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JUNE 2016

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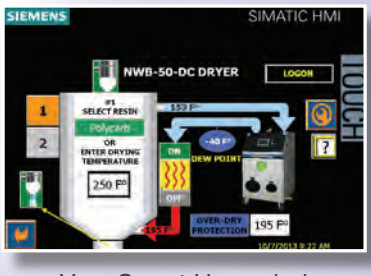

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Canadian Plastics

JUNE 2016

VOLUME 74 • NUMBER 3

LOOKING BACK...

Long before Finland started exporting hockey players to Canada, Finnish plastics product maker Oy Wiik and Hoeglund — known today as KWH Group — exported itself to Ontario. As reported in the July 1967 issue of *Canadian Plastics*, Oy Wiik and Hoeglund had just chosen Hunstville, Ont. as the site for its first PE pipe manufacturing facility in North America. Set to open in June 1968, capacity at the plant would be 10 million lbs, rising to 25 million lbs if and when the markets developed — the main markets being municipal authorities for water and sewage systems. Pipes would be manufactured in sizes ranging from 4-inch to 40-inch diameters. Oy Wiik and Hoeglund also signed a deal with DuPont Canada for it to supply the plant with Sclair PE pipe resins for production.

Number of the month:

$179*

* The average price of a six-inch 3D-printed model by MY3DAGENCY.COM. (See page 28)

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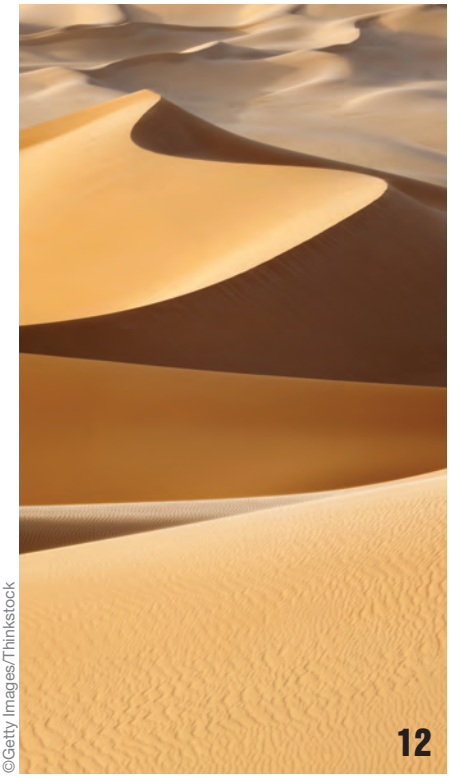

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The left gets it right in Alberta

It's tempting these days to give up on politics entirely. The sad spectacle of the U.S. — a nation of 322 million people — being unable to produce two better presidential candidates than Donald Trump and Hillary Clinton, for example, is enough to make even Santa Claus reach for the Prozac.

Every once in a while, however, the planets align and the political class gets it right.

A case in point can be found, surprisingly, in a new economic policy unveiled in Alberta. (I say "surprisingly" because it comes courtesy of the left-wing NDP, a party not exactly known for being simpatico with Canada's business community.)

In February, in a bid to increase investment in the province, Alberta's NDP government introduced the Petrochemicals Diversification Program, a subsidy program which gives companies building new petrochemical plants a total of $500 million in royalty credits over 10 years. The ultimate goal is to encourage between $3 billion and $5 billion of new investment in chemical manufacturing, and the province estimates that two or three new plants — at the least — could be built under the plan. The provincial government also said construction of such facilities could create up to 3,000 new jobs for each plant, including 1,000 full-time jobs once the plants are operational.

Why is the program necessary in the first place? Because although Alberta has vast supplies of methane and propane, it costs 30 to 40 per cent more to build processing plants in the province than it does on the U.S. Gulf Coast, where US$100 billion in current projects are either proposed or under construction. The result is that propane gas is mainly shipped out of province to be processed elsewhere. With sufficient inducement, the theory goes, plants in Alberta could transform the gas into polypropylene, which is used to make all kinds of consumer goods, plastics products among them.

The program has gotten a thumbs up from some of the same people who were probably most worried by the NDP's stunning provincial victory last year. "I think this puts us on the radar screen," said David Podruzny, vice president of business and economics for the Chemistry Industry Association of Canada. "The program is going to improve Alberta's ability to attract world-scale investment projects that are already going to come somewhere in North America."

This prediction is already being borne out, as petrochemical companies are lining up to apply for the program. First, Calgary-based pipeline heavyweight Pembina Pipeline Corporation has announced a partnership with a subsidiary of the Kuwait Petroleum Corporation to study whether to build a large-scale petrochemical processing plant in Alberta. If approved, the plant could be completed by 2020.

Second, Tulsa, Okla.-based natural gas supplier Williams Companies has announced that its Canadian subsidiary, Williams Energy Canada ULC, is mulling a final investment decision on a propane processing plant north of Edmonton this year, and said the subsidy program could tip the scales toward approval.

And third, Vancouver-based Methanex Corporation is also considering expanding its existing methane processing plant in Medicine Hat.

These are still early days for the Petrochemicals Diversification Program, of course, and there aren't yet any shovels in the ground for new construction. But whatever the outcome, Alberta Premier Rachel Notley and her team deserve credit for at least going to bat for the province's chemical making sector. The contrast with Ontario, where the Green Energy Act actively hampers industrial development, couldn't be more striking.

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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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Silicone-based polymer makes wrinkles disappear...temporarily

Photo Credit: Melanie Gonick/MIT

Seen Wayne Newton lately? If so, you know what happens when a facelift goes wrong. But a new silicone-based polymer developed by a group of scientists in Massachusetts might make going under the knife a thing of the past.

The polymer is designed to mimic the mechanical and elastic properties of youthful skin and is practically invisible to the eye, and can instantly make wrinkles disappear. The catch is that, at present, it lasts for only 24 hours.

Jointly developed by scientists at the Massachusetts Institute of Technology (MIT) in Cambridge, the Massachusetts General Hospital, and Cambridge-based medical research firms Living Proof and Olivo Laboratories, the material has a siloxane building block and a cross-linked polymer layer (XPL) that can be stretched more than 250 per cent and still return easily to its original state. In laboratory tests, the novel XPL's elasticity was much better than that of two other types of wound dressings now used on skin — silicone gel sheets and polyurethane films. The material also met the required optical and mechanical properties and did not irritate the skin.

As reported in the journal *MIT News*, the XPL is currently delivered in a two-step process: Polysiloxane components are applied to the skin first, followed by a platinum catalyst that induces the polymer to form a strong cross-linked film that remains on the skin for up to 24 hours. The catalyst has to be added after the polymer is applied because after this step the material becomes too stiff to spread. Both layers are applied as creams or ointments.

The researchers performed several studies in humans to test the material's safety and effectiveness. In one study, the XPL was applied to the under-eye area where "eye bags" often form as skin ages. These eye bags are caused by protrusion of the fat pad underlying the skin of the lower lid. When the material was applied, it exerted a steady compressive force that tightened the skin. In another study, the XPL was applied to forearm skin to test its elasticity. When the XPL-treated skin was distended with a suction cup, it returned to its original position faster than untreated skin.

Since the skin-tightening effect only lasts for 24 hours, more research is obviously needed before the XPL technology is ready to take the cosmetics industry by storm. In the meantime, Living Proof has spun out XPL to Olivo Laboratories, a new startup formed to focus on the further development of the material. Initially, Olivo's team will focus on medical applications for treating skin conditions such as dermatitis, *MIT News* said.

So if it's too late for Wayne Newton, there's hope yet for the rest of us to have an easier time in looking younger longer. **CPL**

Former Engel Group directors Georg, Irene Schwarz pass away


Georg and Irene Schwarz
Photo Credits: Engel

Husband and wife team Georg and Irene Schwarz, who were both instrumental in building and leading the Engel Group injection molding machinery brand, passed away within a few days of each other in late March and early April at ages 88 and 86.

"For Engel, the deaths of Irene and Georg Schwarz mark the end of an era," said Schwertberg, Austria-based Engel in a news release. "For decades, they jointly managed the business; both followed the development of the company with great interest until the end. They leave behind a void that cannot be filled."

Born in 1929 in Serbia, Irene Engel came with her family to Austria in 1944, where one year later her father Ludwig Engel founded a machinery construction company called Engel in Schwertberg. She worked in the company from the very beginning in roles as diverse as bookkeeper, financial director, controller, and director of human resources. In 1951, she married Georg Schwarz, who also joined the staff at his father-in-law's company. Georg Schwarz was born in 1928 in Croatia, and moved with his family to Upper Austria in 1945, where he attended a technical school for mechanical engineering.

After the death of Ludwig Engel in 1965, Irene and Georg Schwarz took over the management of the company that had 380 employees at the time. "With entrepreneurial courage and a special intuition concerning industry trends and growing markets, they guided the company onto a path of growth that continues today," Engel said. "Early on they decided to establish foreign subsidiaries, opened two production plants in North America, and already set the course for the system solutions business in the 1980s with the development and production of the company's own robots."

In 1997, they turned over the operational management of Engel to the third generation when Peter Neumann, husband of Georg and Irene's daughter Helga, became CEO. But both remained actively involved in the business. "At the start of the new millennium, Irene and Georg oversaw the step into Asia with the founding of the production plants in Korea and China, and when flooding destroyed the production facilities at the headquarters in Schwertberg in 2002, they also joined in actively tackling the task of rebuilding," Engel said.

