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Canadian Plastics

APRIL 2017
VOLUME 76 • NUMBER 2

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FROM THE ARCHIVES

The December 1978 issue of *Canadian Plastics* reported on a new rotational molding startup in Toronto called Techstar Plastics Inc. The firm was founded, our report said, when "nine young men quit their jobs following a major disagreement with the owners of the plastics company where they worked." Leaving behind salaries totaling about $250,000, they worked six days a week to get Techstar up and running, our report continued, "with those able to afford it not yet drawing a salary." Fast forward to 2017 and Techstar is still in business, having relocated to Port Perry, Ont., where it molds material handling products, commercial recycling containers, and dock floats.

Number of the month:
$361.7 million*

* Preliminary estimate, in U.S. dollars, for shipments of primary plastics equipment for reporting companies in Q4 2016. (See pg. 6)

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Automakers dodge a $200 billion bullet

Detroit's Big Three automakers and other vehicle suppliers must be thanking their lucky stars for the 100,000 or so swing voters in Michigan, Pennsylvania and Wisconsin who put Donald Trump in the White House.

Why? Because in mid-March, Trump announced plans to reinstate a promised review of regulations that set tough U.S. vehicle fuel efficiency standards for the 2022-25 period. American automakers agreed to the 2025 Corporate Average Fuel Economy, or CAFE standards, in 2011 in a landmark deal brokered by the Obama administration that aligned greenhouse gas limits set by the Environmental Protection Agency (EPA) with fuel economy regulations governed by the National Highway Traffic Safety Administration. The rules called for the American automotive fleet to average 54.5 miles per gallon by 2025.

Part of the deal included a mid-term review in 2018 to determine whether the final years of the program, the 2022-2025 model years, would be feasible given new technologies and changing oil prices. And things have indeed changed: The negotiators underestimated booming U.S. oil production and SUV sales when they agreed to the original standards six years ago, and the automakers now say that falling gasoline prices have squelched demand for the most fuel-efficient vehicles, making achieving the standards more difficult.

But in its last days the Obama administration EPA reneged on the mid-term review and pushed through portions of the regulations before Trump took office. Which is why, shortly afterwards, automakers — including the chief executives of General Motors, Ford Motor Company, Fiat Chrysler Automobiles, and the top North American executives at Toyota Motor, Honda Motor, and others — appealed to Trump to review the rules. In a letter to Trump, they argued that, under the stringent targets locked under Obama, the industry would have to spend US$200 billion by 2025 to comply, putting thousands of jobs at risk. "As recently as late last fall, the EPA assured us that the mid-term review would not result in a final determination before the next administration came into office," the letter said. The Auto Alliance, a trade group representing automakers including the Big Three, released its own statement accusing the EPA of "unnecessarily politicizing" the mid-term review by moving to finalize the regulations ahead of schedule.

For those who think — as I do — that the EPA did indeed pull a fast one in trying to make an end run around the mid-term review, Trump's decision to reinstate it is welcome. As the Auto Alliance said, "What we're really trying to do is just restore the process, and because the process was truncated, we don't know what the standards should be." Reopening the review of the CAFE standards doesn't signal a return to the steel-clad gas guzzlers of yesteryear, it should be noted, so there's no downside for the plastics industry's sizeable auto parts making sector. No matter what, lightweighting will continue.

The auto industry liked the original deal because it provided a road map for new technologies and regulations through 2025, and made long-term investment planning easier. The government liked it because it reduces carbon monoxide emissions and U.S. oil dependency. It's a good deal for all concerned, in short, which is why it's good news that the 2018 mid-term review appears to be back on.

