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Canadian Plastics **75** YEARS

FEBRUARY 2018

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Common questions, uncommon answers • p23

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FROM THE ARCHIVES

There was an important meeting held at the Constellation Hotel in Toronto in July 1967, and a *Canadian Plastics* reporter was there. As later recounted in our August 1967 issue, the meeting was attended by representatives from 22 Canadian extrusion companies, and the upshot was the decision to establish a profile extruders division within SPI Canada, which was the forerunner of today's Canadian Plastics Industry Association. Tom Nicholson, president of Toronto-based extruder Polyform, was named as the chairman of the newly formed division; Raymond Dallaire, of Quebec's Futurama Plastics, was selected as vice chairman; and SPI Canada's Ron Evason was picked as secretary/treasurer.

**Number of the month:
2.3%***

* Rate of economic growth in Canada for 2018 as forecast by the International Monetary Fund. (See pg. 14)

Cover Photo: Getty Images



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16 INJECTION MOLDING: Transparently innovative

Injection molding is the most common method of part manufacturing in the industrial sector, indispensable for producing high volumes of the same item. But the parts coming out are only as good as the resins going in, which makes material selection a key consideration for any molder. Here are some of the newest cutting-edge resins and additives on the market.

20 SIZE REDUCTION: The cutting edge

Manufacturers and suppliers of size reduction equipment are headed for early, unplanned retirements if they don't respond quickly to the needs of their plastics processing customers. So what do those customers need? We asked the manufacturers and suppliers themselves.

23 PURGING COMPOUNDS: Asked and answered

Since many plastics processors treat commercial purging compounds as an option instead of a necessity, CPC makers and suppliers have to be on top of their games when dealing with these often sceptical customers. Here are some of the most common questions they face about how to choose and use purging agents, and their answers.

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Good and bad omens for 2018



There's a special place in hell, someone once said, for those who remain neutral during difficult times. At the risk of feeling the heat, I'm on the fence as I contemplate the plastics industry's economic prospects in 2018. (Which is also this magazine's 75th anniversary — hence the new logo on the cover — and which we'll be exploring in more detail in future issues.)

There's positive news for some of Canada's plastics processors, for sure. For one, the federal Liberal government says it will finally fulfil a campaign pledge to cut the small business tax rate to nine per cent by 2019 — the rate was cut to 10 per cent effective Jan. 1, 2018 — and will also drop a proposal aimed at limiting the ability of incorporated business owners to convert income into capital gains, which are taxed at a lesser rate. The planned change had been slammed by critics as an obstacle to transferring family businesses on to the next generation.

And as I write this in late-January, Philippe Couillard's Quebec Liberals are planning to cut taxes for small and medium-sized businesses in the next provincial budget.

On the corporate side, however, there appears to be no tax relief coming. In a speech at the Davos summit in Switzerland in January, Prime Minister Justin Trudeau said that Canada won't be slashing taxes to compete with Donald Trump's America. Canada's average corporate tax rate is about 27 per cent now, which doesn't look good compared to the new corporate tax rate of 21 per cent — down from 35 per cent — in the U.S. Some banks are now warning that the substantial tax change in the U.S. could end up inflicting more damage on the Canadian economy than the possible termination of NAFTA. In its first public estimate of 2018, for example, the Bank of Canada predicted the U.S. tax reforms will encourage

firms to divert more of their planned investments from Canada to south of our border, trimming half a percentage point off Canadian investment by the end of 2019.

On the other hand, based in large part on the U.S. tax cuts, the International Monetary Fund has raised its estimate for economic growth in Canada for 2018. In a new report, the international lending agency said that U.S. tax cuts are expected to help boost global economic growth this year, and as a result it now projects Canada's economy will grow 2.3 per cent in 2018, up from an earlier estimate of 2.1 per cent. Growth for 2019 is forecast at 2.0 per cent, up from an earlier projection of 1.7 per cent.

So we'll have to wait and see how this one plays out.

But here's something with no possible upside: Trudeau also said in his Davos speech that his government has no plans to reduce regulatory red tape. This one will hurt, as all the evidence suggests that businesses coast-to-coast are being weighed down by stringent and often unnecessary regulation, which is essentially a huge, hidden tax. For example, a new report from the Canadian Federation of Independent Business (CFIB) said that complying with "unnecessary, redundant or overly burdensome" red tape cost Canadian companies \$10 billion last year, with small businesses bearing the brunt of that burden. "Companies with more than 100 employees spend about \$1,253 per employee on meeting regulations, but those with fewer than five workers spend an average of \$6,744 per employee," the CFIB said. Contrast our reams of red tape with the Trump administration's rapid deregulation of the American economy, and it could spell trouble.

With all this in mind, here's my belated New Year's wish: that I've underestimated the economic positives and overestimated the negatives.

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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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Fanta reborn in new spiral PET bottle

After 70-plus years we all start to look our age, as even a quick glance at Rolling Stones' guitarist Keith Richards demonstrates.

The Fanta brand soft drink is no exception. Seven decades after the Coca-Cola Co. introduced the popular product — it's biggest brand after Coke — the bottle style was beginning to look a little tired.

Which is why Coca-Cola recently partnered with Sidel, a division of packaging supplier Sidel Group, to rejuvenate the Fanta brand in a new "spiral" PET bottle redesign. "Like any product, Fanta has evolved over the years, with a number of bottle redesigns under its belt," said Gregory Bentley, Coca-Cola packaging engineer in charge of global project coordination. "However, the popularity of the Fanta Splash bottle shape had led to it becoming something of a generic bottle for sparkling beverages on the supermarket shelves of key markets, which diluted the Fanta ownership of the bottle shape."

As a long-time supply partner, Sidel was enlisted to qualify the new Fanta bottle for industrial production. But it wasn't a particularly easy job. "The new bottle shape required precise understanding of how PET behaves under pressure, particularly how the carbonation of the beverage can potentially deform the bottle sections, which could lead to the drink spilling," Bentley said. And just to make things more difficult, the bottle had to be 100 per cent recyclable.

The new design is said to be a rule breaker in the world of carbonated soft drinks. "It features a spiral, inspired by the twisting of an orange to release its juice, and is based on a series of ribs decorated with small bubbles, including a torsion in the bottom half," Bentley said. "This spiral gives the Fanta bottle an unusual, asymmetric structure which presented a real challenge in terms of developing a container able to withstand deformation and stability issues."

The spiral bottle required full design testing and refinement, achieved through more than 60 technical drawing iterations and Finite Element Analysis to test performance using computing analysis. Moreover, it involved the production of 15 pilot molds and feasibility tests carried out by Sidel to validate the final design.

A similar bottle shape has been deployed for the whole Fanta bottle family and is now available for 500 ml, 1L, 1.5L and 2L formats. Also, an alternate 500 ml spiral bottle has been developed specifically for gravity-fed inclined shelves, which are typically implemented in cold chain distribution. "This required specific design rules to be



Photo Credit: Sidel Group

adopted, with very precise bubble numbers and locations around the ribs which constitute the spiral," Bentley said.

Fanta's new spiral PET bottle is currently available in Italy, Poland, Malta, Serbia, Finland, Romania, and the UK, with plans for global roll-out over the coming months.

And as for the global roll-out of a redesigned Keith Richards, we'll keep you posted.

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Montreal start-up wants to fast-track your R&D

You don't have to read Shakespeare to know that to be or not to be is one of the world's oldest unanswered questions. A modern variation that plagues many small and medium-sized manufacturers is whether to outsource their research and development (R&D) or not.

And the stakes can be almost as high. The end goal of R&D is to innovate: to obtain new knowledge, applicable to your business' needs, which can eventually result in new or improved products, processes, systems, or services that can increase sales and profits. Big corporations and manufacturers typically have the resources necessary to conduct their own R&D in-house, but that's not the case for many smaller companies, which don't have the time, expertise, and manpower necessary to devote to creating new products — let alone the money to cover a high front-end investment and therefore a longer period of negative cash flow.

Which is why many of Canada's plastics processors should get a little excited about AxiPolymer Inc., a new product development company specializing in the polymer industry.

The Montreal-based firm was founded last year by Dr. Ata Zad, a polymer science graduate of École Polytechnique de Montreal with over a decade of experience working for such companies as Teknor Apex and Solmax. AxiPolymer's goal, Zad said, is simple: to fill a void in the plastics industry by providing product development services for companies to launch innovative products more efficiently.

And since, now more than ever, the secret of commercial success is staying ahead of the competition,

it's a void that desperately needs filling, Zad added. "More than almost any other manufacturing segment, plastics processors have to innovate to compete, and other businesses may have access to the same technology and compete with lower prices or stronger marketing," he said. But while innovation is



AxiPolymer founder and president Dr. Ata Zad.

Photo Credit: AxiPolymer Inc.

necessary, the R&D behind it can — as we've noted — be difficult for the small and medium-sized firms that constitute the bulk of the plastics manufacturing sector. "Many other industries have access to external firms that specialize in R&D to fulfill their needs, but plastics companies are almost left alone in this regard," Zad said. Traditionally, these companies

have had to use specialized nonprofit research institutions or universities — but these have drawbacks too, Zad continued. "Universities and research agencies are fine for developing long-term projects, but don't have the flexibility for shorter projects that demand quick turnaround times," he said. "Which means that when a market is growing very fast and competitors are rushing in, as is the case with today's plastics industry, by the time they deliver a developed product, it's too late for the manufacturer to be the first to market. And for industrial projects, it also helps to have an industrial, as opposed to an academic, perspective."

EXPERIENCE PAYS OFF

Which is where AxiPolymer comes in. The company employs a network of experienced polymer engineers and industrial scientists to develop a given application before new entrants arrive and the window of

opportunity closes. "I took my time to assemble the right team of university researchers and plastics industry veterans with more than 100 years of combined experience in the polymer industry," Zad said. "Some of our researchers, in particular, felt wasted in the slow pace of the university setting, and are very eager to get working for private sector product development."

AxiPolymer's product development services run the gamut from A to Z. "We can define innovation strategy with a customer, explore their strengths and identify major potential projects, conduct a feasibility study for a proposed new technology, develop custom additive compounds for a new product, execute the product development process from start to finish, and protect the customer at the end by developing intellectual property," Zad said. "We also have access to the latest testing equipment — including tensile tests, impact tests, tests for resistance and permeability, dynamic mechanical analyses, and rheological analyses — and pilot plants in injection molding, extrusion, blow molding, and five-layer films."

And AxiPolymer's emphasis, Zad continued, is on speed. "My colleagues and I have designed a small, agile structure to provide a very fast time to market for a technology or service," he said. "Outsourcing R&D and product development is the best way for many Canadian plastics companies to innovate. In bordering the U.S., they have the biggest market in the world at their doorstep; the challenge is to innovate beyond what American and other competing firms can do, and our goal is to help them."