Both received a variety of honours over the years. The government of Upper Austria presented them with the Decoration of Honour in Gold. Georg Schwarz was also awarded the Grand Decoration of Honour in Gold of the State of Lower Austria and the Grand Decoration of Honour in Silver of the Republic of Austria; he was appointed Honorary Senator of the University of Leoben, and in 1992 Honorary Senator of the Vienna University of Technology; and in 2009 was inducted into the Plastics Hall of Fame. Irene Schwarz, meanwhile, was appointed Honorary Senator of the University of Leoben in 2006, the first woman in the history of the university. **CPL**

GN Thermoforming expands in Czech Republic (again)

It sounds like one of the tougher *Jeopardy* questions: What do the province of Nova Scotia and the Czech Republic have in common? From the plastics perspective, the answer is GN Thermoforming Equipment.

In March, Chester, N.S.-based GN held a series of customer training sessions to mark the approaching second anniversary of the opening of its sales and technical centre in Jihlava, Czech Republic. "The three training sessions were a major success with more than 60 participants, including end users and processors from throughout Europe, India, and the Middle East," said Jerome Romkey, GN's business development manager.

Checking out a thermoforming machine at GN's training session in March.
Photo Credit: GN Thermoforming Equipment

In April 2014, the company relocated and expanded its original office in Jihlava to a larger 11,000-square-foot sales and technical centre facility also in Jihlava, which is about two hours from Vienna, Austria, and one hour from Prague. It was the latest development in GN's surprisingly active history in Europe. "We began selling into central Europe and Russia in 1991, and by 1998 we had a sales agent based in the Czech Republic," Romkey said. "We founded our own sales operation in Jihlava in 2003, and then decided a few years ago that we needed an even bigger presence, which led to the establishment of our current sales and technical centre."

According to Romkey, the sales and technical centre — which has a staff of nine personnel — is intended to help GN support its customers from Western and Central Europe, Russia, India, and the Middle East, and also expand its business in key markets. "Our machinery, which matches what the European thermoforming equipment makers are offering, is particularly well-suited to what European customers are looking for," he said.

GN manufactures servo-driven, roll-fed thermoforming machines for the production of food packaging. **CPL**

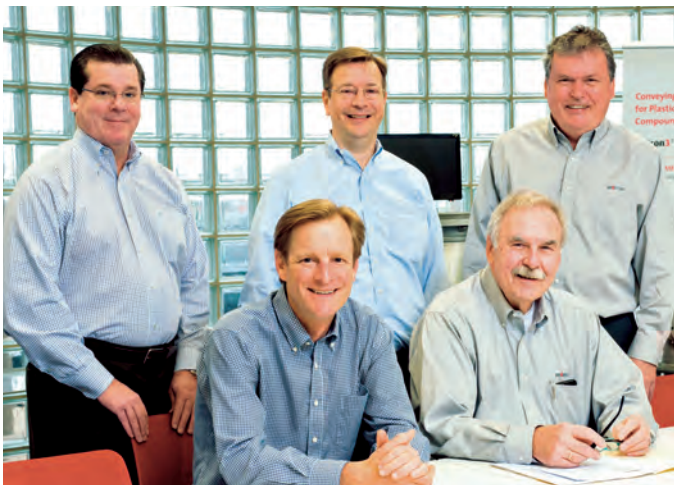
IPEG acquires Pelletron

IPEG Inc., which owns auxiliary equipment makers Conair Group and Thermal Care Inc., has acquired Pelletron Corporation, a supplier of pneumatic conveying systems, dust removal systems, and other related products.

Pelletron will operate as an independent subsidiary at its existing location in Lancaster, Pa.

The financial terms of the deal are not being disclosed.

According to Chris Keller, CEO of Cranberry Township, Pa.-based IPEG, Conair and Pelletron are not competitors. "Whereas Conair offers vacuum-based systems that might convey hundreds or thousands of lbs per hour, Pelletron offers pressure-driven systems that are used by resin producers to handle thousands and tens of thousands of lbs per hour," Keller said in a statement. "There is virtually no overlap."



Pictured left to right are, in front: Chris Keller, IPEG CEO, and Heinz Schneider, Pelletron president; in back: Kirk Winstead, IPEG COO, John Erkert, IPEG CFO, and Paul Wagner, Pelletron vice president.
Photo Credit: Pelletron Corporation

Pelletron, founded in 1987, has been operated by Heinz Schneider and Paul Wagner since 2003 and owned by them since 2008. The two will remain in their current roles of president and vice president. All other employees are also expected to remain with the company.

According to Schneider, IPEG ownership will give Pelletron the financial strength to handle large projects that can run into the millions of dollars. "Our growth has been limited by our size, not by our know-how or capability," Schneider said. "With the backing of IPEG, our customers will be able to have more confidence in our ability to handle these larger projects." **CPL**

SUPPLIER NEWS

- York, Pa.-based extrusion equipment maker **Graham Engineering Corporation** has appointed **Turner Group Inc.**, which is headquartered in Seattle, Wash., as the sales and service representative for **American Kuhne** medical extrusion systems in the provinces of British Columbia and Alberta.
- German automation and tooling supplier **Zimmer GmbH** has opened a Canadian subsidiary in Barrie, Ont. **Zimmer Group Canada** can be contacted at sales@zimmer-group.ca, or 416-766-6371.

Rotoplast buys Pickering, Ont.-based rotomolder ACO Container Systems

Rotoplast's Sébastien Daudelin (left) and Mathieu Arsenault.
Photo Credit: Rotoplast

In a move to expand its product offering, Quebec-based rotational molder Rotoplast has purchased rotomolder ACO Container Systems, which is headquartered in Pickering, Ont.

ACO manufactures storage tanks with a capacity of up to 62,500 litres.

The financial terms of the deal have not been disclosed.

The purchase is the latest event in a busy year for Rotoplast, which is headquartered in East Farnham, Que., about 50 kms southeast of Montreal. The company, which was founded in 1994, was formerly owned by a private capital management firm. In March 2015, its two leading managers, Sébastien Daudelin and Mathieu Arsenault, bought out all of the company's shares to become its sole proprietors. **CPL**

Arburg launches Taiwan subsidiary

German injection molding machine maker Arburg has launched a Taiwan subsidiary, based in Taichung.

The subsidiary, which officially started on April 1, takes over from Arburg's Taiwanese sales agent C&F International, which has represented Arburg since 1981.

"By taking on many sales and service employees from our former trading partner, the same extensive knowledge and familiar local contacts will continue to be available to our customers in the future," said Arburg overseas sales director Andrea Carta.

Arburg subsidiary manager Michael Huang (left) and overseas sales director Andrea Carta.
Photo Credit: Arburg

The firm has hired Michael Huang as subsidiary manager. He has previously worked in management and sales at materials producers GE Plastics and Sabic.

The subsidiary's showroom has three Allrounder machines, training rooms, and an extensive spare parts store. **CPL**

Big changes at Thermal Care

In the space of a busy few weeks in April, process cooling system supplier Thermal Care Inc. acquired a new president and — after 40 years at the same location — a new headquarters. The company's new president is Lee Sobocinski, previously its director of sales. And after four decades at the same facility in Niles, Ill., Thermal Care has moved less than one mile down the road into a new custom-built headquarters.

Lee Sobocinski
Photo Credit: Thermal Care

According to Sobocinski, Thermal Care's new 135,000-square-foot facility in Niles is 40 per cent larger than its previous floor space and has room for future expansion. "Our new facility is going to allow us to continue with our growth strategies," he said. "The building has a technologically advanced testing facility; an area for R&D; a cutting-edge welding department; and a warehouse designed for efficient flow using a wire-guided system, which will help decrease lead times." **CPL**

Nova Chemicals opens Centre for Performance Applications in Calgary

Photo Credit: Nova Chemicals Corporation

In May, the polyethylene business of Nova Chemicals Corporation opened its renovated Centre for Performance Applications in Calgary, a facility designed to expand on Nova's former Chemicals Technical Centre as a hub for PE resin testing and applications development.

A range of new equipment and upgrades has been installed at the facility, Nova said, including a suite of conversion equipment and physical and analytical test lab equipment. "Conversion capabilities help meet a range of customer trial requirements, from collation shrink to adhesive lamination and vertical form fill seal," the Calgary-based company said in a statement.

Investments were also made in rigid plastics molding capabilities. "A new Sacmi compression molder and Sumitomo Demag injection molding press together fully replicate caps and closures' manufacturing processes," Nova said. "An upgraded rotational molder provides improved reliability, data quality, process control, and ergonomics." **CPL**

PEOPLE


Jana Davis


Ken Forden


Scott Gardner


Mark Garretson


Larry Korpanty


Vince Musacchio

– Magnet technology supplier **Bunting Magnetics Company**, headquartered in Newton, Kan., has appointed **Jana Davis** to the new position of chief operating officer.

– Chippewa Falls, Wis.-based **Nordson Corporation** has appointed **Ken Forden** as the general manager of the extrusion and coating die business within its polymer processing product line.

– Pawcatuck, Conn.-based extrusion equipment maker **Davis-Standard LLC** has named **Scott Gardner** as regional sales manager for elastomer and profile systems for Ontario, Quebec, and the Maritime provinces.

– Lunenburg, Mass.-based **S&E Specialty Polymers LLC** has named **Mark Garretson** as regional sales manager for Canada.

– Baltimore, Md.-based auxiliary equipment maker **Novatec Inc.** has named **Larry Korpanty** as its drying project coordinator.

– Cincinnati, Ohio-based flexible packaging supplier **ProAmpac** has appointed **Vince Musacchio**, the former head of flexible packager Pro-lamina's Canadian operations, as president of its ProAmpac global flexible division.

By Mark Stephen, editor

WANT SAHARA-DRY RESINS? MAINTAIN YOUR DESICCANT!