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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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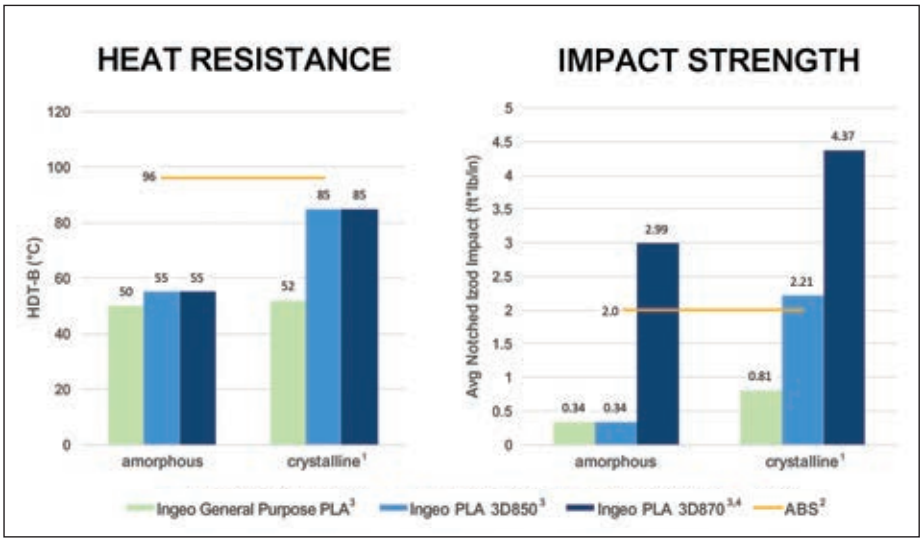
PLA gets tougher for industrial 3D printing



Graph Credit: NatureWorks LLC

If you're above a certain age, you'll remember this Charles Atlas ad: a skinny guy getting sand kicked in his face on the beach, going home and bulking up, and becoming a hero by returning to punch the sand-kicker's lights out. The point is, people appreciate seeing something that was once weak get tougher.

The makers of polylactic acid (PLA) can probably relate. A thermoplastic polymer derived from renewable resources like corn starch or sugar cane, PLA has a relatively low glass transition temperature (typically between 43° and 60°C), which makes it fairly unsuitable for high-temperature applications. Even things like a hot car in the summer can cause parts to soften and deform.

On the flip side, because it's odorless and low-warp and doesn't require a heated bed, PLA is also one of the most commonly used desktop 3D printing filaments and the "default" recommended material for many desktop 3D printers. But heat resistance and impact resistance limitations have kept it from crossing over into the industrial 3D printing sector.

Until now, possibly. Minnetonka, Minn.-based biopolymer supplier NatureWorks LLC has just introduced a new PLA 3D printing grade designed specifically for 3D filament manufacturers looking to tap into the lucrative industrial prototyping market. Called Ingeo 3D870, the material builds on the firm's 3D850 material, which was introduced in 2015, by exceeding the impact strength and — after post-print annealing — the heat resistance of 3D parts printed in ABS, which is the other most commonly used filament material for 3D printing. "We've added impact modifiers to the 3D850 base grade to give 3D870 more impact resistance, and a nucleating package to speed up crystallization and realize additional heat properties," said Dan Sawyer, global leader, new business segment at NatureWorks. "It's now on par with injection molded ABS."

Furthermore, Sawyer added, Ingeo 3D870 doesn't need to be printed with a heated build chamber to eliminate possible warping, as is necessary with industrial prototype parts printed from ABS filament. "This allows Ingeo 3D870 to be printed by a wider range of industrial 3D printers," he said.

Ingeo 3D870 also complies with chemical inventory listings in key markets in North America, Asia, and Europe, Sawyer said, which expands sales opportunities for filament manufacturers.

So it sounds like the days of 3D-printed PLA getting sand kicked in its face by the industrial sector are finally over. **CPL**

Plastics machinery shipments fall in Q4 of 2016

For the first time since the recovery in the plastics industry began in 2010, North American shipments of plastics machinery posted a second consecutive quarterly decrease, according to statistics compiled and reported by the Plastics Industry Association's Committee on Equipment Statistics (CES).

North American shipments of plastics machinery posted a year-over-year decline in the second quarter of 2016, the CES said, with the preliminary estimate for shipments of primary plastics equipment (injection molding, extrusion, and blow molding equipment) for reporting companies totaling US$361.7 million in Q4. "This was 7.4 per cent lower than the robust total of US$390.6 million from Q4 of 2015, but it was 24.2 per cent higher than the US$291.3 million from Q3 of 2016," the CES said. "For the entire year, shipments of primary plastics equipment were up 1.2 per cent when compared with the annual total from 2015."

"After rising steadily for six years, shipments of plastics equipment hit a plateau in 2016," said Bill Wood of Mountaintop Economics & Research Inc. Wood is the plastics market economist who analyzes and reports on the plastics machinery market for the CES. "The annual total was just high enough to extend the string of annual increases to seven years. The quarterly comparisons will be difficult in the first half of 2017, but the underlying economic fundamentals will gradually improve. If Congress passes corporate tax reform in 2017, then the uptrend in this data may re-emerge later this year."

