts the programmed path. The user has two options for how this adjustment is made: the compensated path option or the compensated centre path option.

ROUGH STUFF

Tebis America Inc. has launched its Version 4.0 Release 2 CAD/CAM software for tool, die, and mold manufacturing. This version is said to be especially well-suited to rough machining of deep cavities, and also effective for hard-

material machining. In roughing, the company said, the depth of cut and the best utilization of cutting data ensure fast and cost-effective manufacturing while keeping tool costs low. The tool path automatically adapts to the geometry without full-width machining, and the integrated re-roughing counteracts the formation of larger steps in steep boundary areas. These areas can be machined from bottom to top with a smaller depth of cut. The new Version 4.0 Release 2 also has an extended "ActSurf/Reduce" function for convenient flattening of positive radii to prevent contact of the sheet metal with the die; and has an extended list with known machine conflicts integrated in the CAD/CAM software for quick access.

3D Systems has released Version 13 of its Cimatron software, featuring a broad range of new CAD for tooling functionalities for faster design, including direct modelling, new mesh operations with hybrid modelling capabilities, and enhanced assembly functions; boosted drafting capabilities, including the dynamic creation of multiple views and the ability to create shaded views; new mold design applicative tools, including gates design for a more streamlined design process, and conformal cooling tools for the easy design of curved cooling channels that shorten injection cycle times and prevent part warpage; separate environments for progressive and transfer dies for quick design of any die type; smart electrode mirroring tools and hybrid design environments that offer accelerated electrode design with automated solid tools; a new plate machining solution that provides a complete set of capabilities for fast, efficient, and automated programming of mold plates and die plates; and new measurement on CNC machines to define the measurement probing cycle in the NC environment, which allows validation of the machining process while the part is on the machine.

So, if you haven't already, quit building skyscrapers without a blueprint; make it easier on yourself by using some of the latest design and engineering software. **CPL**

RESOURCE LIST

Autodesk Canada Company (Toronto); www.autodesk.ca; 416-362-9181
CGTech (Irvine, Calif.); www.cgtech.com; 949-753-1050
Missler Software/DDS Software Solutions (Windsor, Ont.); www.thecadcamguys.com; 226-346-8398
CAD-CAM Services (Boisbriand, Que.); www.cad-camservices.com; 450-979-8877
MoldTrax (Ashland, Ohio); www.moldtrax.com; 419-281-0790
Open Mind Technologies USA Inc. (Needham, Mass.); www.openmind-tech.com; 888-516-1232
Tebis America Inc. (Troy, Mich.); www.tebis.com; 248-524-0430

AUXILIARY EQUIPMENT

Vacuum dryer with doubled throughput

The new *VBD 300* vacuum dryer from **Maguire Products Inc.** is designed to enable more molding and extrusion processors to obtain the substantial advantages of vacuum dryers over conventional desiccant systems, including lower operating cost, increased efficiency, and greater control over the drying process.

The VBD 300 achieves throughputs of up to 300 lbs (136 kg) per hour, which is double the capacity of the company's VBD 150 model. While the VBD 150 is sized for the throughputs of many injection molding machines and of small extrusion lines like those for medical tubing, the new VBD 300 model opens the benefits of vacuum resin drying to a broader range of applications. Maguire also offers the VBD 1000 dryer for high-volume operations.

In comparison with desiccant dryers, the VBD vacuum dryer consumes 60 per cent less energy, dries resin in one-sixth the time, and substantially reduces the heat history to which polymer is exposed. The speed with which the VBD system removes moisture makes properly dried polymer available for production only 35 minutes after a cold start.

Like other VBD models, the VBD 300 dryer is a gravimetric system that employs load cells that precisely monitor the weight of material at two critical points, making possible precise control over material consumption and documentation of process conditions for certification to customers. Use of load cells also enhances control over the drying process.

The VBD 300 dryer also has an intuitive, easy-to-use touchscreen controller that allows operators to manage all drying parameters from just one screen; and comes with a five-year warranty.