By removing moisture from the process air stream, desiccant material puts the "dry" in dryers. But contamination and the passage of time can render desiccant about as effective as a wet sponge. Which means you've gotta know how to look after it...and when to replace it.

In the land of resin drying, the desiccant dryer remains king. Despite being challenged by newer drying technologies like straight compressed air dryers, compressed air units with a moisture removal membrane, and vacuum dryers, desiccant systems still account for the vast majority of dryers being used by plastics processors. Why? They've long been the gold standard for drying resins that have a tendency to absorb moisture — from mild to moderately hygroscopic materials such as ABS, acetal, acrylic, PC, PBT, LCP, and some TPOs, TPEs, and TPUs, to strongly hygroscopic and difficult-to-dry resins like bottle-grade PET and nylon.

A desiccant dryer's effectiveness hinges, of course, on the desiccant material itself, which removes moisture from the process air stream. If the desiccant is doing its thing, and the heaters and blowers are working as designed, the dryer can achieve -40°F dewpoint, considered adequate for drying any hygroscopic resin. But if it's not doing its job, this same desiccant material becomes a dryer's Achilles' heel.

Which is why desiccant maintenance is a big part of efficient resin drying. And it begins by understanding which type of desiccant a dryer uses. "Desiccant dryers come in three basic styles: twin-tower and carousel designs with two or more desiccant beds, and models with rotating honeycomb wheel desiccants," said Mark Haynie, dryer product sales manager with Novatec Inc. "The first two types use desiccant beads and the third uses a pure crystalline molecular sieve desiccant that's grown onto a substrate and formed into a circular wheel shape."

BEST DESICCANT DRYER FAILS

No matter what the desiccant dryer type, the most common cause of failure, the experts say, is contamination of the desiccant beds by plasticizers — called volatiles — that are driven off the resins being dried. "Both honeycomb and beaded-type desiccant dryers are prone to failure from volatile contamination," said Jamie Jameson, drying product manager with Conair. "It's something the dryer makers can't control, since we don't always know the chemical makeup of the components in today's resins, nor do we know the chances of volatiles being driven off the pellets under various processing conditions." Only one thing is certain: Once the pores of the desiccant become sufficiently clogged with volatiles, the desiccant is *histoire*.

A second cause of contamination is dust created by the temperature extremes of regeneration. "These thermal swings can cause the clay binder in desiccant beads to become brittle and separate, allowing the beads to break apart," Jameson

said. "This creates dust and fines that migrate into the resin over time." Suppliers of honeycomb dryers claim their products have an edge here. "Since honeycomb desiccant is crystallized onto lightweight glass fibres, the desiccant wheel will not break down or fracture over time like desiccant beads," Jameson continued.

A case in point is Piovan's HR series dryer. Zeolite molecular sieve material is coated on the internal surface of the honeycomb structure, Piovan said, "to guarantee zero dust emission."

There are non-scientific ways to determine if your desiccant material is contaminated. First, use your eyes. "Fresh molecular sieve is bone-coloured," said Charles Sears, president of Dri-Air Industries Inc. "As plasticizers in the material begin to carbonize due to the high temperature of regeneration, the desiccant turns brown; it will still work, but won't hold as much moisture."

And with desiccant beads, use your hands. "Grab and squeeze a handful of the beads to see whether they generate heat," said Mark Haynie. "If they don't feel hot, they should be replaced."

But hopefully you won't let the problem progress that far. "The most obvious sign of contamination in desiccant is slow, steady dewpoint deterioration," said Anthony Johnson, product manager, material handling with ACS Group. "If the dewpoint moves from -45°F to -35°F, for example, and there are no obvious air leaks in the system, it's time to replace the desiccant."

One piece of good news is that the quality of the desiccant itself shouldn't play a role in either contamination or breakdown. "Both molecular sieve material and molecular beads are made according to very tight specs, and only by a few suppliers that have the manufacturing process well under control," Johnson continued. "Our company has been working with the same supplier for many years, and we haven't had any issues."

OUNCE OF PREVENTION

But if you can't prevent volatiles and dust emissions from occurring, you can prevent them from coming in contact with your desiccant. "Plasticizer traps trap these by-products out of the return air before they can return to the desiccant beds," said Brian Davis, president of Maguire Canada Inc. "They can significantly extend the life of the desiccant."

A slight variation to gas-like volatiles given off by many materials occurs with thermoplastic acrylic resins that contain cellulose acetate butyrate. "These emit a tar-like substance that attaches to the molecular sieve and plugs up the holes," said Charles Sears. "Like other types of volatiles, these tars have to be removed from the air stream coming back; we recommend adding a return heat exchanger and a plasticizer trap."

A key to any good plasticizer trap is a well-working cooling coil, which cools the air so the volatiles condense, after which the trap removes the condensate from the air stream. "The cooler the air that goes back into the dryer, the longer the desiccant is going to last," said Brian Davis.

In addition, keep on top of your air filter maintenance. "Poor filter maintenance is probably the number one reason for premature desiccant failure and, as a result, dryer failure," Charles Sears said. "The filter looks clean to the naked eye but it's actually full of tiny fines blocking the air flow, which affects the functioning of the dryer, both wheel and bed-types. We can equip the dryer with devices that will detect this blockage and alert the user." It definitely helps to have a regular air filter maintenance routine. "Turn the dryer heaters off and allow the heaters to cool before the blowers are stopped," Mark Haynie said. "Carefully remove the filter elements, air-blow or vacuum them to remove accumulated dust and fines, and then carefully re-install the filter elements so no leaks are allowed around the base of the filter or the filter housing or lid. And always replace filter elements if they are damaged, distorted or can't be cleaned."

The eyes have it: New desiccant on the left, old desiccant on the right.
Photo Credit: Dri-Air Industries Inc.

TIME PASSAGES

Contamination and premature breakdown aside, the main enemy of desiccant is time. "Desiccant beads are going to break down eventually due to normal wear and tear," said Brian Davis. "The question we hear from all of our dryer customers is, 'How often do we have to

STEAMING HOT!

A ridiculously easy way to test your desiccant

"Remove some desiccant from your dryer and heat it in an oven to 400°F for an hour. After it cools down, put it in a container and add a few drops of water. If the desiccant emits a lot of steam, it's still effective; if it doesn't, it isn't."

Charles Sears, Dri-Air Industries Inc.

change our beads?'" The answer varies, but most desiccant bead manufacturers typically recommend changing the material every two years, although the beads may be effective for longer. "We have customers that change their desiccant beads every two years, and others that change them every five years," said Jamie Jameson. "The answer usually depends on a host of processing factors."

Manufacturers of desiccant wheel dryers claim that molecular sieve desiccant doesn't wear out in the same way. "Pure molecular sieve desiccant that's permanently bonded to the air-passing corrugations of the wheel element doesn't break down over time," Mark Haynie said. "If the desiccant stops absorbing moisture effectively, the wheel assembly itself — complete with desiccant medium and its cylindrical enclosure; and on some models, its end caps and drive system — is replaced as a complete unit. So the customer never has to worry about replacing the desiccant alone."

An alternative design is Wittmann Battenfeld's DryMax Aton 2 segmented wheel dryer; it has 36 segments packed with desiccant beads, which the company said allows for easy replacement of the beads as an alternative to what it calls a "costly wheel replacement."

For the foreseeable future at least, desiccant's reign as king of the dryer types seems secure. And to feel secure about the desiccant inside your own dryer, you've gotta put the time in to maintain it and, when necessary, change it. **CPL**

RESOURCE LIST

ACS Group/EquiPlas (Markham, Ont.); www.aecinternet.com; 416-407-5456

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 Laferrière** (Mascouche, Que.); www.industrieslaferriere.ca; 450-477-8880
- **Turner Group Inc.** (Seattle, Wash.); www.turnergroup.net; 206-769-3707

Dri-Air Industries Inc. (East Windsor, Conn.); www.dri-air.com; 860-627-5110

- **Hamilton Plastic Systems Ltd.** (Mississauga, Ont.); www.hamiltonplasticsystems.com; 800-590-5546

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

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

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STAND TALL against product DEFECTS

"Life is easy," the showbiz saying goes; "comedy is hard." Extrusion blow molding is hard, too, and when it fails the results aren't funny. Here's how to avoid some big problems.

By Mark Stephen, editor

Extrusion blow molding (EBM) makes a diva like Jennifer Lopez look low-maintenance. Blow molding consultants like to describe it as the most technically challenging of the molding processes, and they're probably not wrong. In injection molding, for example, once you've got the right mold in place, you're basically good to go; the production process is not a major challenge. The contrast with EBM is almost painful. "With blow molding, a good mold only gets you, at most, 50 per cent to where you want to be; the other 50 per cent is the process, and a perfect mold can still make an unacceptable part," said Tom Boyd, president of Blow Molded Specialties. "There are many indirectly controlled variables, and for every part that we produce, we must create a process to maintain control. The molding process itself has a major influence on the end product."

And by "molding process", he means everything. "The type of plastic, the process temperature, the velocity or pressure of the blown air, mold close speed, part design — all play major roles in blow molding, and a problem with any one of them can sink your end product," Boyd said. And let's face it: In EBM, the one thing that's inevitable is the daily production problem. But it doesn't have to shut you down. Here's how to avoid some of the most common product defects.

THICK AND THIN

The most obvious sign that something has gone wrong is uneven wall thickness. And wall thickness problems are common because the wall thickness is already going to vary from place to place in the blow molded part, based on how much the material has to stretch as it's being blown. It doesn't help that, the more complex the shape, the more wall thickness variation there is over the entire surface area of the part. According to Ottmar Brandau, president of Apex Container Tech Inc., a number of factors have to come together to let the parison inflate into a part of even wall thickness, beginning with making sure EBM extruders have an L/D ratio of 24:1, 22:1 for heat-sensitive materials like PVC. "Parisons are easier to control when they run at the lower end of the temperature range, and modern screws allow this to happen," Brandau said.