To modify Shakespeare, then, it's a possible solution to an R&D conundrum that — for small and medium-sized manufacturers — can make the difference between being and not being in business.

CPL

Huntsman Corp. founder Jon Huntsman dies at 80



Photo Credit:
Huntsman Corp.

Industry legend Jon M. Huntsman, founder and Chairman Emeritus of specialty chemicals firm Huntsman Corp., died on Feb. 2 at age 80.

Born in Idaho, Huntsman got his start in the plastics industry in the late 1960s, working for a California-based packaging company partly owned by Dow Chemical Co. After founding Huntsman Container Co.

in 1970 as a plastic foam packaging maker, he developed the revolutionary PS “clamshell” container used by fast food restaurants like McDonald’s in 1974, and then went on to invent as many as 30 other popular products, including the first plastic plates and bowls.

In 1982, Huntsman formed Huntsman Chemical Co. in Salt Lake City, Utah. The firm expanded through a series of strategic acquisitions — including from Texaco and Imperial Chemical Industries — and now employs 10,000 workers and has annual sales of about US\$7 billion, and produces polyurethanes, pigments, advanced materials, performance products, and textile effects. Huntsman had stepped down as executive chairman of the firm on Dec. 31, 2017, at which point he was named director and Chairman Emeritus of the company.

Huntsman received numerous industry awards in his long career, including membership in the Plastics Hall of Fame and a leadership award for lifetime achievement from the American Chemical Society.

CPL

Nova investing \$2 billion in new facility and plant expansion in Ontario

Nova Chemicals Corp. has announced plans to invest more than \$2 billion in two new significant growth projects for its Ontario operations.

In a statement, the Calgary-based plastics and chemical company said the funds will go towards building a new PE facility in the Sarnia-Lambton region, and also pay for the expansion of Nova’s current Corunna site in the southwestern Ontario area.

The expansion of Nova’s Corunna cracker by approximately 50 per cent will provide ethylene feedstock to a new PE facility, Nova’s second advanced Sclairtech technology facility (AST2). The AST2 facility is designed to increase Nova’s PE production capacity by approximately 950 million lbs per year.

Site preparations are currently underway for both projects, Nova said, with start-ups targeted for late 2021. CPL



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DMS open house highlights new ownership, new direction

Mold component supplier DMS Components recently held a well-attended open house at its headquarters in Windsor, Ont. to celebrate the fact that, after 40 years of business, it now has new ownership.

In October 2017, family-owned DMS was sold by owners Dave and Breen Belleperche to Vince Schiller, a Windsor-area businessman and owner of Southwestern Manufacturing. Tom Kaschalk, formerly at Ramstar Carbide Tool Inc., has also recently been added as general manager of sales and operations, and Heather Amlin-Boisvert is the new director of human resources and operations. "Under Vince, Tom, and Heather's guidance, we've spent the last four months rebranding the company, which includes a policy of putting quality cards in with the packaged items sent

to customers that contain the name of the person responsible for the order," said DMS vice president Mike Hicks. "It's unusual to do that in our industry, but it gives the employee and the company greater accountability."

And the Jan. 16 open house was part of that rebranding process. "We had approximately 200 Canadian and American moldmakers and other customers attend the event, as well as the German organizers of the Molding Expo trade show in Stuttgart and most the board of directors of the Canadian Association of Mold Makers," Hicks said. "It was a way to further highlight our rebrand, and also to reach out to customers to get their opinions on what is working and what needs improvement to make our business



Meeting and greeting at the DMS open house.

Photo Credit: snapd Windsor

run smoother."

DMS currently employs 15 people and is looking to add to its staff with positions for marketing, sales, and its warehouse. The company supplies more than 12,000 parts integral to moldmaking, including mold bases, ejector pins, core pins, and brushings. **CPL**

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Horizon Plastics sold to U.S. molder

As part of an ownership transition plan, Horizon Plastics International Inc., a long-time Canadian-owned injection molding company headquartered in Cobourg, Ont., has been bought by Columbus, Ohio-based Core Molding Technologies, a compounder of custom sheet molding compound and molder of fibre-glass reinforced plastics, for approximately US\$63 million.

Horizon will now operate as a wholly-owned subsidiary of Core Molding.

Founded by Clay Elliott and Albert Traub in 1972 to fill a gap in the little-known structural foam molding industry, Horizon is now a leading custom molder of multi-nozzle structural foam and structural web products, with over 20 product lines. The company has approximately 250 employees operating within two manufacturing facilities located in Cobourg and Nuevo Leon, Mexico. In 2003 the organization passed on to the

second generation, Brian Read, Elliott's son-in-law who was a partner in the firm since the 1980s.

"As I looked to transition ownership of Horizon, it was important to find the right partner, and as a long-term Cobourg resident and business owner, future stability of the organization and support of our outstanding technical and production teams was a high priority," Read said in a statement. "I also favoured a strategic partner with the scale and technology foundation to continue growing these specialized processes into expanded applications. Core Molding is that partner."

Horizon reported annual sales of approximately \$60 million last year, the statement said.

Core Molding plans to continue all Horizon operations and "does not expect any significant restructuring, shut-down, or employee severance costs," the statement added, and the company's name will not change. **CPL**

Aoki holds NPE2018 machine preview

Japanese injection stretch-blow molding machine maker Aoki Technical Laboratory Inc. kicked off its NPE2018 season earlier than most exhibiting companies by holding an exhibition machine preview at its manufacturing headquarters in Ueda, Japan on Jan. 30-31. The event — which featured bottle production on the shop floor and seminar presentations — drew almost 200 customers from North and South America, Europe, the Middle East, and Asia, and the main focus was on the company's new AL series of injection stretch-blow molding machines.

The AL machines are designed to reduce production costs and save space and energy through machine and mold downsizing and — depending on the model — can handle mass production of different types of con-

tainers from narrow neck to wide mouth. The new series features Direct Heatcon, a proprietary Aoki molding technology that eliminates the need for reheating by enabling preforms to be injection molded and heat conditioned at the same time; and a high-speed mold release recently developed by Aoki to shorten injection, cooling, and blow time. “The AL units could cut the cycle time by up to 60 per cent from Aoki's earlier SBIII series, so customers can dramatically increase production volumes per cavity,” Jose Penalozza told *Canadian Plastics*, which attended the preview. Penalozza is the head of Mississauga, Ont.-based Penzola Solutions, which represents Aoki



Checking out one of the AL units at Aoki's machine preview.

in Canada. “The new machines also offer stable molding at lower processing temperatures in PET, and can use other materials such as Tritan, HDPE and PP,” he said.

NPE2108 runs from May 7-11 at the Orange County Convention Center in Orlando, Fla.; Aoki will be exhibiting at S11085 in the South Hall. **CPL**

Machinery sales veteran Bob Harris passes away

Robert (Bob) Harris, a long-time machinery salesman in Ontario's plastics industry sector, passed away on Dec. 22, 2017 in Orillia, Ont. at age 80.



Harris got his start as a salesman with Toronto-based auxiliary equipment maker Mould-tek Industries Inc. in the early 1960s. In the late 1960s he joined Toronto's Danson Corp. Ltd. — which was then one of Canada's biggest machinery sales firms — and rose to become the company's manager of injection machine sales during a period when Danson represented Natco, which was the largest American manufacturer of injection molding machines at that time. Harris left Danson in 1972 and cofounded sales firm Plastics Machinery Inc., in Markham. He co-owned the company with Glen Billinger beginning in 1977, and the two worked together for 15 years. “Bob was a great salesman, very honest, and a tremendously innovative person,” Billinger said. Harris struck off on his own one last time in the early 1990s, owning and operating machinery sales firm Cactus Machinery in Toronto.

After his retirement, Harris was known for hosting his annual “Bob Harris Golf Tournament” at Horseshoe Valley Golf Course in Barrie, Ont., which involved other Ontario plastics pioneers. Harris' son Keith is also an industry veteran, with a 30-year career that includes working for Mould-tek and now for Hamilton Plastics Systems in Toronto. **CPL**

Husky installs energy storage system to cut power costs

Processing equipment maker Husky Injection Molding Systems Ltd. is set to benefit from the recent installation of what it calls a “first-of-its-kind” energy storage system at its headquarters in Bolton, Ont.

Constructed and installed by Convergent Energy + Power, a developer of energy storage projects throughout North America, the system was custom-made for Husky's plant, and will reduce Global Adjustment demand charges, which can account for up to 70 per cent of electricity bills for some customers in Ontario. Installed the end of 2017, the project is anticipated to reduce electricity cost on the load it addresses by almost 30 per cent per year starting this year.

Convergent worked with Lockheed Martin Energy to install their GridStar lithium-ion battery systems, and also used local Mississauga, Ont.-based vendors for the balance of plant equipment, Ontario-based S&T Electric for construction management, and SNC Lavalin for the design work. **CPL**



Photo Credit: Husky Injection Molding Systems Ltd.

Steve Maguire, nine others join Plastics Hall of Fame

Steve Maguire, the founder of Aston, Pa.-based Maguire Products Inc., is among 10 plastics industry veterans recently named by the



Photo Credit:
Plastics Academy

Plastics Academy to the Plastics Hall of Fame. Maguire Products is a maker of gravimetric blenders, feeders, and other auxiliary equipment. Some of Steve Maguire's major contributions include the Maguire weigh scale blender, vacuum dryer, Gaylord sweeper, shuttle granulator, liquid colour delivery system, and low-profile vacuum receiver. Steve Maguire remains a prolific inventor today, holding more than 40 patents with 11 patents pending.

The other nine inductees are:

- Robert Ackley, who started his career at Pawcatuck, Conn.-based extrusion equipment maker Davis-Standard LLC as a draftsman in 1959 and advanced through numerous

roles, including vice president of operations and vice president of engineering and R&D, before being named president in 1983.

- Ira Boots, who helped build Evansville, Ind.-based Berry Plastics Corp. into a packaging giant and now serves as chairman of U.S.-based machinery manufacturer Milacron LLC.

- Karlheinz Bourdon, who worked in senior management positions for Ferromatik Milacron and currently is senior vice president of integration for KraussMaffei Corp.

- David Cornell, who worked for Eastman Chemical Co. for 28 years and led the commercialization of polyester plastics, most notably PET bottle polymer.

- Donna Davis, who currently serves as ExxonMobil's sustainability and advocacy manager, plastics and resins, and has also served in many roles for the Society of Plastics Engineers, including president from 2003-2004.

- Donald Graham, the founder of plastic processing equipment maker Graham Engineering and of Graham

Packaging Co., a major blow molder based in York, Pa.

- Max McDaniel, a senior fellow scientist and catalyst technology expert at Chevron Phillips Chemical Co. who holds more than 370 patents and has written hundreds of peer-reviewed technical papers.