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

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

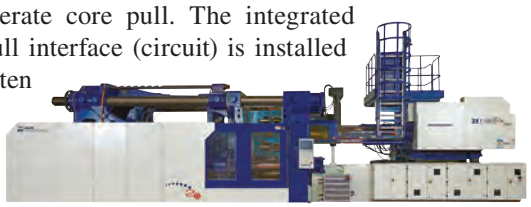
INJECTION MOLDING

All-electrics available in larger tonnages

Absolute Haitian, the exclusive distributor of Haitian and Zhafir injection molding machines in the U.S. and Canada, has announced the availability of four new larger models of its all-electric *Zeres* series injection molding machines with integrated hydraulic system.

The new models range from 899 to 1,551 tons. Previously, the largest model available for the Zeres product line was 730 tons.

The Zeres series is based on the Zhafir Venus II platform but includes an integrated hydraulic circuit to facilitate molding applications which require core pull or sophisticated ejector functions. The hydraulics open new possibilities for molders who prefer electric machines but need hydraulics to operate core pull. The integrated hydraulic core pull interface (circuit) is installed on the moving platen and provides more flow and increased pressure compared to external power pack solutions. Pressure and flow rates are adjustable via the machine's controller.



Software is included to control up to three hydraulic circuits.

The new models include the ZE 8000 (899 tons clamp

force), the ZE 9000 (1,014 tons clamp force), the ZE 10800 (1,216 tons clamp force), and the ZE 13800 (1,551 tons clamp force, and pictured in photo).

The machines offer injection capacities from 34.29 ounces to 187 ounces, and feature the latest control technology, including a 15-inch colour touchscreen monitor.

Absolute Haitian (Worcester, Mass.); www.absolutehaitian.com; 508-459-5372
Shadow Automation Inc. (Uxbridge, Ont.); 416-464-2070
Barway Plastic Equipment Inc. (Vaudreuil-Dorion, Que.); www.barway.ca; 450-455-1396

MEASUREMENT

Bulk solids level detection for plastics

The *Dynatrol DJ* series of level detectors from the Automation Products Inc. division of **Dynatrol** are used to measure high, intermediate or low level detection of plastic pellets.

Bulk solids level measurement is easily obtained in storage bins or hoppers for powders, granules, regrind material, and more.

The DJ level detectors require no adjustments and have no moving parts, making them virtually wear-free.

A variety of Dynatrol models are designed for the plastics industry and handle bulk solids in the density range of 15 to 60 lbs/ft^3 or greater than 60 lbs/ft^3.

The units are approved for Class I, Groups C & D; Class II, Groups E, F & G; and Class III services.

Automation Products Inc. division of Dynatrol (Houston, Tex.); www.dynatrolusa.com; 713-869-0361

METAL SEPARATION

Redesigned eddy current separation conveyor

The redesigned *eddy current separation conveyor* from **Bunting Magnetics Company** has a clean, low-profile design and permanent rare-earth magnetic technology to effectively separate non-ferrous conductive metals such as aluminum and copper from dry recyclables such as PET and plastic flake.

With magnetic rotor speeds of up to 3,600 rpm during operation, the machine is well-suited to separate aluminum cans, making it invaluable in the historically high-volume aluminum recycling market. Other applications include small particle processing, chopped wire, electronic scrap, MRF, MSW, wood, paper, glass, automobiles, and rubber process streams.

Additional key features include tough urethane belts for longer wear, belt guide rails for better belt tracking, corrugated belt sidewalls for material containment, cantilever frame design for belt replacement in minutes, standard take-ups for easier belt adjustment, and double variable frequency drives for adjustable speed.

The redesigned eddy current separation conveyor is available in widths

of 24, 36, 48, and 60 inches.

Bunting Magnetics Company (Newton, Kan.); www.buntingmagnetics.com; 800-835-2526

MOLD TECHNOLOGY

New alignment locks for large molds

Progressive Components recently introduced its new *Z-series* inserted bar locks, designed for mold weights from 25,000 to 75,000 lbs, and said to be the largest standard alignment lock in the industry.

The locks allow mold designers and molders to select off-the-shelf components for alignment of large molds. Inserted bar locks deliver the maximum amount of guidance and support for the minimum amount of machining required. Long-term, precision registration of plates is achieved when utilizing Progressive's Z-series proprietary treatment, radial ramp lead-in geometry, and particle rings on the plate surface.

Additionally, the lock's off-the-shelf availability eliminates the need of in-house design and manufacturing.