Second, if the parison has a warmer and colder side, the warmer side will always blow into a thinner wall, which makes even parison heat paramount. "Heater bands should not be aligned along the head, since this always leaves a slightly cooler area in the same parison part," Brandau said. "And all thermocouples must have good contact with the metal of the head, distributor, and extruder."

Third, the die must be adjusted so the parison runs straight. In a perfect world, the parison will run straight anyway, but EBM has nothing to do with a perfect world. "If the parison is wandering, the material will be thin on that side, so the die must be moved in that direction," said Werner Amsler, president of W. Amsler Equipment Inc.

A straight-running parison should guarantee even parison wall thickness, right? Wrong. "Temperature and pressure differences in the head can cause the parison to run straight with uneven wall thickness," Amsler continued. "This usually means there's a problem with the heat distribution in the head — perhaps a heating band that doesn't work."

Fourth, when there is more than one cavity, parisons must have the same length or else the programmed parison points won't end up in the same spot on the container. "Parison length can be adjusted with either temperature or chokes in the distributor between the extruder and the head," Ottmar Brandau said. "The former method must be used with materials like PVC that don't allow for chokes, but otherwise isn't recommended because it introduces variation in parison temperature that will affect shrinkage."

Fifth, oblong containers will have thinner walls in the far container sides as the parison thins out during inflation. "To counter this, parison wall thickness can be increased in those areas that will form these far sides by cutting pockets into the die after the parison has been marked to find the proper parison locations," Brandau said. "These cuts must be done in increments as they may have a large effect on the container, and often two or three iterations are necessary to get it just right."

And sixth, take care with your venting. "Entrapped air when the mold halves close prevents proper distribution and cooling of the plastic," Brandau said. Which is why all molds should have a surface texture tailored to the material being molded. "The texture allows the air to move behind the inflating parison towards the mold faces, where vents allow it to escape," Brandau said. "Special geometries like handles may also require hole or corner vents that are increasingly cut with lasers instead of drill bits."

Finally, remember to use the wall thickness controller or programmer — which practically all modern EBM machines come with — to change the die gap during extrusion to reflect changing container geometry. "These also counter the propensity of the parison to sag under its own weight," Brandau said.

DISTRIBUTION PROBLEM

After uneven wall thickness, parison curl is one of the more aggravating problems that can bedevil your process. "Parison curl is caused by uneven distribution of material in the upper accumulator head area," said Robert Slawska, president of Proven Technology Inc. "The pressure drops around the circumference are not equal all the way around the diverter. This often occurs when the majority of the flow comes straight down the extruder inlet side of the material flow area in the head. This can be corrected by adjusting the bushing to be offset by pushing in on the bolts on the heavy-

wall side of the parison."

It's also possible that the default viscosity of the plastic flowing out of the die head may not be the same all around. In which case, parison curl is a temperature problem. "It's very important that an accurate and sensitive temperature measuring instrument be used," a technical paper from Paulson Training Inc. noted. "Thermocouple or infrared instruments are the most common. Measure the plastic temperature all around the parison circumference and look for differences. Record the measurements and their location." If you find any variations in the parison temperature, the paper continued, measure the metal temperatures all around the die head looking for corresponding die head temperature variations. "Local differences in the die head temperature could be caused by a burned out heater, an incorrect heater control setting, a change in heater output or a slightly loose heater band," the paper said. "With the problem of parison curl, it's tempting to start right away moving the adjustment ring to stop the curl. But if you do that and the problem is the plastic temperature, you will be chasing the problem continuously."

ON THE SURFACE

A third serious defect relates to poor part surface. One of the most common — and certainly the most colourful sounding — is "orange peel", a deformation of the smooth surface that typically occurs at the end of the flow path in thick-walled parts molded of high-viscosity materials. "Orange peel is caused by the condensation of water droplets on the mold when the dewpoint is above the mold water temperature," said Frank Falcone, president of Falcone Technical Services. "It's a problem I see more and more often, as molders over-inflate the parison and the cold mold touches the plastic."

To prevent the condensation, gradually raise the mold temperature, if possible. "If raising the mold temperature can't be done without increasing cycle time, it may be necessary to air condition some localized areas of the plant, especially during periods of high humidity," Falcone continued.

There are a variety of other causes of a rough or pitted surface. First, the mold surface is old or worn. "If this is the case, the surface should be refinished," Falcone said. "The mold should have a fine matte finish to allow air to vent quickly and the parison to conform to the mold surface while it's still hot." Second, the vents necessary for air to escape the mold are clogged or too small; if they're blocked, the air can't escape and may cause surface problems. Third, the air lines are clogged. "Blow pressure needs to be high enough that the air can quickly and fully blow mold the part," Falcone said. "The air lines should be checked for clogs and the blow pin for any leakage." And fourth, there might be moisture in the resin or the resin isn't melted uniformly.

If you haven't guessed by now, there are many parameters that have to come together in the end to yield perfect blow molded parts, and operators need training and experience to master them. Which might just be the biggest problem of all. "Virtually every product defect in EBM can be traced to bad habits," Falcone said. "Very few young workers are being taught the right habits anymore, and in today's hyper-competitive climate, even the older, experienced operators are often too busy to slow down and follow proper procedures."

And that's not something we can help you with. So borrow a page from J. Lo's book and start rehearsing your moves. **CPL**

RESOURCE LIST

Apex Container Tech Inc. (Wasaga Beach, Ont.); www.blowmolding.org; 705-429-1492

Blow Molded Specialties (Pawtucket, Conn.); www.bmsplastics.com; 401-723-3000

Falcone Technical Services (Toronto); www.falconetech.com; 416-213-9534

Paulson Training Inc. (Chester, Conn.); www.paulsontraining.com; 860-526-3099

Proven Technology Inc. (Hillsborough, N.J.); www.industrialblowmolding.com; 908-359-7888

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

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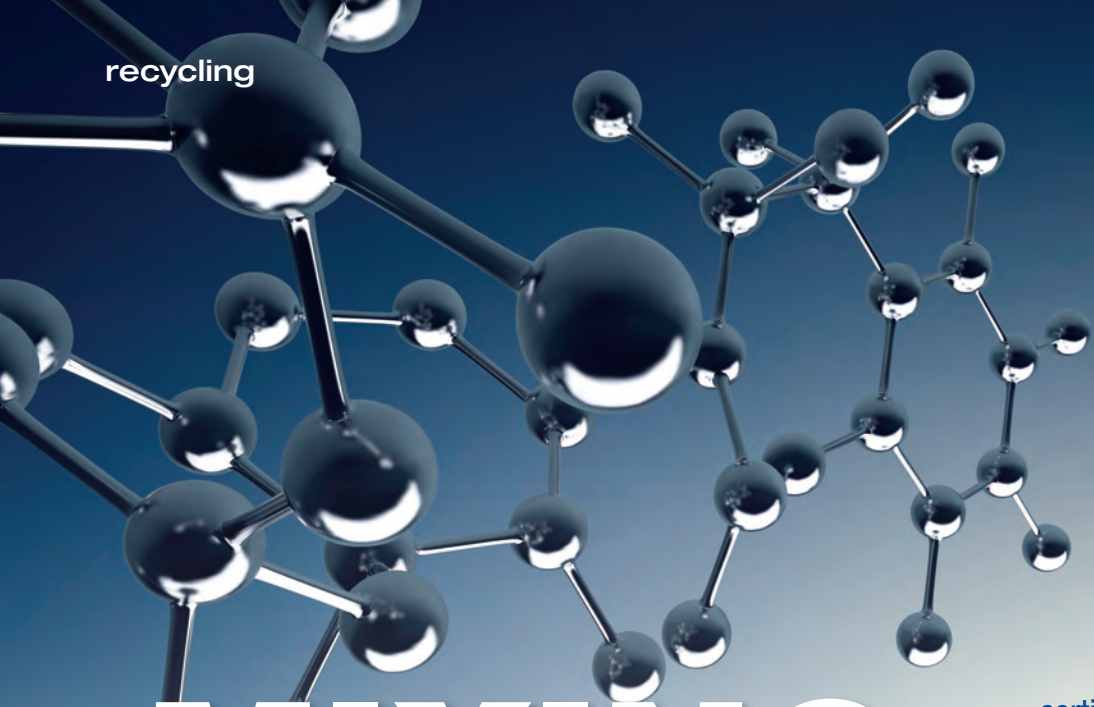

By Mark Stephen, editor

For years, the recycling industry has scrapped residual materials left after sorting and processing because they don't blend well. But it doesn't have to be this way. Functional additives can improve compatibility and offer upcycling opportunities for both recyclers and brand owners.

MIXING IT UP *with* Compatibilizers

Garbage in, garbage out. If the famous adage applies anywhere, it applies to the recycling of post-consumer plastics. Because if recyclers don't get a good yield from the mixed-material bales coming in, the quality of the product going out will be underwhelming, suitable only for lower value goods due to poor material performance.

And it doesn't help that most plastics recyclers are currently seeing sharp decreases in bale quality and yields. "The residual materials that are left over after a bale has been processed are often sold for a few pennies per lb (if they can be sold at all), which is far less than what the recyclers actually paid for the bale," said Kim Holmes, the director of recycling and diversion at the Society of the Plastics Industry. "Recent findings suggest HDPE recyclers are experiencing a 20 per cent yield loss; in PET recycling, the yield loss is 40 per cent. And in bales of material where the resin types are inherently highly mixed, such as bales of plastics from electronics, the most desirable resin types like ABS and HIPS might make up only about 60 per cent of the bale."