- Martin Stark, a 40-year veteran who spent his career with Battenfeld Corp. in Skokie, Ill., and Williamston, Mich.-based blow molding machinery maker Bekum America Corp., where he served as president and now as chairman.

- Hideo Tanaka, whose engineering designs spanned a wide range of processes from nylon inflation blown film through all-electric injection molding machines, and who helped grow Toshiba Machine Engineering Co. Ltd. to a preeminent place in the plastics machinery industry.

The 10 new Plastics Hall of Fame members will be inducted during an awards dinner to be held on May 6 during the NPE2018 trade show in Orlando, Fla. **CPL**

PEOPLE



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Chow



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Duckham



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Gambade



Fabien
Jossic



Kevin
Miller



Jakob
Mosser



John
Thayer

– Florence, Ky.-based processing equipment manufacturer **KraussMaffei Corp.** has appointed **Jim Chow** as technical sales engineer for the KraussMaffei and Netstal injection molding machine brands in the English-speaking Canadian provinces.

– Berlin, Germany-based extrusion blow molding machinery maker **Bekum Maschinenfabriken GmbH** has appointed **Bill Duckham** as its new sales director; and **Werner Pawlowski** as its new global sales manager for the automotive, large packaging, and technical parts industries.

– Netherlands-based materials company **Royal DSM** has named **Wilfrid Gambade** as president of its DSM Dyneema division, which supplies ultra high molecular weight PE fibre.

– Montreal-based robotic equipment supplier **Sepro Canada** has appointed **Fabien Jossic** as its new service technician for Quebec.

– Metal separation technology maker **Bunting Magnetics Co.** has named **Kevin Miller** as the general manager of its headquarters and primary manufacturing facility in Newton, Kan.

– Chicago-based packaging company **Coveris Holdings SA** has named **Jakob Mosser** as its new CEO.

– Calgary-based material supplier **Nova Chemicals Corp.** has appointed **John Thayer** as senior vice president of its PE business. Thayer replaces Chris Bezaire, who has retired.



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From the agonies of the ongoing NAFTA renegotiation, to the newly crafted TPP deal, to tax cuts and red tape, Canada's plastics industry will face a host of disruptions and challenges this year. Can we make it safely to the other side?

OUR INDUSTRY IN 2018:



CROSSING the RUBICON

In 49 BC, Julius Caesar and his army famously passed a point of no return: Disobeying direct orders, they crossed the Rubicon river and attacked the Roman Senate, thereby igniting a fierce civil war that ended in Caesar becoming Rome's dictator for life.

Fast forward to today and Canadian manufacturers might be facing their own smaller scale point of no return, as 2018 shapes up to be a year of disorder and conflict, with plenty of uncertainty ahead. And how we all get across this Rubicon over the next 12 months could determine the shape of the plastics sector for years to come.

If you want to dip a metaphorical toe into the river, both good and bad currents can be felt. On the plus side, a world recovery is gathering steam: The World Bank estimates that global economic growth will hit 2.9 per cent in 2018. The euro-area is experiencing strong momentum, the World Bank noted, although the Brexit negotiations are likely to see the pace slow somewhat. "The UK economy is likely to

bear the brunt of Brexit-related uncertainty, but the odds of a severe downturn are low," the Bank said. The U.S. economy took off in the middle of 2017 in anticipation of U.S. tax cuts that were finally passed in December. "A return of business investment and solid consumer spending contributed to the rapid growth and are expected to continue in the coming year," the Bank said. It projects the U.S. economy to grow at 2.5 per cent in 2018.

Looking at the negatives, the populist anger that enabled the election of Donald Trump in the U.S. and Brexit in the UK is still simmering, fuelled by inequality, disruption, and immigration. As a Reuters economic report put it, "an unpredictable America is no longer committed to advancing a rules-based, liberal world order." China is growing increasingly assertive under President Xi Jinping, the report noted, while Saudi Crown Prince Mohammed bin Salman is flexing his muscles around the Gulf. "The risk of a conflagration on the Korean peninsula is all

too real," it said. "Business is grappling with self-inflicted scandals and activist attacks, and a backlash is building against Big Tech's overweening power."

And we can set all of this against the backdrop of the fluctuating Canadian dollar. The latest RBC Economic Outlook predicts that, while Canada's dollar will weaken modestly early in the year, anticipated rate hikes will likely cause the dollar to modestly rebound. "On balance, we forecast that Canada's currency will trade between 75 U.S. cents and 80 U.S. cents in 2018," RBC said.

TRADE TRADE-OFFS

So much for the 30,000-foot view, but what about closer to home? What should Canada's plastics processing industry expect to encounter in the next 12 months? Any discussion of this has to begin with the plain and massive fact of the ongoing renegotiation of the North American Free Trade Agreement (NAFTA). The auto industry — so important to so many of Canada's



By Mark Stephen, editor

Getty

plastics processors, machinery manufacturers, and tool makers — was at the vanguard of the NAFTA integration in 1994, which brought Mexico fully into the North American auto production system for the first time. NAFTA eliminated barriers to trade provided the vehicles and parts meet the so-called “rules of origin” requirements. Under NAFTA, a certain percentage of the materials within a good must be made within a NAFTA country to qualify. The required North American content for automobiles, light trucks, engines, and transmissions began at 50 per cent and increased to 62.5 per cent over an eight year period from 1994 to 2002; the required North American content for other vehicles and automotive parts began at 50 per cent and increased to 60 per cent over the same period. In calculating this percentage, NAFTA requires that manufacturers and producers track the regional value content of major automotive components and subassemblies.

In short, NAFTA’s tariff elimina-

tion changed how the automobile industry in North America manufactured its products, and, as a result, automotive trade has expanded exponentially among the three NAFTA countries. At present, however, confusion reigns. In early February 2018, news reports said, Canadian government officials were “convinced” that the Trump administration would soon announce its withdrawal from NAFTA. In mid-February, however, President Trump told the *Wall Street Journal* that the U.S. might not be on the verge of pulling out of the agreement after all. Trump said “there’s no rush” to agree to a new version of NAFTA because Mexico has presidential elections coming up in 2018, which could complicate the negotiation process.

In the midst of these contradictory signals, the Canadian government is said to be working on a proposal to boost the amount of North American-made content in cars and trucks manufactured in the NAFTA zone in a bid to break the deadlock over one of the most contentious subjects in the trade deal’s renegotiation. As noted, vehicles made in the NAFTA zone must currently contain 62.5 per cent North American content to be shipped between the three countries without paying duties. But that content requirement only applies to some components, codified on what is called the “tracing list.” Canada is considering proposing that the content requirement instead be calculated on the total value of a vehicle, news reports said, which would ensure that some things currently not covered — such as the development of software that runs the computer systems in vehicles — is included in the total. Another possibility, one report said, is to exclude from the calculation components that are commodities — such as brakes, wheels, and windows — but include spending related to R&D and software. Such an approach would capture content that is more crucial as technology related to self-driving vehicles becomes more important. Another option supposedly under consideration is to adopt the content formula that was negotiated for autos in the Trans-Pacific Partnership

(TPP), according to which content from outside North America could be considered North American content if it undergoes “substantial transformation” in a NAFTA country. At present, however, none of these sticking points has been resolved, and the NAFTA talks — and whiplash-inducing developments — continue.

The afore-mentioned TPP is another factor that will shape our industry in 2018. Here, at least, we have some clarity and finality, if not complete satisfaction. While many believed the original TPP had suffered a fatal blow when Trump withdrew from the 12-nation deal in early 2017, the pact was resurrected in February 2018 when Canada and the remaining members of the old TTP agreed to a revised trade agreement without the U.S., opening distant new markets for Canadian manufacturers. Besides Canada, the new deal’s partners are Australia, Brunei, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam. Most importantly, the deal will open up access for Canada to Japan’s economy, the third-largest in the world.

AUTOMOTIVE ANXIETY

But the automotive parts component — a key sector to the TPP deal — risks being more controversial. Canada managed to get a bilateral arrangement with Japan to resolve non-tariff barriers, including a binding dispute settlement mechanism; and also reached a bilateral agreement with Malaysia to adjust auto rules-of-origin, with another agreement currently in the process of being finalized with Australia. But the Toronto-based Automotive Parts Manufacturers’ Association (APMA) is underwhelmed. In an interview with *The Canadian Press* news outlet, APMA president and CEO Flavio Volpe said the agreement moves Canada in the exact opposite direction of where its most important customer and powerful next-door neighbour is headed — right in the midst of the sensitive NAFTA negotiations. According to Volpe, the U.S. is pushing for a new NAFTA that increases domestic content requirements and keeps Chinese parts out of North America, but the

revamped TPP deal moves Canada and Mexico the opposite way, reducing local requirements and letting more product from non-TPP countries like China into the supply chain, while at the same time caving into the other TPP countries that really wanted a deal without extracting much new in return. “This could not be a dumber move at a more important time,” Volpe said.

Dumb move or not, a big goal of both TPP and NAFTA is to boost automotive production. So it’s ironic that these trade deal reboots are underway just as automotive production is expected to drop in 2018. According to the Conference Board of Canada’s latest outlook, automotive production is expected to grow by an anemic 0.8 per cent this year. The Conference Board’s newest report expects a U.S. sales decline of almost 1.5 million vehicles in 2018 from record sales of 17.46 mil-

Canadian auto industry’s high share of exports has left the sector vulnerable in ongoing trade negotiations. Though production is expected to expand slightly, the Conference Board forecasts the sector’s profits will decline. Compared to pre-tax industry earnings of \$1.9 billion in 2017, the report said, lower revenues will actually translate to profits of \$1.6 billion in 2018 in spite of lower costs.

TAXING PROBLEMS

The U.S. tax cuts passed last year permanently reduced America’s corporate tax rate from 35 per cent to 21 per cent, and are generally perceived as being problematic for Canadian corporations, which are taxed at a suddenly less-competitive rate of about 27 per cent. The old rate caused many U.S. corporations and manufacturers to rearrange their affairs to avoid investing, which

in a speech at the Davos summit in Switzerland in January, Prime Minister Justin Trudeau said that Canada won’t be slashing corporate taxes to compete with Donald Trump’s America.

Other structural economic changes taking place in America will not have spillover benefits for Canadians, however. Just the opposite, in fact: they highlight chronic challenges facing our entrepreneurs, plastics processors among them. For example, the Trump administration’s rapid deregulation policy — under which agencies have issued 22 deregulatory actions for every one new regulatory action — is removing constraints that often tied up American manufacturing. The result is a boost in business optimism, as evidenced by the record number of small business owners in the U.S. telling a National Federation of Independent Business survey in February that they plan to expand. In Canada, meanwhile, excessive regulations remain an albatross around industry’s neck. A new report from the Canadian Federation of Independent Business (CFIB) concluded that the cost of regulations reached a whopping \$36.2 billion in Canada last year, with more than a quarter of that total representing “unnecessary, redundant or overly burdensome” red tape. Worse still, small businesses are bearing the brunt of this burden: Companies with more than 100 employees spend about \$1,253 per employee on meeting regulations, the CFIB said, but those with fewer than five workers spend an average of \$6,744 per employee. According to the CFIB’s accompanying survey, which polled about 7,800 small business owners, 78 per cent said “excessive” government regulations add “significant stress” to their lives.