The shipments value of injection molding machinery decreased 12.1 per cent in Q4 of 2016 when compared with the total from Q4 of 2015, the CES said. "The shipments value of single-screw extruders decreased 9.2 per cent; the shipments value of twin-screw extruders (which includes both co-rotating and counter-rotating machines) fell by 8.1 per cent in Q4 when compared with last year; and the shipments value of blow molding machines increased 9.1 per cent in Q4," it said.

New bookings of auxiliary equipment for reporting companies totaled US$126.6 million in Q4 of 2016, the CES said. "This represented a slight 0.1 per cent decline from the total from Q4 of 2015, but it was a gain of 5.0 per cent when compared with the total from Q3 of this year," it said.

The good news? "After a modest decline in 2016, overall demand for plastics products in the U.S. will start to rise again in 2017," Wood said. "Our forecast for the economy in 2017 calls for annual, real GDP growth in the range of three per cent, due primarily to steady improvement in wages and household incomes resulting from stronger employment levels."

The CES also conducts a quarterly survey of plastics machinery suppliers that asks about expectations for the future. According to the Q4 survey, 91 per cent of respondents expect market conditions to either hold steady or improve during the next 12 months. This is up from 86 per cent reporting the same in the previous quarter.

"The outlook for global market conditions also improved in the third quarter," the CES said. "North America was the region with the strongest expectations for improvement in the coming year. Mexico is expected to be steady-to-better. The outlooks for Asia and Latin America continue to be more optimistic than they were in the previous quarter, while the outlook for Europe weakened modestly."

The respondents to the Q4 survey expect medical and packaging to be the end markets that will enjoy the best growth in demand for plastics products and equipment in the coming year, the CES continued. "The expectations for automotive demand improved after a sharp dip in the previous quarter," it said. "Expectations for all other end markets call for steady-to-better demand to prevail in 2017." CPL

Maguire Canada now distributing Dri-Air dryers

Dryer manufacturer Dri-Air Industries Inc. is now being distributed in Canada by Maguire Products Canada Inc.

Headquartered in East Windsor, Conn., Dri-Air is a leader in supplying both compressed air and desiccant drying technology — which, when you scratch the surface, makes the collaboration a particularly good fit for Vaughan, Ont.-based Maguire Canada, which is the long-time distributor of Novatec brand dryers in Canada. "In the U.S., Dri-Air and Novatec have enjoyed a good working relationship for years, with each company allowing the other access to its product line," said Maguire Canada's general manager Brian Davis. "We've now made this relationship official in Canada by becoming Dri-Air's sales and service distributor."

For Dri-Air, the move will further solidify the firm's long-standing presence in Canada. "Canada is a very important market for us, and we've had Canadian representation for over 30 years," said Dri-Air president Charlie Sears. "But we're particularly pleased to be associated with Maguire Canada, which really has its finger on the pulse of what's going on there. As a U.S.-based firm, it's also important for us to know that our Canadian customers have trusted and reliable service representation, and the Maguire Canada staff has been fully trained in all of our product lines."

Maguire Canada is represented in Eastern Ontario, Quebec, and the Maritime Provinces by Barway Plastic Equipment Inc., which is headquartered in Vaudreuil-Dorion, Que. CPL

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

Innovation always comes from paradigm shifts.

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

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

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

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

Flexcool

Innovative industrial cooling solutions:
full process control and highest energy efficiency

DigitempEvo Thermochiller
- Single and Dual temperature control
- Integral cooling and heating functions
- Auto-adaptive operation

Aryacool Drycoolers
- High efficiency cooling fans
- Automatic adiabatic function
- Self drain feature for rigid climate operation

Aquaflow Pump Units
- Inverter controlled operations
- Multiple pump assembly
- Automatic stand-by rotation

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Trio of plastics pioneers pass away

Three North American plastics industry pioneers have passed away recently.

Loren Neil Peterson, the co-founder of Salina, Kan.-based bulk material handling equipment maker Vortex Global, died on Jan. 29 at age 87. He founded Vortex with his son-in-law Lee Young in 1977. A mechanical engineer, Peterson developed and patented a wide range of conveying equipment, including a "Y" type diverter valve and coupling system with a straight-line layout to reduce pressure losses in pneumatic conveying systems, the Orifice Gate, the Wye Line Diverter, the Roller Gate, and the Fill Pass Diverter. His last patent was granted in 1990 for the Clear Action Gate.