So what do recyclers do with that 40 per cent of material that can't be further segregated by resin type, either due to technical challenges related to collecting, cleaning, and sorting or to economic infeasibility? For years, the recycling industry has scrapped incompatible residual materials that are left after sorting and processing, which is an excellent way to lose money. Interested in staying in the black instead? Consider using compatibilizers.

TALK, TALK

Compatibilizers aren't exactly new to the plastics world, but they have long been confined to prime material applications, allowing resins that would not normally blend together to bond in a way that creates enhanced performance when compared with either polymer alone.

More and more recyclers, however, are now finding using compatibilizers as the keys to recycling multi-resin products, chief among them flexible packaging. Take barrier packaging, in which more than one type of resin is present. "Barrier films often contain EVOH and/or nylon layers, which are incompatible with many polyolefins," Holmes said. "But by using compatibilizers, these layers of otherwise incompatible resins can 'talk to each other' and be blended and then used in varying levels to make parts for durable goods." In short, the use of compatibilizers permits multi-resin, residual recycle materials that would otherwise not be compatible to be blended and used in more valuable applications, creating true upcycling opportunities.

A new compatibilizer from Stow, Ohio-based additive

supplier Struktol is a case in point. Called TR 052, the compatibilizer and blending aid is designed for incorporation of regrind/recycled product in a wide range of polymers. "Processors can realize improved physical properties and overall improved processability of compounds requiring some level of recycled content," the company said. "TR 052 has been shown to significantly improve the processability and performance of mixed recycled streams used when separation of the resins is not done prior. The additive compatibilizes dissimilar polymer systems, allowing for expanded use of these mixed recycled streams."

MIX MASTERS

The lowdown on some of today's top compatibilizers

MATERIAL SUPPLIER	BRAND NAME	TARGET RESINS FOR BLENDING
Arkema	Lotader AX8840, Lotader AX8900	PET, PBT, PPS
Arkema	Lotader 3210, Lotader 3410	Polyamide/polyolefin
BASF	Baxxodur EC 301	Cross-linking agent for epoxy resin systems
Dow	Retain	PE/EVOH or PA/EVOH/PE
Dow	Intune	PE/PP
DuPont	Fusabond M603	PE/ PA, PE/ EVOH, PA, EVOH/ PE
DuPont	Fusabond E226	PE/PA, Surlyn EVOH or PA
DuPont	Bynel 41E710	PE/EVOH or PA/EVOH/PE
DuPont	Surlyn 1650	Surlyn EVOH or PA
DuPont	Fusabond P353	PP/PA or PP/EVOH/PP
DuPont	Elvaloy PTW, Elvaloy 3427AC	Polysters/ PE
Struktol	TR 219	Polyamide, PET
Struktol	TR 229	Polyamides, PC, PC/ABS

POLAR OPPOSITES

But even though the case for using compatibilizers is solid, recyclers still have to do their homework. As noted by Holmes, there are several categories of compatibilizers available as material additives in the marketplace today, beginning with bipolar copolymer compatibilizers, which allow polymers with different polarities — in short, whether or not they have positive or negative charges — to be made compatible. (Some examples of polar plastics are PA, PC, PMMA, and ABS. The most common non-polar plastics are PP, PE, SEBS, PS, and PTFE.) "A number of commercial TPEs are based on block copolymers of polar aromatic styrene monomer and non-polar aliphatic butadiene monomer; when the butadiene styrene block copolymer is added to a resin blend, its built-in bipolarity acts to attract the dissimilar polar polymers, creating a compatibility effect," she said. "This approach works well with known segregated streams, such as a non-polar polyolefin with a polar polymer such as nylon, but is of limited value in post-consumer recycle streams containing a multiplicity of polymers that vary from batch to batch of recycled material."

The second category is maleated copolymer compatibilizers. "Maleated polymers can be prepared directly by polymerization or by modification during compounding via the reactive extrusion process," Holmes said. "Their anhydride groups can react with amine, epoxy, and alcohol groups. For example, DuPont's Fusabond M603 is a random ethylene copolymer, incorporating a monomer that is classified as a maleic anhydride equivalent for application uses."

According to Holmes, styrene maleic anhydride copolymer is another suitable agent for compatibilizing normally incompatible polymers such as nylon/ABS blends. "The limitation of this class of additives is their specificity, requiring known chemistry of the polymers to be compatibilized," she said. "In addition, maleic anhydride depolymerizes condensation polymers such as PET and PC, thus

obviating its use in mixed streams such as PCR containing olefins, PET, and other assorted polymers."

The final category is in-situ macromolecular catalysts. "Since monomers become polymers in the presence of catalysts, copolymerization of two or more dissimilar polymers in the melt via in-situ catalysis using thermally stable organometallics holds the possibility of allowing the use of high levels of PCR in consumer goods," Holmes said. "Ester forms of organometallics such as titanates, zirconates, aluminates, and zirco-aluminates provide possible chemistries for R&D in using high levels of PCR in consumer goods, since they are already used as esterification catalysts for PET and as single-site metallocene catalysts for polyolefins. In addition, it's possible that this class of catalysts is synergistic with maleated copolymers."

APTITUDE TESTS

A disadvantage of this last class of additives is their newness to the recycling industry. "Recyclers generally are not R&D chemists, and often require simple additive systems and processes that can be replicated easily in a practical manner and at a reasonable cost," Holmes said. "For example, recyclers will have to become more familiar with reactive compounding techniques to optimize the catalysis effects, and will need the capability to monitor and adjust melt-process conditions."

And an aptitude for chemistry isn't the only stumbling block to maximizing compatibilzer use. A second hurdle is the generally inconsistent nature of the resin mix. "It's often very hard to predict the exact mix of resins in any feed stream, let alone the residual content of that stream after sorting out the desired materials," Holmes said. "This means some further processing and separation might be necessary."

Third, compatibilizers also target specific resin types, meaning recyclers can't use just one compatibilizer for all the post-consumer materials in their recycle stream. "For compatibilizers to work consistently, the recycle feed stream itself has to be fairly consistent in resin composition," Holmes said. "On the other hand, where there are varied recycle streams, the use of organometallic esters should be investigated more thoroughly and their efficacy established. Also, as with any new chemistry, food-contact approval for the compatibilizer use has to be obtained."

These challenges notwithstanding, compatibilizers will no doubt continue to open up new economic opportunities for both recyclers and brand owners. The rebooted motto? Garbage in, quality recycled resins out. **CPL**

FLEXCOOL: THE UTMOST FLEXIBILITY OF APPLICATION AND EFFICIENCY OF OPERATION FROM AQUATECH

Innovation always comes from paradigm shifts.

The **Flexcool solution** from Aquatech uses ambient temperature to cool the processing equipment, with energy savings of between 35% and 50% — making it ideal to serve sets of injection molding machines with diverse characteristics — situations where different users are present and operating at varying processing conditions (temperature, flow, pressure). Flexcool ensures the highest level of control, flexibility, and energy efficiency.

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.

Flexcool

Innovative industrial cooling solutions:
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CRASH course?

A new report predicts rough road ahead for the automotive supply chain. Which means a bumpy ride for North America's tooling industry.

By Mark Stephen, editor

Moldmakers, take heed: A new report is warning that, although the automotive industry is strong today, it's on an unsustainable path and must be prepared for another slowdown.

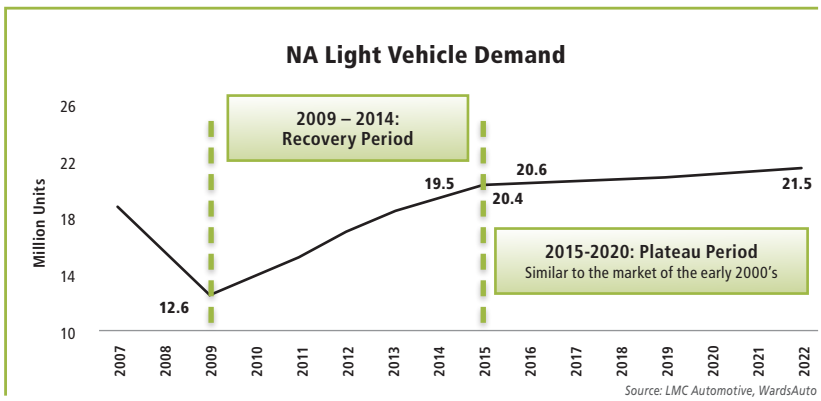
"Although the North American automotive industry is predicted to produce more than 20 million vehicles in 2016, the industry will experience a plateau going forward to 2022," said the report, issued by Southfield, Mich.-based analyst Harbour Results Inc. "The automotive industry has reached an inflection point and the entire manufacturing value chain will need to change the way it traditionally does business to remain profitable and prepare for a future downturn."

The report, written by Harbour Results president Laurie Harbour, identifies a number of reasons for the projected fall-off, beginning with the fact that the once-dominant Big Three automakers of Detroit currently have less than 45 per cent of North American market share, down from a whopping 87 per cent in 1962 — a precipitous slide that's a recipe for industry instability. Added to that, regulatory issues, customer demand, advanced technology, and economic factors are putting automaker profits at risk, Harbour said. "Factors that are eating away at profitability include increased complexity, increased capital investment, increased tooling costs, product development cost and timing, high launch costs, and warranty costs," she said.

A third problem is caused by the sheer number of new vehicle launches, as automakers strain themselves to satisfy post-recession consumer demand — made more difficult to adjust to, paradoxically, by the fact that fewer models will be made of each. "With an unprecedented number of North American vehicle launches scheduled for 2017, 2018, and 2019 — 40, 49, and 39 respectively — resources will be constrained," Harbour said. "[At the same time], a shift to low-volume vehicles with a high mix of product will result in 80 per cent of the models being under 100,000 units in annual volume by 2018."