In the end, after examining some of the factors that will impact Canada’s plastics industry in 2018 — trade agreement rewrites, America’s new business-friendly tax structure and deregulatory push, reams of red tape, and more — “significant stress” might just sum up everything for all of us. It’s what you have to deal with when you cross the Rubicon.

GPL

“ **A new report concludes that the cost of regulations reached \$36.2 billion in Canada last year, with more than a quarter of that total representing ‘unnecessary, redundant or overly burdensome’ red tape. And small businesses are bearing the brunt of the burden.** ”

lion units in 2016. Sales are expected to average 16 million vehicles in the U.S. over the next five years, with demand further compressed because U.S. millennials are buying vehicles at half the rate of Americans aged 35 and older. “New vehicle sales in the U.S. are coming off the peak reached in 2016 as pent-up demand from the aftermath of the global recession is satisfied,” said Sabrina Bond, an economist at the Conference Board. “Going forward, demand for new vehicles will continue to ease as a result of the aging of the Baby Boom population in the U.S. and Canada and urban millennials’ purchasing fewer vehicles due to ready access to ride-sharing.”

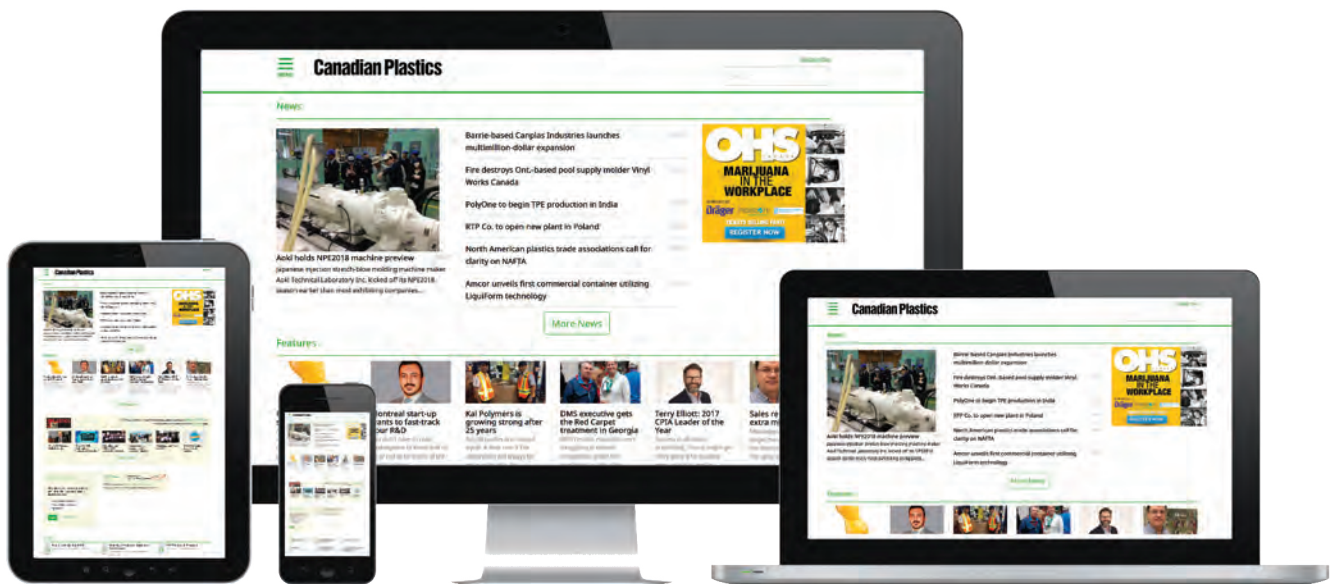
Potential changes to NAFTA’s rules of origin could also take a “sizable bite” out of Canadian auto exports and manufacturing investment, Bond continued. According to the report, the

reduced productivity; the new rate should free up money for American companies to invest. In short, Canada’s biggest manufacturing and business investment rival just got a lot more competitive. But the silver lining is that, based on the boost to global economic growth that the tax cuts should deliver, the International Monetary Fund (IMF) has raised its estimate for economic growth in Canada for 2018 from 2.1 per cent to 2.3 per cent. It seems the old U.S. corporate tax structure was operating as a kind of logjam in the world economy, blocking the flow of money and distorting investment decisions. But that logjam has now been atomized. “The U.S. tax reform and associated fiscal stimulus are expected to raise U.S. growth, with favourable demand spillovers for U.S. trading partners, especially Canada,” the IMF said in a recent report. Which is good, because

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Transparently **INNOVATIVE**

Injection molding is the most common method of part manufacturing in the industrial sector, indispensable for producing high volumes of the same item. But the parts coming out are only as good as the resins going in, which makes material selection a key consideration for any molder. Here are some of the newest cutting-edge resins and additives on the market.

By Mark Stephen, editor

You wouldn't make a car part from Play-Doh, but molding it from a substandard material isn't a much better idea. Resins and additives that perform well are the lifeblood of successful plastics processing — especially in injection molding, which is where you'll find many of today's most innovative polymer applications.

Which is why material selection is so important. Choosing the right resin or additive at the start will not only save injection molders time and money, but will also ensure optimal performance and manufacturability. With that in mind, here's a look at some of the newest materials on offer for injection molding. From impact strength, to scratch resistance, to heat resistance and more, these materials have got what it takes to elevate your application.

SUPER STRONG

The new Creamid family of glass fibre-reinforced polyamides from Teknor Apex Co. is designed for injection molders that want to take on more demanding metal-replacement

applications or replace alternative thermoplastic materials for greater versatility in processing. According to Teknor Apex, the compounds differ chemically from standard polyamides, and exhibit higher tensile strength and better flow properties compared with standard glass-filled polyamide counterparts, greater dimensional stability, lower water absorption, improved chemical resistance, and enhanced surface aesthetics. Featured grades include Creamid-A3H7G8.2S*9217/2 (40 per cent glass loading), Creamid-A3H7G10.2S*9217/2 (50 per cent glass loading), and Creamid-A3H7G12.2S*9207/2 (60 per cent glass loading). "When compared with a standard 43 per cent glass-filled polyamide, a 40 per cent glass-filled Creamid compound shows a 68 per cent improvement in spiral flow tests, reaches a 41 per cent lower peak injection pressure, and requires 43 per cent less clamp force," said Brian Rickard, director of strategy and business development for Teknor Apex's ETP division. "Longer flow length and lower injection pressure translate into a wider processing window, more efficient filling of complex or thin-wall cavities,

reduced part warpage, and a possible reduction in the number of gates or knit lines. A lower clamp force also opens the possibility of increasing the number of cavities or running parts in a smaller, less costly molding press.” Creamid compounds also provide tensile strength up to 260 MPa, Rickard added, which is a property more commonly expected from die-cast aluminum or zinc.

Ineos Styrolution has developed a new styrenic copolymer composite called StyLight that the company said delivers an “excellent” mechanical performance profile in its stiffness, strength, and impact strength that is on a par with, or even better than, today’s most advanced (PA6 or PC-based) thermoplastic composites in the marketplace for woven glass reinforced thermoplastics. “The hybrid production process of StyLight ensures the highest quality and low cycle times, as complex parts can be produced in just one processing step by thermoforming the thermoplastic composite sheets, back-injection molding, and decorating,” Ineos said. “Along with this, StyLight has the property of lower shrinkage during the consolidation step of the styrenic copolymer matrix, based on a modified SAN, which reduces the surface roughness or ‘waviness’ significantly and offers superior surface quality.” StyLight also offers a thickness reduction of between 50 to 70 per cent compared to other injection molded parts, the company said, resulting in a weight reduction of 40 to 50 per cent.

Sabic Innovative Plastics recently unveiled its new Lexan CXT line of high-clarity, high-heat, injection moldable PC copolymer resins, designed to offer a balance of high temperature resistance, high flow, and good colour stability under extreme molding conditions. “Lexan CXT resins can be used in optical applications in the electronics, consumer and industrial, and healthcare industries,” Sabic said. “Typical products in the first two areas include lenses and small sensors that detect visible light; in healthcare, the materials answer the call for excellent optical quality and the ability to resist high temperatures involved, for example, when over-molding clear face shields with silicone rubber.” With Vicat B120 softening temperatures as high as 190°C (374°F) and glass transition temperatures of up to 195°C (383°F), Lexan CXT resins can provide converters with the potential to injection mold parts that can withstand demanding assembly processes, such as cold reflow or wave soldering onto printed circuit boards, Sabic

said. Parts will also stand up to prolonged exposure to high service temperatures. “Lexan CXT resins, which can have a refractive index over 1.6 as well as high transparency — greater than 89 per cent in the visible and infrared spectra at a thickness of 1 mm — can help enable the production of very small lenses, such as those used in mobile phones, that can be assembled onto a PCB that then goes through various soldering operations,” Sabic said. “The resins’ very good thermal stability can help prevent deformation or discoloration.” The new Lexan CXT resins complement Sabic’s existing Lexan PC copolymer specialty resins, including EXL, XHT, and SLX materials. “These can be distinguished, respectively, by particularly good low-temperature impact resistance, heat resistance in clear and opaque forms, and high weatherability,” Sabic said.

THE NYLONS

A new, semi-transparent nylon developed by BASF SE is designed to compete against PC in aggressive conditions. Ultramid Vision is a semi-crystalline nylon featuring very high light transmission and low light scattering properties. It retains nylon’s chemical resistance and resists high temperatures and UV degradation, and BASF claims it is the first semi-crystalline nylon for transparent and semi-transparent components in chemically challenging environments. Conventional nylons are nearly opaque at wall thicknesses of about 1 mm, BASF said, but parts molded from Ultramid Vision allow see-through applications at wall thicknesses of up to several millimeters. “Optical properties are maintained at elevated temperatures and moisture,” the firm said. “The new nylon also resists scratching and is suited to flame-retardant uses. The nylon’s outstanding UV resistance allows it to withstand direct exposure to sunlight as well as indoor uses involving UV light.” It also resists stress cracking due to sunscreen, cleaning agents, solvents, and fats and oils. “The new material is suited for use in visual check components such as fluid level indicators, as well as applications in illumination and light fixtures,” BASF said. “It combines the good mechanical properties and processability of nylon 6 at an attractive price, and can be an alternative to PC, amorphous aliphatic polyamides, and styrene-acrylonitrile copolymers.” Additionally, it can be used with other nylons in multi-component injection molding for multi-functional products with transparent or illuminated sections. Specially

HOW TO CHOOSE WISELY

Key factors to consider when selecting an injection molding material.