Martin Walsh, who played important roles in starting up several plastics-related companies in Ontario, including blown film system supplier Brampton Engineering Inc., passed away at age 73 on Feb. 9. Walsh co-founded Brampton Engineering in 1973, and co-owned and co-managed the firm for several years. He then founded Colortech Corporation, a supplier of colour and additive concentrates; and in 1992 founded Brampton-based Lex Technologies Inc., which supplied compounding equipment to make composites based on various scrap materials, plastics, and rubber. Walsh left the plastics industry in the mid-1990s.

Don Starkey Sr., the founder of Wauconda, Ill.-based mold components supplier Progressive Components, died on Feb. 20 at age 84. Starkey began his career as a moldmaker, and later formed Midway Mold, a Chicago-area mold shop that he sold in 1969. He then started D&L Incorporated in 1970, as an independent sales rep for several mold building companies. In 1987, D&L — which stands for Don and his wife Lois — began distributing components for molds. Three years later, he joined Cam Fran Tool as their sales manager, and D&L was purchased by Starkey's sons, Don Jr. and Glenn. The company then became Progressive Components. **CPL**

SUPPLIER NEWS

- Woodbridge, Ont.-based **Polyten Inc.** is the new Canadian distributor for **Marcus Oil Wax** products. Headquartered in Houston, Tex., Marcus Oil Wax manufactures linear, low molecular weight PE waxes used in plastics and coatings applications.
- Ontario-based resin supplier **Simcoe Plastics Ltd.** has expanded its product portfolio by moving into machinery sales. The firm, which is headquartered in Shanty Bay, Ont., is now representing machinery vendor **APSX LLC** of Cincinnati, Ohio, by selling its APSX-PIM line of desktop injection moldings machine in Canada.
- Pawtucket, R.I.-based custom compounder **Teknor Apex Company** has named plastic resin distributor **M. Holland Company**, headquartered in Northbrook, Ill., as its distributor for engineered thermoplastic products in North America.

PEOPLE

- The Toronto-based **Supply Chain Management Association** has appointed **Christian Buhagiar** as its president and CEO.
- Pawcatuck, Conn.-based extrusion equipment maker **Davis-Standard LLC** has named **Robert Dages** as aftermarket regional sales manager working for its Circonix division.
- **Tech Blend and Co. LP**, a St-Jean-sur-Richelieu, Que.-based producer of black concentrates for thermoplastics, has named **Peter Ducato** as sales and marketing manager for the U.S. Midwest. He will be based out of Rockford, Ill.
- Cranberry Township, Pa.-based auxiliary equipment maker **Conair Group** has named **Sam Rajkovich** as vice president, sales and marketing.

Christian Buhagiar

Robert Dages

Peter Ducato

Sam Rajkovich

Quebec injection molder Precimold sold

Candiac, Que.-based contract manufacturer, custom injection molder, and tool maker Precimold Inc. has been sold by its founder and president Gunter Weiss to Jack McDonald, an industry outsider and entrepreneur based in Montreal.

The terms of the deal have not been disclosed.

Born in Germany, Weiss was trained as a master moldmaker. He emigrated to Quebec and then, in 1966, founded the business that eventually became Precimold as a tool shop. He added injection molding in 1973, and renamed the business Precimold in 1979.

Today, Precimold produces technical parts for the automotive, defense, medical, and electronic markets from a 48,000-square-foot facility. The firm employs approximately 75 workers and operates 20 injection presses with clamping forces up to 300 tons. Precimold also carries ISO 9001, ISO 13485, and ISO/TS 16949 accreditations, and operates class 10,000 and class 100,000 cleanrooms.

"I've been open to selling Precimold for the past ten years, but I was waiting for the right fit," said Weiss, who recently turned 83 and is now retiring...maybe. "I told Jack that I live three minutes from the plant, and that if he needs me he can call me anytime of the day or night," he said.

And Weiss believes he found the right fit in McDonald, who has a commerce degree from Montreal's Concordia University and 35 years of experience in a wide range of private sector businesses, most recently running a distribution company. "My job isn't to make the molds or shoot the plastic, since Gunter has already put together one of the best teams in the industry for that," McDonald said. "My job is to create a culture that provides purpose for every member of the team and that relentlessly drives our main message: that our parts are important to everyone's health and safety, including our own."

Photo Credit: Precimold Inc.