Progressive Components (Wauconda, Ill.); www.procomps.com; 847-487-1000

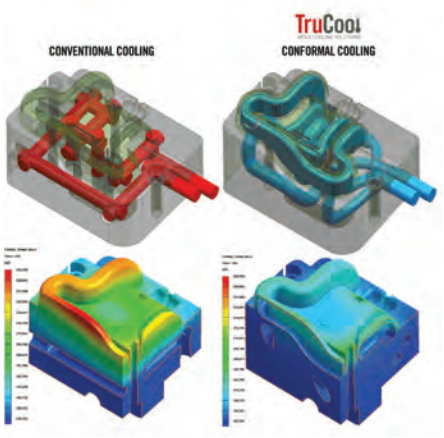
AceTronic Industrial Controls Inc. (Mississauga, Ont.); www.acetronic.com; 905-564-7227

Revolutionary conformal cooling solution

DME's new *TruCool* conformal cooling inserts utilize a cutting edge, direct-metal laser melting 3D printing process to produce highly complex cavities, cores, and components with conformal cooling channels, to achieve shapes, paths, and channel geometries that are difficult to obtain with conventional tooling.

Each mold is manufactured to the customers' requirements to provide even distribution of cooling and the option to introduce individual insert temperature controls.

The proprietary 3D formulation technology, for metal powder processing, enables the delivery of 3D-printed metal without porosity that is superior to other standard off-the-



shelf formulas used by the competition.

By controlling both the hot and now the cold halves, customers have full process parameter control. The design solution places cooling (or heating) channels at the optimal distance from the part surface, allowing the mold to maintain a targeted, consistent temperature for superior thermal control.

DME of Canada Ltd. (Mississauga, Ont.); www.dme.net; 800-387-6600

TESTING EQUIPMENT

Interactive tool for predicting multilayer film performance

Nova Chemicals Corporation recently launched its updated *Bonfire multilayer property predictor,* a web-based tool designed to allow customers to predict the performance of complex film structures with up to nine layers.

Enhancements in the new version include new calculations, structure templates, reports for offline reference, and an expanded resin database that can save customers time and resources when developing new structures and applications.

An intuitive user interface walks users through the process of building potential structures while giving them the ability to select any of Nova's resins and non-PE polymers that are commonly used in multilayer structures. Additionally, customers can estimate bending stiffness, which translates to converting line speeds. Calculations for machine direction tear and penetration energy will be added in the next several months. Common structure types can be saved as templates for later use. For reference offline, Bonfire lets users export their predicted structure data into a PDF report format.

The predictor also allows customers to simulate and compare a wider range of structure design options than would be feasible with physical trials, and ultimately launch new applications more quickly and cost-effectively.

Promising structures simulated in Bonfire can be produced, converted and tested at Nova's state-of-the-art Centre for Performance Applications in Calgary, reducing the need to use converters' commercial assets.

Bonfire is available at www.novachemicals.com/bonfire.

Nova Chemicals Corporation (Calgary, Alta.); www.novachemicals.com; 403-750-3600

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(1) Based on total square km of coverage on the shared LTE network available from Bell vs. Rogers' LTE network. See bell.ca/LTE for details.

Bell business just got better

Why pellet size and shape matter (part 1)

By John Bozzelli, Injection Molding Solutions

There are hundreds of details in the injection molding process, and in evaluating them I can get rather "picky." In this article I'm picking on the pellets. Regardless of the resin type or manufacturer, you as a molder want your pellets to be uniform in size and shape. But pellets vary in size and shape. In the case of regrind, they can range from fines to larger chunks. The bottom line is, you need all the pellets to be uniformly melted at the proper temperature. If your pellets range in size and geometry, this won't happen. Non-uniformly melted resin will not yield uniformly good or identical parts, period.

My guess is that the majority of molders don't give this issue much thought. We assume all is well because we see molten polymer coming out of the nozzle when we purge the machine, or because the parts look good. Wrong. To understand the problems with melting non-uniform pellets, let's look closer at the melting process.

The melting process starts with the hopper, which feeds the granules into the feed throat. The hopper should be designed to provide mass flow — not funnel flow — so that resin is fed uniformly to the feed throat. There must be no channeling in the centre, which is known as funnel flow (or "rat-holing"). Take a reality check by going onto the shop floor and watching the pellets through the cleanout window. If the pellets up against the window do not slide down into the feed throat, you have a problem. My bet is that 95 per cent of the time, those pellets stay there for the entire run.