The end result for the moldmakers? More of the uncertainty they've learned to live with because of previous automotive downturns. "The tool and die industry has continued to face increased challenges, including increased tool complexity, shorter lead times, lack of skilled labour, tooling jobs on hold, capital equipment needs, and cash flow management," she said. "And as we look to the future, there continues to be a capacity gap within that industry."

So despite the relatively smooth day-to-day conditions the auto industry is enjoying right now, it might just be a rough ride for them going forward. **CPL**



Source: LMC Automotive, WardsAuto

Toolmaker ROCAND INC. *goes to Mexico*

Quebec-based moldmaker Rocand Inc. hopes to take a big leap forward by heading south.

The company opened an $8 million manufacturing facility in Silao, Mexico in mid-March, pursuing what it calls "fantastic" growth potential in that country.

The 4,128-square-meter plant — called Rocand Molde y Plastico S de RL de CV — is located in Puerto Interior Industrial Park, one of Mexico's most modern manufacturing districts. "At present, the plant has four five-axis CNC machines, laser welding equipment, wire and sinker EDM, and four Negri Bossi presses and one Battenfeld press that we use for mold testing, prototyping and, if necessary, part production," said Rocand's president Andre Rochette. "The moldmaking equipment is all brand new, and the injection presses — which range from 85 to 900 tons — are almost new. And all of our auxiliary equipment, including a Wittmann robot, is also brand new."

Rocand was founded by Rochette in Quebec City in 1996, and the new operation in Mexico isn't the company's first venture beyond Canada. Beginning in 2008, Rocand opened a series of plants and technical support facilities in France, Germany, and Brazil. And this isn't even Rocand's first time in Mexico, either. The company opened a 13,000-square-foot technical support centre in Monterrey in 2007 that didn't quite take. "We had rented a plant in Monterrey but, despite the fact we had customers nearby, the timing wasn't ideal and we shut the venture down shortly afterwards," Rochette said. "The timing is much better for us now."

That might be, at least in part, because Rocand has six Tier One customers in Silao, which is at the centre of the booming Mexican automotive industry. "Our customer base in Mexico is definitely automotive, but there are other companies located around our new facility that service other sectors, and they're interested in us," Rochette said. "So we see this as an opportunity not only to service our core business, but also to lay the groundwork for expansion going forward. We've already trained new staff and plan to have approximately 100 employees in Silao within five years.

Up to now we've invested $4 million; the total investment over five years will be $8 million."

Back home in Quebec City, meanwhile, Rocand's 90 workers are kept busy developing and making tools for a variety of plastics manufacturing sectors, including automotive, electrical and electronics, consumer goods, biomedical and pharmaceuticals, aerospace, and packaging.

The Quebec City production site was expanded to 20,000 square feet in 2013 — testimony to the modest growth potential the company sees in Canada. "Canada will always be our home, but there's a limited number of injection molding companies to service here, and even fewer in Quebec City, which is why we've always had our eye on the international scene," Rochette said. "With this new manufacturing plant in Silao, we can take another step towards increasing our production capacity and collaborate even more closely with clients and partners."

It's an upbeat twist to having your business go south. **CPL**

MY3DAGENCY.COM wants to revolutionize SHORT-RUN & PROTOTYPE PRODUCTION

By Mark Stephen, editor

In addition to 24/7 traffic gridlock and a professional hockey team that habitually overcharges and underperforms, one of the problems with modern-day Toronto is the lack of meaningful manufacturing going on in the city's downtown core. It used to be a mecca for making things, but nowadays if you had a few bucks for every shuttered factory that's been turned into an upscale, industrial-themed condominium complex, you'd probably have more cash on hand than Justin Bieber.

Which is why it's nice to see a recent startup like MY3DAGENCY.COM come along. Located in Toronto's Liberty Village area — about as downtown as it gets — the company is a leading 3D printing innovator, specializing in producing finished production-quality concepts for Canada's consumer goods packagers and lifelike scale models for the country's professional athletic, bridal, entertainment, and action figure industries.

And in the process it's helping launch what might just be a small-scale manufacturing — okay, *additive* manufacturing — renaissance in downtown TO.

MY3DAGENCY.COM president Michael Gossack with the company's ProJet 660 Pro 3D printer (and a Jason Priestley model).

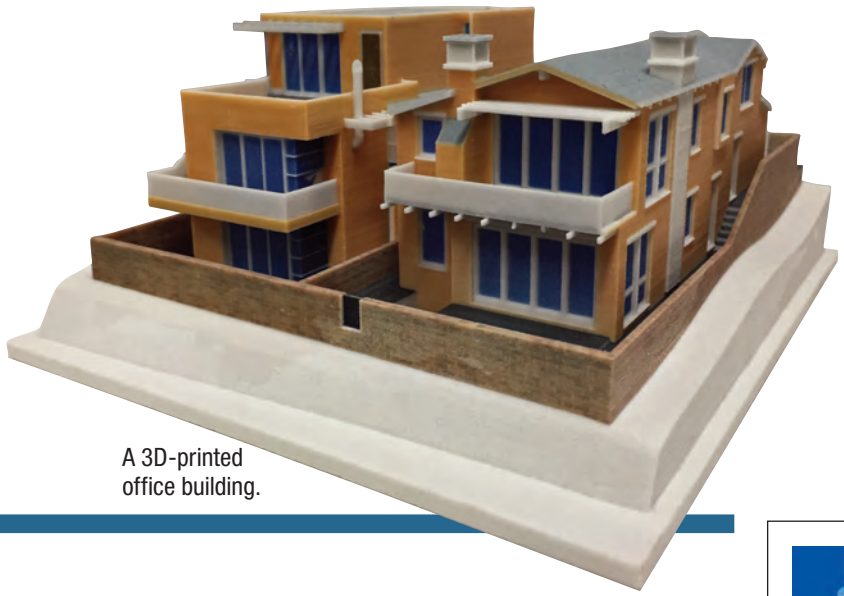
MODEL OPPORTUNITY

MY3DAGENCY.COM was founded in 2014 by company president Michael Gossack with the idea of tapping into one of the ultimate niche markets: using 3D printing technology to make limited edition collectible figures of actors, athletes, and musicians. "Our concept was to get big names in the entertainment and sports industries to endorse realistic, 3D-printed scale models of themselves," Gossack said. "They could then advertise the models online and by tweeting it out to their fans, and we would print each model as it was ordered."

Unlike crude, cartoon-like figurines designed from one or two photographs — think bobblehead dolls, for example — MY3DAGENCY.COM carefully scans an individual in person to guarantee the most realistic, lifelike model possible. "It takes about four minutes to make a complete scan of an individual from head to foot using a handheld scanner," Gossack said. "The data is then sent to a graphic designer who combines, edits, and adds texture to the information for a print-ready 3D model, and then uploads the file into our 3D printer. Each model typically takes a few hours to print, and then goes through a few steps of post-processing and finishing, and is then ready for shipping." The 6-inch models sell for an average price of $179, he added.

At present, MY3DAGENCY.COM is about as lean as a manufacturing company can get, with three

What do TV star Jason Priestley, cake toppers, and yogurt containers have in common? They've all been 3D-printed in stunning detail by this innovative Toronto-based startup. And they might just be the tip of the additive manufactured iceberg.



A 3D-printed office building.

Stubble and all: The real Jason Priestley in the photo backdrop and a 3D-printed model in the forefront.

Photos on this page courtesy of MY3DAGENCY.COM

employees and a single ProJet 660 Pro 3D printer. "It's the simplest and most efficient large-build, full-colour 3D printer of its class on the market, with a net build area of 10 x 15 x 8 inches," Gossack said. "The materials we print with are all polyamide granular powders, which are strong, flexible, and allow us to achieve a high level of detail."

Television actor Jason Priestley was the first Canadian star to have himself 3D-printed by MY3DAGENCY.COM; other notables to date include middleweight boxing champ Stephan Boyd and film and TV actress Tatiana Maslany. As with anything involving the rich and famous, things can get complicated if you're not careful. "Other than politicians — who are in the public domain — we require a celebrity's permission to make a 3D model of them, so I've had to learn a fair bit about copyright and infringement law to pursue this line of manufacturing," Gossack said.

And that's in addition to having to teach himself how to 3D-print, period. "Additive manufacturing is a new and evolving technology, which makes it very difficult to learn; online videos that purport to give you instructions tend to be doctored and unreliable," Gossack said. "In the early days, we actually had to pay a competitor to come in and give us some basic lessons; the rest of the process we learned on our own through trial and error, at the cost of a lot of time and expensive printing material."

But the upside is a business model that seems rock solid. "Since we only print models to order, we don't lose money by having unsold stock piling up," Gossack said. "We've

already been successful enough to have forced our biggest competitor to change its manufacturing style and offer six-inch models, like ours, at much cheaper prices."

The company has also expanded its model-making from sports and entertainment figures to everyday people — brides and grooms in particular. "There's enormous potential for us to 3D-print customized brides and grooms as wedding cake toppers," Gossack said. "They're a lot more appealing than the generic cake toppers the wedding industry has been supplying for decades."

Other manufacturing possibilities, he continued, include creating precise, miniature models of buildings for architects, developers, and engineers; and models of employees, commissioned by their employers, to recognize outstanding achievements or work anniversaries.

PACKAGING POTENTIALS

But MY3DAGENCY.COM's biggest new opportunity might just be in reducing the time and cost of creating new consumer goods packaging concepts and prototypes. "We have the ability to take the physical specification requirements and the artist's conceptual drawing and quickly and accurately integrate them into a finished production-quality form that helps everyone to immediately understand what's intended from the key perspectives of corporate brand, consumer function, and overall design," Gossack said.