Jack McDonald (left) and Gunter Weiss seal the deal.

Joining McDonald at Precimold are

Continued on page 10

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three colleagues from a previous business venture: Susan Raywood, who will serve as vice president; Kathy Kerr, who will serve as chief financial officer; and Pierre Cameron, the firm's new vice president of sales. "They bring an outside perspective to a very strong management team," McDonald said.

The sale of Precimold was finalized in late 2016, and in the short period of McDonald's ownership the firm has already invested over $500,000 in a new enterprise resource planning system with extensive production control and data capture capability, a Zeiss O-Inspect 543 with Calypso software for product inspections, and new IT infrastructure. "We will be spending substantially more than that over the next 12 months on a new website, digital marketing, and training development, but the biggest investments will be in moldmaking and production upgrades," McDonald said. The firm is also considering buying some electric injection presses next year. "Precimold is sophisticated and big enough to compete with any other molder in our sector, but we're also small enough to be a flexible and appreciative partner," McDonald said.

"I'm looking forward to spending the next 30 years at Precimold," McDonald added. "I'm not sure I'll still be working at 83, the way Gunter did, but I hope I have half his energy and drive." **CPL**

Gammaflux bought by Barnes Group

Aerospace manufacturer Barnes Group Inc. has purchased hot runner temperature and sequential valve gate control systems maker Gammaflux L.P. for an undisclosed amount, and will add it to its Molding Solutions business.

Sterling, Va.-based Gammaflux has offices in Illinois and Germany, also serves the blow molding, extrusion, and thermoforming sectors. Bristol, Conn.-based Barnes Group launched Molding Solutions with the purchase of hot runner maker Synventive Molding Solutions in 2012. It has since added Otto Männer, Thermoplay, Priamus, and most recently Foboha, the maker of rotating cube molds for thin-wall packaging products.

"Gammaflux adds technologically advanced hot runner temperature control systems to our existing product portfolio, which enable molders to achieve precise temperature control of the injection molding process within the mold," said Scott Mayo, Barnes Group's senior vice president. "This will ensure quality parts in the most critical molding applications."

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

COLD CALCULATIONS

By Mark Stephen, editor

Photo Credit: Piovan S.p.A.

If you think choosing a chilling system comes down to cost, capacity, and performance capabilities, you're only half right. The resins you'll be processing give up heat at different rates, which means you'd better be taking them into account, too.

In everything from romantic relationships to pumping gas, compatibility is critical. If a cat lover hooks up with a feline fur allergy sufferer, for example, bet on a quick breakup; likewise you won't get far by putting diesel fuel into a non-diesel vehicle. It's a law that extends even to selecting the best cooling system for your plastics processing needs. Plastics part makers face an important choice when determining how best to cool their equipment: use a central cooling system, or use portable chillers that serve specific machines or manufacturing cells. There's a variety of factors to take into account when deciding — cost, capacity, performance capabilities — but one consideration tends to get overlooked: the types of resins being processed.

"Resin is an important part of choosing a chiller — especially for custom molders who process wide ranges of resins — because each resin type has its own particular set of characteristics," said Steve Wojcieszek, director of industrial markets with Thermal Care Inc. "This means that each is processed at a different temperature and gives up heat at a different rate."

In other words, cooling one particular resin might require a larger chiller — i.e., a chiller with greater cooling

capacity — than cooling a different resin. Among the common resins, HDPE represents a worst case scenario for cooling needs, the equipment vendors agree. "For injection molding, the rule of thumb is that cooling 30 lbs per hour of HDPE equals one ton of chiller, which translates into a larger chiller than is needed for cooling PS, for example," Wojcieszek continued.

SIZE MATTERS

Key to matching chilling systems with resins is an understanding of how chillers are sized in the first place. "Chiller size is rated in tons per hour of refrigeration, based on a nominal coolant temperature of 50°F," said Tim Miller, heat transfer sales, Conair Group. "One ton of refrigeration, or cooling capacity, is equal to 12,000 BTUs per hour, which is the amount of latent heat absorbed when one ton of ice at 32°F melts to water at 32°F during a 24-hour period. The size of a chiller is based on the tonnage required to deliver the lowest required water temperature to a 'process heat load', which is the sum of heat that must be removed from the molded or extruded plastic, mechanical heat sources in the process equipment, and the influence of ambient conditions."