Want to select the right resin for your project? Then keep the following variables in mind:

Impact strength. Some applications require more base strength than others, so a resin’s Izod impact strength should be determined from the start.

Tensile strength. Ultimate tensile strength, or ultimate strength, measures the resin’s resistance to tension and its ability to withstand a given load without pulling apart.

Flexural modulus of elasticity. This refers to the degree to which a material can be bent without damage and still snap back to its original form.

Heat deflection. This is especially important for applications that require insulating performance or tolerance for a variety of temperature ranges.

Water absorption. This is based on the percentage of liquid taken on by a material after 24 hours of immersion.

Courtesy of The Rodon Group

injection molding

coloured grades are available, or the resin can be coloured with nylon-based colour masterbatches. “Shock- and chemical-resistant covers for lighting sources, back-lit switches, and buttons are other potential applications,” BASF said.

HEAT-RESISTANT, SCRATCH-RESISTANT

In response to increasing calls in the automotive market for materials that resist hot and humid environments, Royal DSM recently added the new HR brand of hydrolysis-resistant grades of PBT to its Arnite family of thermoplastic polyesters. “Our customers are telling us that with continu-

ment, flame retardant grades with UL 94 ratings of up to V-0 at thicknesses as low as 0.4 mm, impact-modified grades, and grades engineered to provide high levels of adhesion to silicone sealants,” Terlaak added.

Specialty chemicals company Lanxess has developed a new heat stabilization system called XTS2 — which stands for Xtreme Temperature Stabilization — for polyamide 66 variants of its Durethan brand polyamides. “This system increases the heat aging durability of the polyamides so much that they reach into the heat deflection temperature range, and can withstand temperatures of up to 230°C, or 450°F, in the long-term,” said Thomas Linder, a material development expert with Lanxess’ high performance materials business unit. “They therefore provide an alternative to costly heat stabilized specialty thermoplastics, such as fully or semi-aromatic polyamides and polyphenylene sulphide.” The first product from the XTS2 product range is a polyamide 66 reinforced with 35 per cent glass fibres (by weight), which will be marketed as Durethan AKV35XTS2. “There are also plans to offer XTS2 product variants with higher and lower glass fibre contents,” Linder said.

Plastics compounder and distributor A. Schulman Inc. has created a new copolyester blend specially designed to give a piano black high-gloss appearance that’s also scratch-resistant. Schulablend M/MC 3501 Piano Black 73265 is based on Tritan copolymer from Eastman Chemical Co. and combined with multi-component blends and additives. According to Schulman, it has optimised the compound in order to achieve excellent chemical, scratch, and mar resistance, while also retaining properties such as high flowability or high notched

impact strength. Piano black high-gloss surfaces are in demand for injection molded applications in industries such as automotive interiors, household appliances, and cosmetics, Schulman added.

ADDING ADDITIVES

Specialty chemicals manufacturer Clariant recently launched its new Senseaction line of colour masterbatches that can be used to make injection molded caps and closures used on bottled water packaging. Available in a wide range of colours, the new line is designed to fulfil the necessary demands of bottled water producers and the processors who supply HDPE or PP caps and closures. “Senseaction masterbatches are designed, processed, and tested to be free of detectable taste and odour effects,” Clariant Masterbatches packaging global head Alessandro Dulli said. “This portfolio will help brand owners make attractive caps that reflect positively on their brand, free of undesirable organoleptic influences.” The new



PolyOne’s Smartbatch Fabric FX colour and additive concentrate helps injection molders produce parts that appear to be covered with textile.

Photo Credit: PolyOne Corp.

ous-use and peak temperatures around the engine continuing to rise, materials like polyamides 6 and 66 and standard PBT are no longer good enough for the job in some applications,” said Mark Terlaak, DSM’s global segment leader for automotive electronics. “Many Tiers see HR PBT as a bridge between these materials and more expensive specialty solutions.” The new materials offer a cost-effective solution in applications exposed to humidity and high temperatures, Terlaak said, including automotive connectors, control devices, and sensors. “The new Arnite HR grades stand out from the pack of PBTs in many ways, but mostly in their higher retention of mechanical properties after USCAR Class 3, 4, and 5 temperature/humidity profile exposure and ‘85/85’ cycles — 85°C/85 per cent relative humidity — of up to 3,000 hours,” he said. DSM is launching the new Arnite family with two 30 per cent glass reinforced grades, one with enhanced silicone adhesion. “When complete, the range will include grades with various levels of glass fibre reinforce-

line of masterbatches is made with raw materials that comply with food-contact requirements, including pigments and carrier resins that can be used for sensitive organoleptic applications. Following the completion of the manufacturing process that involves using special equipment and processes, each Senseaction masterbatch lot is tested in water according to DIN 10995 at an independent laboratory, Dulli added.

PolyOne Corp. recently introduced its Smartbatch Fabric FX colour and additive concentrate, a masterbatch designed to help injection molders produce attractive parts that appear to be covered with textile. In addition, fabric graining and colour can be tailored to meet designers' recommendations. "Smartbatch Fabric FX offers greater design flexibility, and creates attractive, ready-to-use parts that are easier to clean than textile covered applications," said Christoph Palm, PolyOne's vice president and general manager of colour and additives. "This masterbatch also helps manufacturers transition from a complex polymers-and-textile process to more efficient, single-step molding." Fabric FX technology can support applications across various industries, such as transportation, consumer goods, and furniture, Palm continued, and is compatible with a range of polymers, including ABS and PC/ABS. "This concentrate can eliminate the trade-off designers often face when attempting to add fabrics," he said.

"While they heighten consumer appeal, textiles also involve a complex manufacturing process and extra steps. Fabric FX also adds design flexibility and greater efficiency, overcoming the fact that fabric doesn't bond easily with intricate curves and shapes, thereby limiting design options and increasing scrap rates."

Not to knock Play-Doh or anything, but it can't hold a candle to any of these new resins and additives. **CPL**

RESOURCE LIST

A. Schulman Inc. (Fairlawn, Ohio); www.aschulman.com; 800-547-3746

BASF Canada (Mississauga, Ont.); www.basf.ca; 866-485-2273

Clariant Masterbatches Canada (Toronto); www.clariant.masterbatches.com; 800-265-3773

DSM Engineering Plastics Inc. (Birmingham, Mich.); www.dsm.com; 812-435-7500

Ineos Styrolution Canada Ltd. (Sarnia, Ont.); www.ineos-styrolution.com; 519-339-7339

Lanxess Canada (Elmira, Ont.); www.lanxess.ca; 519-669-1671

PolyOne Canada Inc. Distribution (Mississauga, Ont.); www.polyone.com; 905-405-0003

Sabic Plastics Canada Inc. (Long Sault, Ont.); www.sabic-ip.com; 905-534-9220

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

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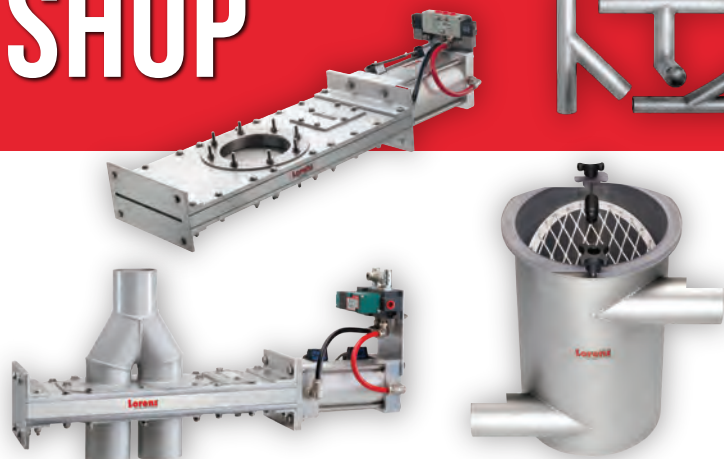
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The CUTTING EDGE

By Mark Stephen, editor

Manufacturers and suppliers of size reduction equipment are headed for early, unplanned retirements if they don't respond quickly to the needs of their plastics processing customers. So what do those customers need? We asked the manufacturers and suppliers themselves.



Photo Credit: Herbold USA

Now more than ever, size reduction is big. Thanks to the rising cost of materials combined with increased demands from customers to include reground and/or recycled materials in the product, today's plastics processors view the use of regrind as a significant marketing opportunity as well as a cost-saving method. But unlike the recyclers — whose end goal is always throughput and more throughput — the processors have varied and evolving needs.

Which is why the makers and sellers of shredders and granulators are always pushing the envelope when it comes to developing cost-effective solutions for providing quality regrind without adversely affecting production rates, part quality, or the plant environment. With all that in mind, we asked some of them to identify the biggest trends in size reduction.

GO BIG OR GO SMALL

Perhaps the processors' most insistent new demand, the machinery suppliers say, is for bigger size reduction machinery, with higher throughput rates, than ever before. "Process-

ing companies that weathered the recession are increasing production capacity significantly," said Madison Burt, vice president of sales with Weima America Inc. "The volume of sales of our bigger models — 10,000 lbs per hour machines — is up, especially among the LDPE film processors. Historically, the focus has not been on these larger machines, but it is now." Among the Weima product offerings, Burt said, interest is strong for the company's Jumbo and Super Jumbo shredders, which are designed for high throughput rates and lend themselves to the shredding of almost all types of plastic. And sometimes one large machine isn't enough. "We're also putting more double systems in place," Burt said. "Other customers want to be able to dedicate one shredding line to one material type and the second to another."

David Lefrancois, president of Herbold Meckesheim USA — a subsidiary of Herbold Meckesheim Germany — also sees a trend for higher throughput granulators. "The demand for machines in the 40 to 100 hp range, which represented our core market just a few years ago, has fallen off dramatically," he said. "The market has now moved to models that provide

up to 200 hp.” Partly in response, Herbold recently introduced a new force-fed granulator for size reduction of PET bottles. The SMS 100/160-9-2 SB3 features a rotor that is 20 per cent larger than current offerings. “The additional size and mass of the rotor allows the granulator to operate at higher throughput rates of up to seven tons per hour,” Lefrancois said. “Material is fed into the destruction chamber through a screw-fed mechanism that utilizes three vertically-mounted feeding screws, guaranteeing consistent feed rates, no material flyback, and less wear on the cutting chamber.”