The company just passed its first test in this sector with flying colours: designing a new plastic yogurt container for Toronto-based packaging supplier Tier One Promotion Packaging Inc. "Tier One needed a finished production-quality container concept to work in association with its exterior labelling for this new container, which was for a customer in China," Gossack said. "We were able to 3D-print four prototype containers, and Tier One used those to develop and manufacture exterior packaging for the customer on time and on budget. Tier One's president later told us they only took the job because they knew we were available to help them. So it's nice to have played a role in keeping some manufacturing here in Canada."

It's because of this last aspect that Gossack sees an especially valuable role for 3D printing. "If a consumer goods packager needs 10 prototype products or less, it's easy for us to do — they no longer have to go overseas for part production and wait weeks or months for a finished prototype," Gossack said. "As long as we have an electronic file of an artist's drawing of the proposed bottle or container, we can 3D-print it for less money in less than a week. The possibilities are endless, and it's all done by us in-house. Product concepts created using 3D printing will help to reduce manufacturing costs, improve time-to-market indices, and enhance the overall consumer experience."

Now if they could just print a solution to TO's gridlock nightmare, we'd be good. **CPL**

THE WYNNE GOVERNMENT IS DANGEROUSLY NAIVE

On April 25, I attended a Mississauga Board of Trade event featuring Ontario Premier Kathleen Wynne. Ms. Wynne gave a well-polished speech on her "plan" that included "climate change", and she also proudly took credit for the closures of coal-fired generation plants in Ontario. "NO MORE COAL in Ontario," she said. As I mentioned in my previous advertisement, the last coal-fired plant in Ontario was as clean as the current natural gas-fired plants. I had the pleasure of having a one-on-one conversation with Ms. Wynne, and asked her about China's contribution to "climate change". "The technology that we have developed in Ontario we plan to sell to China," she replied. Okay, Ms. Wynne, you can discontinue drinking the Evian now. (Ms. Wynne loves her Evian, but spell it backwards and see what you get…)

Canada has about 0.5% of the world's population but contributes 2% of the world's total greenhouse gasses. China has about 19% of the world's population and contributes 29% of the world's greenhouse gasses. Every year China increases its CO_2 emissions, and is now emitting in excess of 10 billion tonnes of CO_2 annually. Did you know that 42% of Canada's land mass is covered in trees, or that this equates to 10% of the world's forested land? Trees not only need CO_2 to grow, but each tree absorbs about 22 kilograms of CO_2 annually, or about one tone of CO_2 every 45 years. Canada has an estimated 318 billion trees, and they consume about 7 billion tonnes of CO_2 annually.

In terms of automotive manufacturing, Mexico has now replaced Ontario as the envy of the world. Mexico has attracted $23 billion in investment from automobile car companies in the last three years. How much money has Ontario attracted? Mexico plans to increase car production by 56% by the year 2020. Everyone — and especially those of us in the plastics processing industry — knows the benefit of having automobiles made in Ontario: automobile assembly plants create high paying jobs and there are thousands of associated spin-off jobs, including, of course, those in injection molding, blow molding, and extrusion. Ms. Wynne's government is doing everything it can to push Ontarians into public transit. Automakers know this, so why would they put new production facilities in Ontario? Which is why the Ford plant in St. Thomas has been closed, and why production of the Toyota Corolla was moved from Ontario to Mexico, and why Caterpillar left Ontario, and why the Camaro is no longer built in Ontario. Is GM going to close Oshawa? Ms. Wynne, we want car production in Ontario. We love our cars and we're not going to give them up.

Another sign of mismanagement in Ontario is its HOV lanes. Ms. Wynne's government created HOV lanes on the 400 series highways that are not used as intended. These lanes are sparsely populated, which causes the other lanes to be stop-and-go. Is there an association between stop-and-go traffic and "climate change"? There is definitely a slowdown of goods. Road congestion impairs goods from getting to the customer, which adds to the cost of goods. I predict that the Wynne government will add an additional gas tax very shortly, with Ms. Wynne taking advantage of the lower oil rate as she thinks we won't notice. Ms. Wynne, isn't this supposed to be government by the people, not for the people? Don't you get the message? I repeat, we love our cars and we want roads to accommodate them. In the 1950s, President Eisenhower created the "interstate" highway system in the United States and in so doing grew the U.S. economy exponentially. History teaches us much.

The Wynne government is also making things difficult for trucks, specifically with its legislation regarding the governing of trucks. As I understand it, the legislation was introduced to prevent cars and transport trucks from getting into speed-related accidents. It's a good theory, but in reality the legislation is increasing the differential in speed between the two vehicle classes — and speed differential is usually the real cause of an accident. Cars on the 400 series are now averaging 120 km/h, while trucks are limited to 105 km/h. This 15 km/h differential actually makes accidents more likely, not less likely.

The Wynne government's plan is to have electrical vehicles (EVs) in every driveway by 2024. There are a few problems with this. One, are these EVs going to be built in Ontario? Probably not, for the same reason makers of traditional cars are leaving the province. At present, most EVs are made in California. Two, are EVs good in cold weather? Ontario gets cold in the winter in case you haven't noticed, and batteries don't work well in cold temperatures. Three, lithium seems to be choice of element that is used in the latest battery. Is there any lithium being mined in Canada? No, it all comes from Bolivia. In short, then, the Ontario government — which is funded by our money — wants to help the economies of California and Bolivia.

As manufacturers we should be **OUTRAGED!** There many, many things Ms. Wynne's government has done to impair manufacturing. This column only scratches the surface.

I think it's time to **BREAK WYNNE**. The bad, bad smell of naivety is all around and getting worse.

We should all be **LIVID!** If you want to suggest, contribute or vent to the **BREAK WYNNE** campaign, email us @

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.

AUXILIARY EQUIPMENT

Temperature control units offer lower energy costs, higher temperatures

With extra pressure, more flow, and higher maximum temperatures, new *temperature control units* from **Conair Group** are designed to save processors up to US$740 per year in pumping energy costs.

Conair engineers designed the new pump so that the amount of fluid delivered with each revolution of the impeller is significantly increased, resulting in greater pump efficiency as defined by the volume and/or the pressure of water delivered per unit of energy.

The new units also have a very high maximum water temperature. With the high temperature option, they can achieve 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 size cabinet.

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. 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 Conair Group (Cranberry Township, Pa.); www.conairgroup.com; 724-584-5500

Dier International Plastics Inc. (Unionville, Ont.); www.dierinternational.com; 416-219-0509

Industries Laferrière (Mascouche, Que.); www.industrieslaferriere.ca; 450-477-8880

Turner Group Inc. (Seattle, Wash.); www.turnergroup.net; 206-769-3707

Cooling conveyors for hygroscopic materials

Reduction Engineering Scheer has expanded its line of cooling conveyors with the introduction of a new *stainless steel conveyor* which cools highly hygroscopic materials during strand pelletizing — including high-temperature polymers that can't be water-cooled due to their moisture absorption.

The newly designed cooling conveyor is designed for materials such as bio-based plastics, highly-filled metal compounds, along with certain polymers used in the medical industry that are water soluble.

The cooling conveyor uses a solid stainless steel belt instead of the standard perforated plastic belt which typically allows water and air to pass through it. The conveyor belt employs a very thin continuous sheet of solid stainless steel to carry the strands, and cooling water under the belt provides the majority of the cooling by transferring heat through the thin layer of metal. Fans placed over the conveyor bring the temperature down an additional few degrees.

The cooling conveyors are available as customized units to meet the unique requirements of laboratory and specialty compounders.

Reduction Engineering Scheer (Kent, Ohio); www.reductionengineering.com; 800-844-2927

INJECTION MOLDING

State-of-the-art dosing and delivery system

The new *T-400 SCF* gas delivery and dosing system from **Trexel Inc.** is designed to provide cost-effective foaming of large injection molded parts by delivering up to 50 grams of nitrogen in a 45 second cycle (0.5 per cent by weight for a 10 kg part weight) in molding machines with screw size greater than 90 mm.

The system is designed to convert industrial-grade nitrogen into a super critical fluid, which it then doses and injects into the plasticizing unit of the molding machine at a pressure of up to 240 bar, creating a lower density microcellular material structure in the molded plastic part.

The SCF produces gas on demand only, minimizing energy consumption and maximizing booster pump lifetime. It features an advanced control system with a 15-inch, PC-based graphical touchscreen user interface. Setup parameters require only the shot size and percentage of the super critical fluid content.

The T-400 retains the similar performance standards from its smaller T-series counterparts yet allows for significant advantages for large injection molded parts, including primary material savings due to a density reduction in the material; an increased opportunity to optimize mold design for significant secondary material savings; a reduced clamp tonnage requirement that enables the purchase of smaller machines which directly reduces initial investment; and improved dimensions (particularly with polyolefins) for better tolerances.

Trexel Inc. (Wilmington, Mass.); www.trexel.com; 781-932-0202

BLOW MOLDING

Multi-layer thickness measurement system

The ability to effectively detect and measure individual layers, including barrier layers, within multi-layer plastic bottles and preforms is an essential step to ensure consistent product quality — however, current techniques are highly destructive, contact-based, and time-consuming.

New from **TeTechS**, the *PlasThick* system is a fast, non-contact, non-destructive solution that quickly measures the individual layer thickness of plastic bottles and performs, and is said by the company to be the only solution on the market that can measure both opaque and translucent plastics.