To the uninitiated, calculating the various heat loads of common resins, and therefore the detailed process load calculations, can seem as complicated as a NASA formulation. The good news is, it's all been done for you. "The cooling system industry has developed timesaving guidelines — we call them cookbook formulas — that simplify the process of estimating heat loads," said Ziggy Wiebe, owner of Chillers Inc.

But that doesn't mean you don't still have a decision to make: specifically, the choice between a central cooling system and portable chillers mentioned above. "Knowing what the resin is only tells us what the heat load is," said Giorgio Santella, chief marketing officer with Piovan S.p.A. "After that, deciding between portable and central systems has nothing to do with the material — it has to do with the unique situation of a molding facility, and each one is different." But some general rules of thumb apply, beginning with this: Since a typical central system is designed to deliver water at just one temperature, a processor running materials that require widely different processing temperatures may not be able to realize the economies that a central system normally provides. "If just one material runs at a lower temperature than others, the central system must be sized to deliver that lowest temperature," said Tim Miller. "Therefore, the system will actually be oversized for the vast majority of the resins being processed."

The key point, then, is how much variation there is in temperature requirements. "Typically, a cooling system needs two per cent more capacity for every degree of cooling below the nominal rating of 50°F," Miller continued. "In other words, running just one material at 40°F will require a 20 per cent larger chiller."

PLAYING THE PERCENTAGES

Under such circumstances, it may make sense to size the central system for all but the lowest temperatures and use portable chillers for any special materials. Which is where the benefits of a modular chilling system come in. "In a cooling system with multiple chillers that couple together to make a complete or expandable chilling system, you can add up to 12 chillers in one bank," said Roger Lambert, president of Temperature Corporation. "Combined with chilled water and tower water pump packages, you'll have a complete cooling system that can be expanded as your plant grows."

The vendors differ on where — and what — the red line is that determines when a central system, supplemented by portable chillers, becomes a more practical solution than portable chillers alone. "When it comes to cooling temperatures, as a general rule, if 80 per cent of your resins are processed within a temperature range of plus or minus 5°F, you should consider a central chilling system," Tim Miller said. Or the line could be drawn according to the number of portable chillers being used. "If half of your chilling system will be made up of portable chillers, the law of

Photo Credit: Thermal Care Inc.

Different resins give up heat at different rates. Thermal Care Inc.'s NQV series portable chiller with variable speed compressor reduces the electrical usage to meet a reduction in heat load.

diminishing returns dictates considering one central system with temperature control units instead," said Adam Zyskowski, sales manager with Berg Chilling Systems Inc.

What all the vendors agree on, however, is that the solution will vary from plant to plant, beginning with the specifics of the molding process. "Typically, blow molding and blown film extrusion require only one water temperature throughout the entire facility, in which case a central system makes sense," said Al Fosco, global marketing manager with Frigel North America. "Injection molders — especially custom injection molders — process wider ranges of resins and therefore need different cooling temperatures, which makes them better candidates for portable chillers, perhaps supplementing a central system or perhaps not."

Other considerations such as available floor space, cost of installation and operation, and even the age of the facility can play roles, too. "I've seen large-scale automotive part making shops that run entirely on tower water," Adam Zyskowski said. "They've accepted operating at 50 per cent production capacity during certain times of the year due to warmer tower water temperatures, but they tend to have aged, antiquated plants. For a brand new plant with new injection molding machines, however, the best solution is to choose a cooling system — whether centralized, portable, or a mix of the two — that allows you to cool the product faster to maximize production."

Compatibility never sounded so cool. **CPL**

RESOURCE LIST

Advantage Engineering Inc. (Greenwood, Ind.); www.advantageengineeering.com; 317-887-0729
Chillers Inc. (Newmarket, Ont.); www.chillersinc.com; 905-895-9667
Berg Chilling Systems Inc. (Toronto); www.berg-group.com; 416-755-2221
Conair Group (Cranberry Township, Pa.); www.conairgroup.com; 724-584-5500
Dier International Plastics Inc. (Unionville, Ont.); www.dierinternational.com; 416-219-0509
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Turner Group Inc. (Seattle, Wash.); www.turnergroup.net; 206-769-3707
Frigel North America (East Dundee, Ill.); www.frigel.com; 847-540-0160
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Piovan Canada (Mississauga, Ont.); www.piovan.com; 905-629-8822
Temperature Corporation (Markham, Ont.); www.temperaturecorporation.com; 877-513-8310
Thermal Care Inc. (Niles, Ill.); www.thermalcare.com; 847-966-2260
D Cube (Montreal); www.dcube.ca; 514-831-6623
Tantus Corporation (Pickering, Ont.); www.tantuscorp.com; 647-258-9657

THE NYLONS

Nylon 6, nylon 6,6 and nylon 4,6, possess superb wear resistance characteristics. Parts produced from these nylon types have surfaces that are self-lubricating, eliminating the need to apply lubricants under normal conditions. Under high speed and high loads lubricants are recommended. Water and other liquids will act as lubricants on working nylon. Hydrocarbon oils and greases do not chemically attack these nylon types.