But not all processors want more throughput from their shredders and granulators. At the other end of the size reduction spectrum is the demand for a slower, cleaner process, especially in granulation. “Some of our customers are asking us to slow the rotor speed on our conventional granulators by supplying 1,200 rpm motors instead of the standard 1,800 rpm motors,” said Mike Cyr, president of Rotogran International Inc. “The result slows the size reduction process down and creates more torque, which improves the quality of the regrind by reducing the number of cuts on the granules, creating less dust and noise. It’s a trade-off that customers who don’t need maximum throughput are willing to make.” And it’s a simple transformation for Rotogran to make, Cyr added. “We have always had a variable speed drive option on our granulators, so customers have always had the ability to set it at a lower speed, but variable speed units are an expensive upgrade,” he said. “The less expensive solution is to replace the 1,800 rpm motor with a 1,200 rpm motor.”

Sometimes it’s the application as much as the customer that demands a high-torque solution. Advances in engineering that create stronger compounds and improved extrusion lines mean that pipe diameters are getting bigger and walls thicker, which makes the use of granulators problematic. Which is why Zerma recently introduced the ZRS pipe shredder, which can process pipes of up to eight meters in length. The pipes are fed into a horizontal feeding trough and forced into the rotor by a hydraulic piston, the company said; the shredded material is then fed into a granulator. “The use of this slow-speed, high-torque shredder allows the processing of thick walled pipes and even purgings without high amperage peaks,” the company said. The ZRS shredders come in three sizes with 800, 1,000, and 1,500 mm rotors, and the biggest model can be used for pipe diameters of up to 1,300 mm.

Christian Weiss, national sales manager with Wittmann Battenfeld Canada Inc., has also observed the growing demand for low-speed granulation. Wittmann’s low-speed Junior series of compact, screenless beside-the-press granulators are designed to grind hard, brittle, glass- or mineral-filled injection molding sprues and parts for closed-loop systems. “The screenless design allows difficult, hard to grind material to pass easily through the grinder, which minimizes maintenance and downtime,” Weiss said. And the low speed decreases noise and fly-back during operation

and provides a better quality, consistent regrind, he added. “We concentrate on beside-the-press granulators dedicated to the machine and the process, preferably with the sprues and runners deposited into the granulator automatically by a feed system or robot,” he said. “This allows sprues and runners to be processed in-line with the parts being consumed and reused into the process at the same time. And the low 32 rpm speed cuts energy costs because it uses a lower motor output compared to conventional granulators.”

LOW ENERGY, QUICK TURNAROUND

Speaking of cutting energy costs, the trend of processors wanting more energy efficiency from their size reduction equipment shows no sign of slowing. If anything, it’s accelerating, especially in jurisdictions with high industrial energy rates, like Ontario. “Saving on energy consumption is definitely a pressing concern for our Ontario customers,” said Greg Parent, Canadian sales representative for Vecoplan LLC. Which makes Vecoplan’s Hitorc electromagnetic pulse drive system a good fit, he continued. “Using a design that incorporates sensors in the asynchronous motor, encoders, and variable frequency drive system to give power when it’s needed, HiTorc applies the highest possible torque over a



Wittmann’s low-speed Junior 2 screenless beside-the-press granulator.

Photo Credit: Wittmann Battenfeld

size reduction

wide speed range, which allows a high torque at a high rpm to limit the current draw. Because high torque is achieved at higher speeds, shredder performance is enhanced." The result is an increase of up to 100 per cent in throughput compared to conventional drive systems, Parent said, and up to 85 per cent reduction in power consumption.

Rapid Granulator Inc., meanwhile, has its own set of priorities based on what it sees in the marketplace. The company recently made a multimillion-dollar investment in machining equipment at its headquarters in Bredaryd, Sweden that will give it extra capacity to produce core components, alleviating what it saw as a production bottleneck; and has brought back in-house all production of its granulators for the North American market to its Pittsburgh, Pa. facility. The ultimate goal is to improve turnaround time. "Markets around the world are all growing at the moment and we see a lot of investments being made by processors, so we need to make sure that our lead times remain reasonable," said Rapid's CEO Bengt Rimark. Rapid can now produce major components like rotors in a single step, he said — a job that required several separate set-ups before. Rimark has also noticed that more and more customers want granulators to be able to operate continuously for long periods at a time. "The granulator is often the most profit-generating piece of equip-

ment in a plastics processing factory, which makes our core technology of machining even more valuable," he said. "We need to maintain very high accuracy and precision, so it's important that we have complete control over production of the principal components in the cutter housings."

So the next time you want to go small with your regrind, consider thinking big with these latest size reduction offerings. **CPL**

RESOURCE LIST

Herbold Meckesheim USA (Slatersville, R.I.);
www.herboldusa.com; 401-597-5500

Rapid Granulator Inc. (Cranberry Township, Pa.);
www.rapidgranulator.com; 724-584-5220

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

DCube (Montreal); www.dcube.ca; 514-272-0500

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

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

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

Zerma/Plastics Machinery Inc. (Newmarket, Ont.);
www.pmiplastics.com; 905-895-5054

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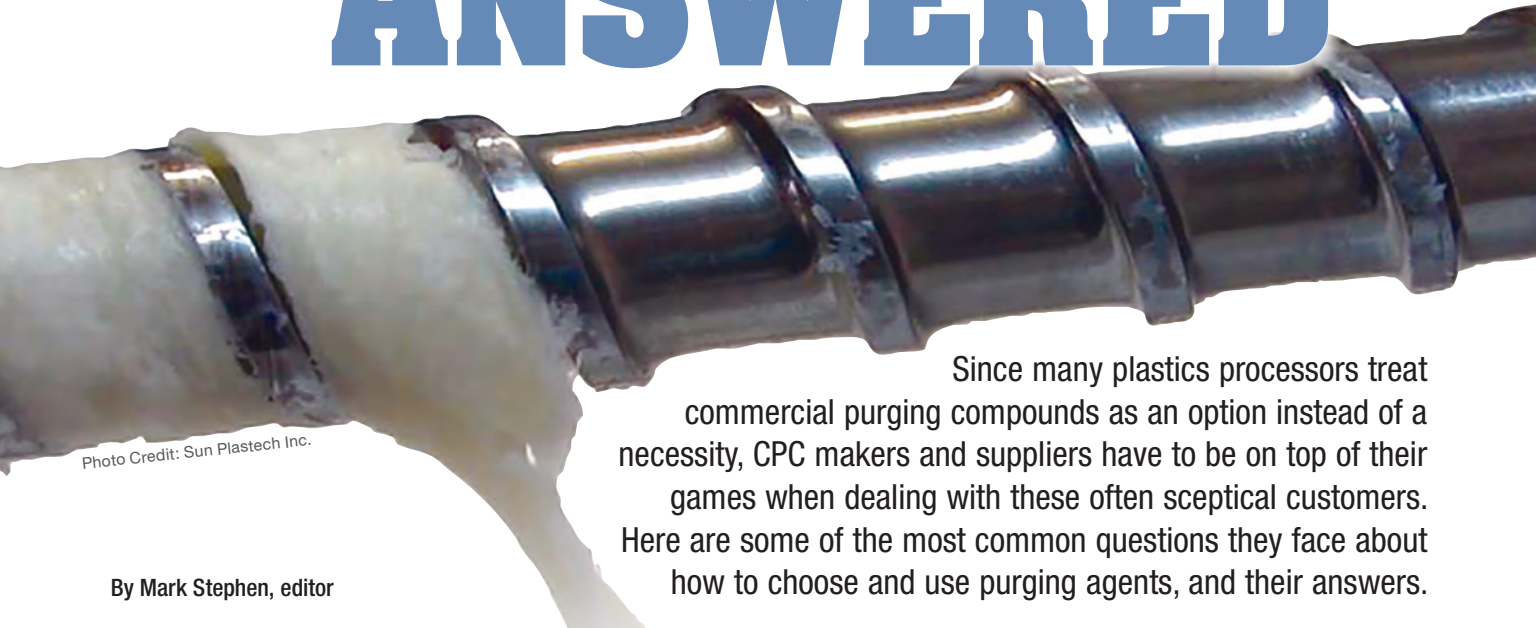


Photo Credit: Sun Plastech Inc.

By Mark Stephen, editor

Nobody, as British comedy troupe Monty Python once noted, expects the Spanish Inquisition. Obviously, then, the Pythons never tried to sell commercial purging compounds (CPCs). Of all the areas of plastics production, CPCs occupy a unique grey area. No one questions the need for conveying systems, processing machines, or size reduction equipment; CPCs, by contrast, are often considered optional, if not unnecessary.

Which means that manufacturers and suppliers of CPCs face thorough inquisitions of their own: near-constant barrages of questions from sceptical processors either unsure of the need for CPCs in the first place, wary of switching from the grade they're comfortable with to a newer CPC formulation, or reluctant to use a more abrasive CPC for fear of damaging their machinery.

So here are some of the most common questions CPC suppliers face about how to choose and use purging agents, and the uncommon answers.

Q: "Do I really need to use CPCs to purge my machines?"

A: Truth is, there are old fashioned, do-it-yourself purging methods that do not involve using a CPC that remain effective in certain circumstances. "Even with a wealth of CPCs available on the market, I still see many processors purging their machines by using the classic mixture of sawdust and Tide detergent," said Jeff Lewis, sales and technical manager with Slide Products Inc. "It's an old-school method and it can do the job." The caveat? Since these age-old

approaches are not effective in removing colour and carbon contamination, they're best employed on the small percentage of dedicated lines for parts that are not surface appearance and are not critical. "If quality and colour don't matter, and if a part can have carbon or black-spot contamination, then a molder may not need a CPC," said Corey Henley, senior technical service specialist with Chem-Trend L.P.

Since many plastics processors treat commercial purging compounds as an option instead of a necessity, CPC makers and suppliers have to be on top of their games when dealing with these often sceptical customers. Here are some of the most common questions they face about how to choose and use purging agents, and their answers.

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Applications for non-CPC purges might include underground black colour pipes, said Ken Shuman, president of Shuman Plastics Inc./Dyna-Purge, and white milk jugs blow molded for the American market. "These processors never change resins or colours, but this is not the case for the majority of molders," he said.

Q: "Can I purge my machines with regrind, which is free?"

A: The short answer: yes, in certain instances. Purging with regrind is another do-it-yourself approach with a long history, and is still popular today, especially for dedicated lines making black or white parts. But molders should understand that regrind isn't completely "free." "There are costs associated with using regrind," said Kathleen Jarvis, national sales director for Neutrex Inc., the makers of PurgeX CPCs. "Aside from the energy cost for grinding, the greater cost lies in the ineffectiveness of regrind to purge and clean a machine. Because regrind exhibits very little mechanical or chemical action, a machine usually has to be purged with large amounts of regrind for a very long period of time, which equals lost revenue and production time. So this wouldn't

purging compounds

offer a savings compared to using an effective CPC.”