PlasThick is designed to offer high precision in conducting measurements of up to 10 layers, ranging in thickness from 0.01 mm to 5 mm, in a matter of seconds. PlasThick not only enables users to effectively determine individual layer thickness, but also allows them to locate and measure the costly, ultra-thin barrier layer within multi-layer structures.

PlasThick is powered by the company's TeraGauge core terahertz platform technology, making it capable of being integrated into off-line, at-line, or in-line systems at manufacturing facilities.

TeTechS (Waterloo, Ont.); www.tetechs.com; 519-584-9998

EXTRUSION

Converting mixed regrind into high-quality thermoformed sheet

The new *high-vacuum twin-screw extrusion (HVTSE)* production system from **Processing Technologies International (PTi)** is designed to convert mixed regrind (PETG and APET) into processable, high-quality thermoformed sheet for consumer packaging.

Many thermoformers use a PET-GAG sheet, which is a PETG/APET/PETG multi-layer sheet structure, for consumer packaging — but the downside is that scrap from this sheet structure ends up in a landfill because extruders can't effectively process this material with conventional equipment. The HVTSE dryer-less extrusion system is well-suited to process mixed PETG and APET sheet scrap. PTi's HVTSE technology, which allows PET to be processed without the need for crystallizing and drying, converts this material into usable sheet.

HVTSE systems ranging from 85 mm to 170 mm are capable of processing PET at rates ranging from 2,300 lbs per hour (1,045 kg per hour) to 5,500 lbs per hour (2,500 kg per hour), and convert a variety of resins including post-consumer and industrial PET/PLA, PP, HDPE, HIPS, and more.

The energy-efficient design allows virgin or recycled PET to be processed without the need for raw material drying and crystallizing. It employs a single atmospheric and dual high-vacuum vent system with a co-rotating twin-screw extruder, which allows moisture and other volatiles to be removed as part of the extrusion process.

Processing Technologies International (Aurora, Ill.); www.ptiextruders.com; 630-585-5800

SIZE REDUCTION

Shredder controls optimized for North America

On the basis of customer feedback, **Vecoplan LLC** has reengineered the control panels on their V-ECO shredder series, optimizing them for the North American market.

Dubbed *REV 11C*, the new panels are UL and CUL-listed,

and meet Safety Category 3 and Performance Level D standards. Operated through HMI (Human Machine Interface) touchscreens, intuitive function controls are designed to be very user-friendly.

Equipped with PowerFlex 525 and 755 variable frequency drives, the panels also incorporate a complete Ethernet communication suite, maximizing communication speed between drives and PLC. This also enables quick and easy reprogramming or reconfiguring through one external connection port. Upgraded to CompactLogix Control Processors, the new control panels can be quickly and easily integrated into existing plant-wide automation systems.

Mechanical innovations on V-ECO shredders include variable frequency inverter drives, "W" rotors embedded with five rows of cutters, single or double rows of bedknives, hydraulic lift-up cutting chamber floors, and externally adjustable cutting tolerances.

Vecoplan LLC (Archdale, N.C.); www.vecoplanllc.com; 336-861-6070
Greg Parent (Toronto); 416-678-0154

RAW MATERIAL HANDLING

Bulk bag filler pivots fill head to operator

A new *rear-post bulk bag filler* from **Flexicon Corporation** features a swing-down fill head that pivots to the operator at floor level for safe, ergonomic spout connections, and a low-profile loading deck that allows removal of filled bags using a pallet jack.

The cantilevered fill head pivots downward to a vertical orientation that places the inflatable bag spout seal, inflator button, and four bag loop latches within an arm's length of an operator standing on the plant floor, eliminating the need to climb steps, strain or risk injury associated with overhead connections to conventional fill heads.

Once the operator connects the bag straps and activates the inflatable bag spout collar, the filler automatically pivots the fill head to horizontal, inflates the bag to remove creases, and activates a flow control inlet valve or feed conveyor. As load cells register the gain in weight, the controller raises and vibrates the loading deck at programmed intervals to densify material and promote flow into bottom corners of the bag. Once the bag reaches its target weight, the controller automatically stops the flow of incoming material, deflates the bag spout collar and releases the bag straps, allowing the filled bag to be removed using a pallet jack or forklift.

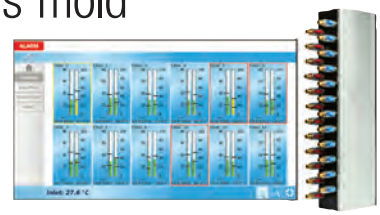
A patented mechanism automatically resets the latch after releasing the bag loops, and repositions it as the fill head pivots into a vertical position, enabling the latch to receive bag loops inserted by an operator and to re-latch automatically.

Flexicon Corporation (Bethlehem, Pa.); www.flexicon.com; 888-353-9426

Rate Technology Systems Ltd. (Mississauga, Ont.); www.ratetechnology.com; 905-607-3240

MOLD TECHNOLOGY

Platform monitors mold cooling circuits



AST Technology's new *System Cooling* platform gives molders the ability to monitor water flow and temperature circuits inside the mold, which are critical to a stable process and the manufacture of dimensionally stable parts.

Cooling constitutes 60 per cent of a mold's overall cycle time, which means System Cooling fills a huge role by

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monitoring every circuit in the mold individually, protecting the mold and improving quality by quickly identifying cooling problems and alerting the user to various common cooling circuit problems.

Molders that run parts with critical tolerances and require consistency of mold cooling can generate reports to support their industry certifications using the system's remotely mounted touchscreen controller. The touchscreen monitor displays the flow and temperature for every circuit, and is used to set warning and alarm limits for flow and temperature to all monitored zones individually, view current status graphically or as text, and store data and mold setups in the internal memory where they are time-stamped and date-stamped for traceability.

AST Technology (Wauconda, Ill.); www.asttech.com; 847-487-1000

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

MATERIALS

Two new PP grades for healthcare applications

LyondellBasell is offering two new grades in its portfolio of *Purell* resins used in pharmaceutical, healthcare, laboratory, and diagnostics applications.

Outperforming other homopolymer PP grades, Purell HP548N offers improved stiffness, which is a property highly valued by customers when rigidity is required for certain medical applications. This grade is well-suited for injection molding technology, and offers an optimized balance between fluidity, stiffness, and crystallization behaviour. Customers report this grade provides advantages during processing, such as time, cost, and energy savings. Purell HP548N is used by customers in vials, pill strips, medical devices, syringe plungers, and rigid containers.

Purell RP315M is a random copolymer designed to offer a good balance of physical/mechanical and optical properties for cast film applications. This new resin features superior sealing performance, an additive package containing slip and anti-blocking agents, low gel content with good optical and aesthetic properties, and a wide processing window. Some typical customer applications for Purell RP315M include packaging of medical devices, cosmetics, flexible packaging, labware, and caps and closures for the pharmaceutical industry.

LyondellBasell (Houston, Tex.); www.lyondellbasell.com; 713-309-7200

How to detect water flow restrictions

By Steve Johnson, ToolingDocs LLC

Usually overlooked until a problem arises, water lines and bubblers can become lined with calcium and rust over time. And it only takes a 0.030-inch buildup on the inside diameter of a water line to reduce the cooling capacity of that line by a whopping 60 per cent.

Other restrictions include small pieces of plastic, rubber, nylon tape (from pipe fittings), and broken off chunks of brass, steel, and even thread seal paste. These clogs are either caught in filters or are easily seen after the mold is disassembled as they damn up around O-rings or any reduction of diameter like water fountains/bubblers or baffles. Other times, the restriction is inside a plate or cavity block, making identification and removal even more difficult.

Production techniques to remove these obstructions are limited to reversing the direction of water or air in hopes of dislodging them; but these seldom work or, if they do, can cause the blockage to migrate somewhere else in the mold.

On the bench, meanwhile, molds are disassembled to individually check each component to locate and then remove the restriction. A popular bench test involves blowing air through lines by hand with a nozzle while listening to the sound and feeling the amount of air coming out of the outlet line or fountain with the other hand. The problem is, gauging the amount of air blowing through a water circuit is practically impossible, and can vary from repair tech to repair tech; and even a small detail like using an air nozzle with a rubber tip that seals tight against whatever you're blowing through can make a huge difference in the "feel" and "sound" of the air coming out of fountains or the outboard fitting.

TWO TYPES OF FLOW MEASUREMENT

There are two types of water circuit checks. The first is a comparative analysis, where the water flow (GPM) of one circuit is compared to a like circuit of the same ID and configuration.

For example, if you check the water circuits of a 16-cavity mold and the pattern is 4 x 4 or 4 rows of 4 cavities, you would then check each of the 4 rows, one at a time, to determine if there was a restriction somewhere in the row of 4 cavities. On our bench manifolds, we installed a shut-off valve on to reduce the inlet line pressure to 10 psi, which puts the GPMs in the centre of the flow meter gauge (1.5 GPMs). This now becomes our test setting for the rest of the water lines, and allows an internal restriction to be easily recognized by an increase in inlet pressure in combination with a reduction of GPMs.

The second check involves the calculation of a Reynolds number to determine if the circuit has turbulent or laminar flow. To find out if a water line or circuit has turbulent flow capability, the best method is to install a flow meter (set up with quick disconnects) on a mold water line (checking only one line at a time) while in production at the press, so water temperatures and additives can be factored in. Water temperature, additives ratio, viscosity, pressure, and water line size all influence GPM, and therefore influence turbulent flow. A common rule of thumb is that anything over 2.0 GPMs usually results in turbulent flow, but consult a GPM flowchart for a better breakdown. **CPL**

Steve Johnson is the operations manager for ToolingDocs LLC, part of the PCIC Group of Companies. He also has his own business, MoldTrax, in Ashland, Ohio. He can be reached at steve.johnson@toolingdocs.com or 419-289-0281.

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