The coefficient of friction and the "state of wear" is affected by surface crystallinity. Crystals are formed by "slow" cool. In other words, in the case of injection molding the mold surface is relatively warm. Mold surface temperatures of 150-250°F are not uncommon for producing nylon parts. Often Technicians are guided by the cycle time and they believe by reducing the mold temperature the cycle time will be reduced. This may not be the case. There is a difference between making a part and making a good part. Nylon 6 is a solid at 400°F. A mold surface temperature of 200°F is relatively low. Note; the temperature the Thermolator is set at is not necessarily the mold surface temperature. The surface temperature has to be measured on the surface of the mold once the process gets up and running.

High surface crystallinity results in a lower coefficient of friction and less wear. Adding molybdenum disulphide or graphite to nylon improves frictional properties of nylon. These substances act as solid lubricants, but also act as nucleating agents. Upon cooling from the "molten" state to the "solid" state assist in developing crystallinity. Small amounts of molybdenum disulphide (small being one per cent by weight of the nylon portion of the compound) results in significant change in the wear performance of the molded part.

Note: molds are not necessarily built for running 200°F plus water. If hoses running 150°F water spring a leak and the water showers a person in the proximity, the water may scald that person. If you decide to run these surface temperatures then an oil Thermolator is recommended. The hoses are braided and threaded couplers are used to affix the hoses to the mold and the Thermolators.

The addition of molybdenum disulphide into nylon results in Moldings of grey parts. Black parts can be accomplished with the addition of black concentrate.

There are producers including us (Pounds of Plastic Inc.) making nylons filled with PTFE (polytetrafluoroethylene). PTFE has a low coefficient of friction. It's highly lubricious. The coefficient of friction is lower than other polymers such as HDPE and nylon. The caveat is the PTFE has low wear resistance. An example of PTFE use is coating of cookware. The use of a metal spatula in a PTFE coated pan will result in scratching. This low wear resistance characteristic of PTFE impairs the use of PTFE in many applications. Nylon filled with PTFE has to be run in a mold with a relatively high surface temperature. It's recommended to have a mold surface temperature of 200°F for the system to work. The PTFE has to bloom to the surface. See Nylenium 1030G PT20 (30 per cent glass reinforced nylon 6,6 with PTFE). By "work", we mean parts produced are lubrcious. The negative to using PTFE is that it has a relatively high specific gravity (2.15) and this raises the weight of the part relative to alternative additives.

Pounds of Plastic Inc. has also created other wear resistant nylon compounds in nylon 6, nylon 6,6 and nylon 4,6. This technology uses high molecular weight oil. This allows the compounds to achieve similar wear properties as molybdenum disulphide filled nylon with the added benefit of colour. These compounds can be colored.

A couple of these applications are for anti-squeak. Two plastic parts rubbing against one another, especially made from the same polymer, will squeak.

The above information regarding wear has its basis on "nylon" moving against steel. Nylon rubbing against nylon doesn't wear as well as nylon against acetal or nylon rubbing against polybutylene terephthalate (PBT). The system is important.

You can conduct a test to demonstrate how processing affects crystallinity. After consuming water from a PET bottle heat the bottle (the threaded cap end works). If you use a lighter you have to be careful not to set the bottle on fire. Use a hot air gun, please. Just heat the end until it gets rubbery. The PET in a water bottle is in an amorphous state. This amorphous state is why it is transparent and this is why the bottle is tough. The water bottle has to be tough. If it were to be brittle and dropped the bottle would break. After application of the heat and removal of the heat the area heated will cool. You should notice that the area turns from transparent to white. This indicates crystallinity. The PET has changed from amorphous to a semi crystalline state. The physical property difference is radical. The crystalline PET can be exposed to greater temperature before it "melts" versus the amorphous PET. The wear resistance is significantly higher in the crystalline PET versus the amorphous version. The point is that through processing the PET bottle producer controls the crystallinity in his product to obtain the desired goal of transparency and toughness.