Also, there’s a relatively new economic consideration to keep in mind. “Since more and more parts are now allowed to have regrind in them, processors might want to think twice before wasting their regrind in purging,” Jeff Lewis said.

The longer answer to the question is that, while mildly effective in a limited number of applications, resin is ultimately designed to make a part, not to clean a screw and barrel. “Regrind can remove small amounts of material and can sometimes be enough if the colours are not harsh and the resins are similar enough, but it won’t displace or clean because it simply doesn’t have the capability of doing that,” said Joseph Serell, vice president of Sun Plastech Inc., which manufactures and distributes the Asaclean CPC brand.

THE LATEST HITS



Photo Credit: Sun Plastech Inc.

“Some CPC makers are constantly introducing new products, but most are not genuine improvements on previous generations,” said Neutrex’s Kathleen Jarvis. With that caution in mind, here are some new CPC grades that you can actually benefit from.

Asaclean: Available through Sun Plastech, the new PF grade is a non-glass filled compound for high-heat resins up to 790°F (420°C).

Chem-Trend: Chem-Trend’s new Ultra Purge PO compound is designed specifically to remove material residues in hot runner systems.

Purgex: Available through Neutrex, the new Purgex 742 grade is engineered for polypropylene copolymer applications, and has non-toxic, non-abrasive active ingredients with a polyethylene carrier.

Shuman Plastics/Dyna-Purge: The new Dyna-Purge F2 CPC offers dual action cleaning to remove material and impurities from the screw and barrel, as well as the tool and die, and has a temperature range of 320° to 625°F (160° to 330°C).

Slide Products: The NPT grade operates at temperatures between 160° to 600°F (70° to 315°C), and requires no mixing or preparation time, thereby shortening the clean-up cycle.

“When trying to remove one resin type with a second resin type, you’ll usually encounter layering of the two. Over time and heat, that second resin will come out eventually, usually as a contaminant.” Because regrind is not an ideal agent, some CPC suppliers offer products that can be mixed with the regrind to make it more effective. “Slide’s PDQ product is a concentrated liquid purging compound that’s poured into the hopper and works with the carrier resin to remove all thermoplastics,” Jeff Lewis said. “It’s effective for resin-to-resin and colour-to-colour changes, requires no soaking, and comes in a self-measuring bottle that meters out an exact amount of concentrate.”

These process aids aside, the big downside to purging with regrind is the use of a “dirty” material as a cleaning agent. “Regrind has already had one heat signature put on it,” Joseph Serell said. “By purging with it, you’re introducing a second heat signature, which makes it even less clean and less likely to purge the machine effectively.”

Q: “Can glass-filled CPCs or other abrasive purging materials damage my machines?”

A: Most CPC suppliers offer glass-filled grades that provide high scrubbing power for maximum cleaning. But, some processors wonder, are they safe for the machines’ surfaces? It’s a legitimate concern, CPC suppliers say, and they hear it from certain types of molders. “Processors that use glass-filled resins are very comfortable with glass-filled CPCs,” Joseph Serell said. “The concern comes from those that don’t run glass-filled polymers.”

But the risk is virtually nonexistent. “Processors that think they can damage their machine with a glass-filled CPC usually forget that they’re not running purging compound the same as they would a glass-filled resin,” Kathleen Jarvis said. “The volume of glass-filled purge that goes through a machine is very small, with a very short residence time — about 10 minutes at the most — so there is virtually no wear and tear to the screw and barrel. And not all glass-filled CPCs contain significant amounts of glass: some do, but many do not, and are only minimally abrasive.”

The only occasions when a glass-filled grade may not be recommended, CPC suppliers say, is for purges of equipment that may be highly polished or textured, such as extrusion dies; or that have high-precision clearances, like extrusion gear pumps. It’s also important for the plastic processor to know if the hot runners can handle glass-filled materials, Corey Henley said, and if the hot runner gate clearance is sufficient. “Also, if parts will be molded out of a glass-filled grade, it’s important to confirm with the purge supplier that there will be no negative effects on the finish of the tool,” he said. “We also stress the importance of getting the glass-filled CPC in and out of the machine as quickly as possible.”

A follow-up question that many CPC suppliers are asked is, when should a glass-filled grade be used? “We recommend glass-filled CPCs for difficult applications such as heavily loaded colour, ‘sticky’ resins such as flexible PVC,

or if the processor is going from a lower melt flow index resin to a higher melt flow index resin,” Kathleen Jarvis said. “It can also be useful when many layers of resin have built up inside the machine.”

Q: “Do I always have to buy the newest CPC grades?”

A: With global chemical suppliers constantly introducing new resins with new properties, you’d think CPC suppliers would be innovating constantly, too, right? Not necessarily. “There are always small groups of molders making niche applications that could benefit from very specific new CPC formulations, but these aren’t commercially viable for us,” Ken Shuman said. “Most CPCs on the market today are versatile and cross-functional enough to handle new resins that are only slight modifications of previous polymers.”

The main exceptions involve new high-heat resins. “Resin makers are constantly developing new grades that top the processing temperature range of previous resins, and these are the changes that we do need to address,” Joseph Serell said. “For example, it used to be very rare to get an application that was above 700°F, or 370°C; now we get inquires for processing temperatures that approach

800°F, or 430°C, and older CPC grades can’t handle that.”

And believe it or not, one of the main goals of most new CPC grades is to allow the customers to use *less* material, with equal or better results, than earlier formulations. “Molders don’t want to give up older, legacy products unless they have to, because they’re comfortable with them and understand how to use them properly,” Ken Shuman said. “It’s our responsibility to innovate and introduce new products that enable processors to use less product while delivering better results. If we don’t, we risk losing them as customers.”

Which is a lot worse than having to answer their Spanish Inquisition-like questions. **CPL**

RESOURCE LIST

- Chem-Trend L.P.** (Howell, Mich.);
www.chemtrend.com; 517-545-7980
- Neutrex Inc.** (Houston, Tex.);
www.purgexonline.com; 281-807-9449
- Slide Products Inc.** (Wheeling, Ill.);
www.slideproducts.com; 800-323-6433
- AceTronic Industrial Controls Inc.** (Mississauga, Ont.);
www.acetronic.com; 905-564-7227
- Shuman Plastics Inc./Dyna-Purge** (Depew, N.Y.);
www.dynapurge.com; 866-607-8743
- Sun Plastech Inc.** (Parsippany, N.J.);
www.asaclean.com; 800-787-4348



AUXILIARY EQUIPMENT

Dryer software ensures lowest possible power consumption



A new *energy saver software system* developed by **Maguire Products Inc.** for its VBD vacuum dryer constantly monitors the changing conditions of dryer operation and automatically makes adjustments to

ensure that power consumption remains among the lowest of any resin dryer in the industry.

Traditionally, the vacuum dryer used increasingly greater amounts of energy as throughput decreased unless it was set up for the lower throughput; at throughputs that were one-tenth of capacity, for example, energy consumption could be ten times greater than at full capacity. If operated at full capacity of 300 lbs (136 kg) per hour, the VBD-300 dryer typically exhibits an energy consumption of 46 watts per kg per hour when drying PC at 250°F (121°C).

Because the new software eliminates the penalty for low-throughput operation, the same dryer can now operate at nearly the same low level of energy consumption at throughputs of only 25 lbs (11 kg) per hour with no operator intervention.

In addition, all controllers for VBD dryers now include a standard onboard energy consumption display and logging capability, and show both real-time and time-averaged values in the industry standard of watts per kg per hour.

Compared to 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.

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

EXTRUSION

New control system for easy operation and Industry 4.0 applications

New from **battenfeld-cincinnati**, the *BCtouch UX* extrusion control system is modeled on well-known user interface designs from mobile phones and tablets, and comes with a 21.5-inch landscape format with swivel-and-tilt functionality, as well as multiple language options and individualized control surfaces for each operator.



Drawing on Industry 4.0 as a means to optimize production, the BCtouch UX comes standard with OPC UA functionality for a standardized interface that allows customers to check the data of battenfeld-cincinnati machines on other providers' visualization systems (provided these are also equipped with an OPC UA function); this enables easier synchronization and an overview over the complete production hall, and therefore better production planning and maintenance.

The system also has a preventive maintenance function that helps the operator to plan the maintenance schedule and/or spare parts orders due to a better control of drive and oil quality; an easy-to-use remote maintenance option for quicker service; and simulation of a running line for training purposes.

battenfeld-cincinnati USA (McPherson, Kan.);
www.battenfeld-cincinnati.com/usa; 620-241-6843

CONVEYING

Enhanced wave conveying system

Conair Group has updated its vacuum powered *wave conveying material handling system*, making it possible to

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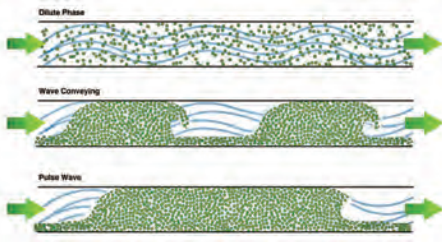
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move any resin, at virtually any speed, with higher throughputs, over longer distances without the damage to materials and

equipment normally associated with conventional dilute phase vacuum conveying.

Originally introduced as the R-Pro resin conveying system for slow-speed, dense phase conveying, the Wave Conveying system achieves very high resin throughputs starting at speeds of about 300 feet per minute — which is up to 2.4 times greater than dilute phase systems — while eliminating angel hair and dust problems.

The wave conveying system uses a Conair LDP series vacuum pump equipped with variable frequency drives that operate at the precise level of capacity and power consumption needed to maintain a specific material velocity in the system. Depending on system usage, this can result in substantial energy savings because the wave puts more energy into moving resin and less energy into moving high volumes of air.

A new type of conveying speed sensor has also been added that monitors the speed of material moving in the mixed-pulse and wave phases that are characteristic of wave conveying. It provides feedback to Conair's FLX-128 Plus conveying control, helping the system maintain even and correct material flows throughout.

And because wave conveying depends on vacuum conveying components similar to those already in use in many facilities, upgrading an existing vacuum conveying system to Conair's wave conveying technology is easy to do.

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

BLOW MOLDING

Collaborative robotic half-cube palletizing system



Proco Machinery Inc.'s new half-cube palletizer, which automatically palletizes blow molded containers with minimal operator involve-

ment, is designed to provide a 50 per cent cost reduction compared to conventional automation solutions.

The half-cube palletizer — which can be easily and quickly adapted to a variety of packaging and repetitive manufacturing situations working alongside existing workers or working independently — is 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 in turn is fitted with leveling pads and castor wheels. The system has a maximum height of 55 inches, which is the half-cube configuration common to most blow molding operations.

The only manual operation occurs when an operator places the trays in the magazine. When palletizing is complete, an alarm sounds and the operator pulls the pallet out and places another pallet in the magazine. The palletizer handles both slip sheet and tray configurations in 44 by 56 inch and 40 by 48 inch sizes.