So how do you ensure mass flow? Check the hopper angle; for mass flow, it should be angled at 60°. Single-shot hoppers are fine, provided you do not see fluidizing of the pellets (dancing in an air stream) when it calls for resin. If fluidizing occurs during screw rotation, you can guarantee the next shot will be a different part, because the fluidizing keeps some pellets from settling into the intake screw flights. This is a process variation. If you do have fluidizing in single-shot hoppers, fix the air leak at the junction of the feed throat with a good high-temperature silicone gasket.

Once you've established mass flow, make sure your feed throat is clean, unobstructed with big chunks, fines, or streamers, and is PID temperature controlled. Erratic water flow in the feed throat is not acceptable; it's the most important zone of the process. It also should be set at a higher temperature than you think. The feed throat has two jobs: feed the resin, and — just as importantly — act as a vent for gases escaping from the feed section of the screw. Set it at between 130° to 150°F — or between 55° to 65°C — to allow volatiles to escape and not condense. Even PP will not get tacky at these temperatures.

If you have bridging problems, note the composition of the bridged material. If all the individual granules are stuck, then the feed throat is too hot. But if there is any completely melted polymer, or if the bridge is a ball of solid plastic, you do not have a feed throat temperature problem; more likely, the non-return valve is leaking.

In my column in the next issue, I'll turn my attention to the feed section of the screw. **CPL**

John Bozzelli is the founder of Injection Molding Solutions in Midland, Mich., a provider of training and consulting services to injection molders, including LIMS and other specialties. He can be reached at john@scientificmolding.com or visit www.scientificmolding.com.

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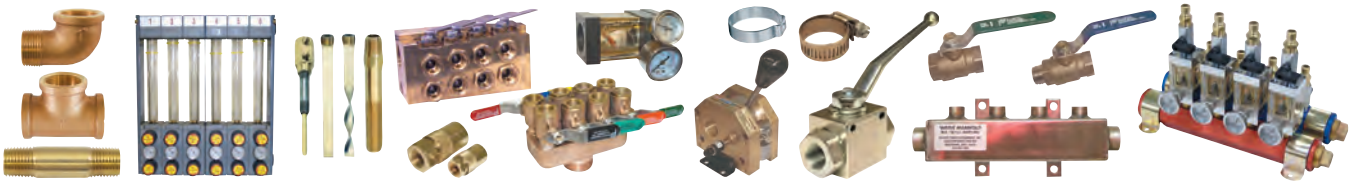

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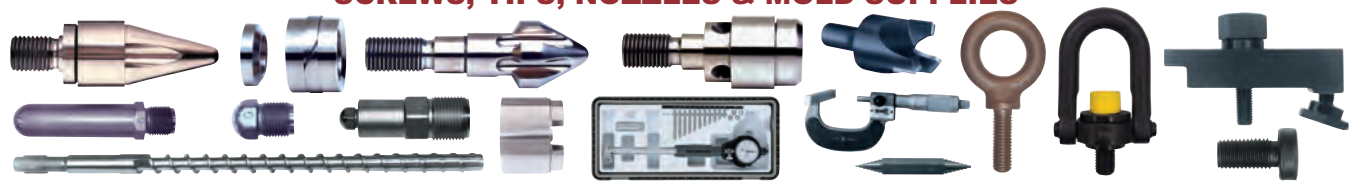

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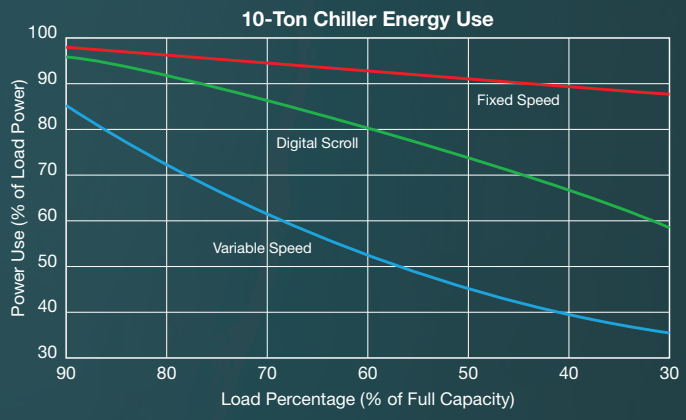

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