Additionally, the palletizer can be configured to pack all necks up or all necks down or, in situations where a standard configuration does not suit a particular application, custom designed options are available.

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



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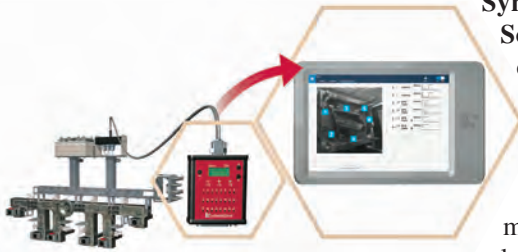
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HOT RUNNERS

Third-generation Synflow hot runner technology



Synventive Molding Solutions has introduced the third generation of its *Synflow* technology, designed to give molders more control over plastic flow and to

solve common defect problems on large parts like automotive instrument panels.

The technology helps molders eliminate cosmetic defects on sequentially filled parts caused by sudden flow front accelerations and stagnations created when the delayed pins open. Giving molders better control of the pin allows for individual flow rate control of each nozzle to balance family molds or fill complex multi-gated geometries.

The most significant addition to Synflow's functionality is the ability to stop the pin and hold it at any position mid-stroke. This allows for individual flow rate control of each nozzle to balance family molds or fill complex multi-gated geometries. Alternating opening profiles can even be programmed, offering the ability to pre-fill cold runners or create differential packing within complex multi-gated parts.

The main difference between Synflow and other pin control technologies currently on the market is the ability to easily upgrade to it after parts have been molded. During mold sampling, if it is determined through a brief trial that Synflow would benefit the process, the technology can be installed and running within a matter of minutes.

All Synventive valve gated hot runners can come standard with SVG+, which includes position sensors that allows for the simple upgrade. The Synflow technology can be added to any of Synventive's activeGate-enabled systems through simple external hookups.

Synventive Molding Solutions Canada Inc. (Toronto);
www.synventive.com; 416-428-4693

PROCESS COOLING

Peak performance, energy-efficient central cooling system

Frigel has now made available advanced 3PR control technology and variable frequency drives for its new *Aquagel GPV* process pump sets, which combine to ensure the pumps operate at peak efficiency with the lowest possible energy consumption, while giving users the ability to gain precise control of the units for optimal performance.

3PR functionality includes alarm and fault indicators and dated history log to identify any potential system issues; real-time data for pressures versus set-points; and pump variables in real-time including speed, frequency, and electrical consumption.



The variable frequency drive pumping assembly on the Aquagel GPV pump sets automatically equalizes pressure depending on process cooling demands, such as the number of machines, pressures, and flow rates. As such, the units deliver the best possible performance with the lowest energy consumption.

Additional highlights of the Aquagel GPV pump sets include modular bolt-on capabilities that easily integrate into Ecodry or Heavygel central systems; multiple selections of high-efficiency pump and motor assemblies to meet any system requirements; a pre-wired inverter drive per pump (range 40 to 60 Hz); manual mode operation available with each inverter; and automatic pump cycling, including standby pumps, to equalize running times.

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

RAW MATERIALS HANDLING

Level detector with long operating life

The *Dynatrol GJ* series of level switches from **Automation Products Inc.** are designed to easily obtain high, intermediate, or low level measurement in storage bins or hoppers.

A variety of Dynatrol models are designed for the plastics industry and handle bulk solids such as granules, polymers, regrind material, powders, flakes, and pellets. The CL-10GJ (pictured) is typically used with bulk solids in the density range of 10 to 15 lbs per cubic foot.



Built in the U.S., all Dynatrol level switch components have been solidly constructed for a long operating life, have no moving parts, and require no field adjustments. They are virtually wear-free; many Dynatrol detectors have been in service for over 25 years.

Additionally, all units are approved for Class I, Groups C and D; Class II, Groups E, F and G; and Class III services.
Automation Products Inc. – Dynatrol Division (Houston, Tex.);
www.dynatrolusa.com; 800-231-2062

COLOUR MATCHING

Latest iteration of popular colour formulation software



The new *Match Pigment 4.0* colour formulation software from **Data-color** is designed to help plastics manufacturers achieve their desired colour

quickly and efficiently, minimizing batch corrections and overall costs to save time and money.

With Match Pigment 4.0, customers can shorten formulation time with up to 50 per cent increase in matching speed, increase productivity with automatic transfer of multiple formulas to the dispenser queue, support greater custom/individual needs with flexible matching criteria options, improve product quality by assuring colourant compatibility for customer use cases, and streamline daily operations with enhanced user interface.

Datacolor (Lawrenceville, NJ); www.datacolor.com; 609-924-2189

Prism Instruments (Pickering, Ont.); www.prisminstruments.com; 888-717-7476

MATERIALS

Medical-grade TPEs offer superior low-temperature toughness

New *Medalist* medical-grade thermoplastic TPEs for low-temperature film from **Teknor Apex Co.** are 70 per cent as dense as PVC with a typical specific gravity of 0.90, enabling medical manufacturers to achieve weight savings and other economies while still providing the same product performance as standard PVC.



The new grade exhibits greater toughness in cold storage applications than PVC, with brittle points as low as -60°C (-75°F) compared to -40°C (-40°F) for PVC. This greater toughness makes it possible to downgauge from standard thicknesses or replace multi-layer structures with monolayer films without sacrificing performance.

The new materials are made with FDA-listed ingredients, are certified to ISO 10993-5 standards for biocompatibility, are REACH SVHC-compliant, and do not contain Bisphenol A.

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

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Molding with 100 per cent regrind (Part 1)



By John Bozzelli, Injection Molding Solutions

The most important variables in molding are those that cause downtime and rejects if not handled properly. The amount and quality of regrind used in the process is one of these. Getting the most production from your purchase of resin requires the appropriate use and care of regrind — including the strategy of using 100 per cent regrind, which might just allow you to attain better process control and never ruin good resin by contaminating it through blending with regrind.

Regrind is material that has been processed at least once before, with the sprue and scrap subsequently ground or chopped. Note that even what most consider “virgin” resin may have one or more processing histories, as it was compounded and pelletized when made. Virgin resins can have additional process histories, as additives such as colour, fillers, and stabilizers require a second compounding step. This compounding may be done by the resin supplier or at a separate compounding facility.

As a result of these processing histories, the polymer may experience degraded physical, chemical, and flow properties. One of the first issues to check if you have questions about resin quality is length of the polymer chain or degradation of the molecular weight. This is done via a melt flow rate (MFR) test. If the chains are broken, MFR will increase in neat resins. Glass-filled polymers are a special case, as the glass fibres are broken during processing and special rules apply.

CAN MY REGRIND BE BLENDED?

What causes molecular weight degradation is important, but not for this topic. Instead, the question I want to

answer is, is the regrind acceptable for blending? If you chopped the chains — for example, by processing wet material that you thought was dry — you’re in trouble, and you should not blend this material with virgin material. If you think you can tell if the resin is wet by the appearance of the melt or part, you’re wrong; water is consumed by the hydrolysis reaction, and parts will look and perform fine at room temperature.

Keeping the polymer chains long is just the beginning. Contamination is perhaps the biggest single problem with regrind. It gets contaminated with other resins, colour, dirt, fines, metal, and other impurities. There are plants that have huge quantities of regrind they know is contaminated and therefore unusable, but it stays on the books as “worth something.” The regrind sits there taking up valuable inventory space.

Other resin/regrind complications can be loss or consumption of additives, such as mold release, antioxidants, acid scavengers, and antistatic agents during previous heat histories; along with colour degradation, fibre-length reduction, overdrying, and more.

WHAT LEVELS CAN BE USED?

Last but not least, we need to discuss regrind use level. How much is allowed, and what is actually being used at the press? In medical applications, the typical answer is: none. The industry range is 0 to 100 per cent. In addition, the target level may be one number, while the actual level being used is often a very different number. Just because you’re using state-of-the-art weigh blending doesn’t guarantee that you’re at the targeted level of regrind. What is your strategy for ensuring the target regrind level?

To develop a strategy and optimize the value of regrind, it’s important to know the complications involved, which can include tracking and documenting the actual level of regrind in a part; degraded polymer in the regrind; a broad range of granule sizes in the regrind; contamination from other plastics, either colourant carrier, metal, wood, dirt, or cardboard; excessive fines in the regrind; and processing variations due to any of the foregoing issues, which can be random and difficult for the processor to catch and accommodate.

If you’re blending regrind with virgin, you must contend with all of these issues. They might be possible to deal with on paper but nearly impossible to control on the production floor. For instance, how do you test to verify that the regrind is good, as opposed to contaminated or degraded? It can be done, but I have yet to see it truly implemented; and then there is the cost.

The bottom line is, if the regrind is good, then why blend it? And if the resin regrind is not good, why blend it? When you blend regrind with virgin, you’re opening the door to a variety of problems: it’s hard to track, there’s no way of dealing with contamination, and there is the question of process stability as various percentages of regrind go through your presses.

In my next column, we’ll consider the alternative approach of using 100 per cent regrind.

CPL

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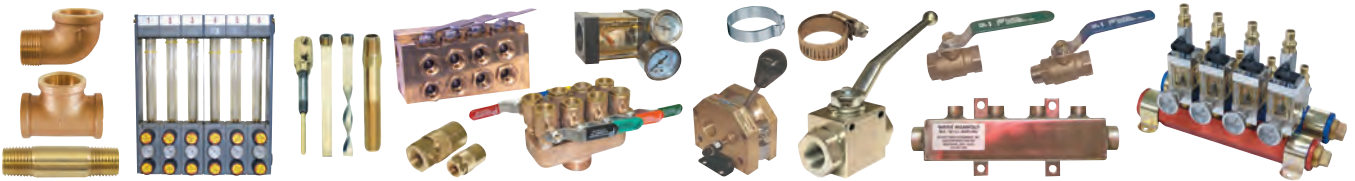
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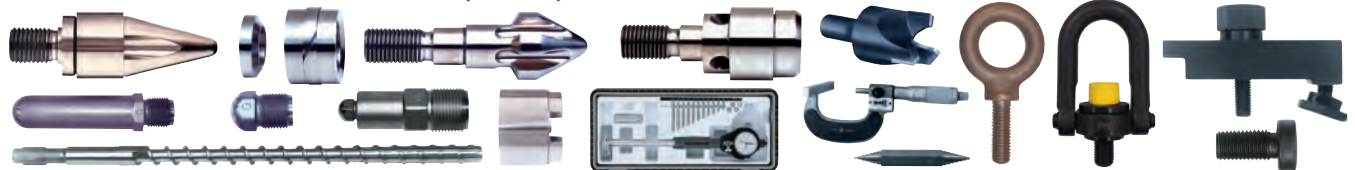
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