Processors of nylon have to understand that they can affect the physical properties (crystallinity) of nylon parts they produce by adjustments to the process.

For additional information regarding the science of nylon wear, please don't hesitate to contact Richard Pounds at 905-286-9894. Email us at rpounds@poundsofplastic.com.

HOT DEVELOPMENTS

By Mark Stephen, editor

The K show was last year and NPE was the year before that, but if you think hot runner suppliers are taking a break, think again. They're still churning out new technologies faster than Usain Bolt can sprint. Here's a look at some of the latest.

Life is full of contradictions. "If you want peace, prepare for war" is a classic. On a less philosophical level, hot runners are another. An assembly of heated components — hot halves, nozzles, and gates — that inject plastic into the cavities of an injection mold, hot runners also have the contradictory task of maintaining the plastic material within them heated uniformly while the rest of the injection mold is being cooled in order to solidify the product quickly.

It's a complicated business, which is why hot runners are usually assembled from components pre-manufactured by specialized companies. And since these companies are constantly churning out new technologies, it can be hard for a molder to keep up. Worried that you might have missed something? Here's a look at some of what's new, now.

KEEPING IT SIMPLE

Ewikon Molding Technologies Inc. recently unveiled its new "micro-manifold" technology, designed to be a standardized solution for the efficient large-scale production of polyolefin parts with small shot weights in molds with an extremely high number of cavities. The balanced micro-manifolds feature four screwed-in heat conductive tip inserts each, and are fed by a main manifold on a second level. The four gates in the micro-manifold have only one heating circuit, which simplifies wiring and control circuitry. The tip inserts can be changed without dismantling the manifold system. This compact design keeps total flow length and pressure drop to a minimum. "Since a part of this space can be used to integrate additional support sleeves or domes into the plate, mold designs with micro-manifold technology are not only more compact, but also more stable when compared with conventional multi-cavity mold layouts," the firm said. Ewikon offers complete hot halves with micro-manifold technology as 16, 32, 64, 96, 128, and 192-drop versions with standardized dimensions. Target branches are the packaging and medical industries.

Hasco has now extended its nozzle range with the new Vario Shot nozzle series, designed to allow the rapid implementation of more than 1,000 nozzle variants for applications from simple gating onto a subrunner to high-end valve gate solutions. An advance on the earlier Techni Shot nozzle design, the new nozzle features press-fitted heaters for high and even heat transfer, insulating material use to minimize exterior heat loss, and larger melt channels within a more compact architecture with very narrow pitches possible in multi-drop applications. The wear-resistant molybdenum tips can be easily changed and optionally given an additional wear-resistant coating for processing highly abrasive materials, the company said. "Additional specifications for the design of the nozzle were the highest possible melt throughput for the smallest possible size, and maximum stability," said Florian Larisch, Hasco's executive vice president of hot runners. "The compact design permits small mounting dimensions, a close pitch for multiple gating applications, and a low overall energy requirement."

New from **Heitec Hot Runner Systems** is the X-Slim nozzle, which handles larger shot weights than the compa-

Hasco's Vario Shot nozzle.

Photo Credit: Hasco

ny's Slim-Line nozzle, while retaining a small installation bore diameter. The X-Slim boasts what the company calls the largest ratio of flow channel diameter to installation bore diameter on the market. Three models have flow channels from 4.5 to 8 mm and installation bore diameters of 11 to 20 mm. The series is available as a hot tip or a valve gate version. Lengths can be chosen from 50 to 300 mm.

THE HEAT IS ON

HRSflow has introduced two new technologies designed to optimize injection molding processing while also simplifying routine maintenance of hot runner systems. The first, the firm's 3-Layer Tip, is a special coating-free tip made of three materials, one of which is a copper bushing internal to the flow channel to improve thermal conductivity. The new design provides increased temperature at the gate, which improves the processing of materials such as glass-filled fibre. Through the use of a special material and the removal of any coating, the 3-Layer Tip ensures wear reduction of the nozzle tip, elimination of black spots on the molded parts, and an optimal mechanical resistance. Although these improvements have been produced especially for the automotive lighting sector, all injection molded parts with high cosmetic requirements can benefit from the product, the company said. The firm's second new technology is Pressure Block, designed to prevent non-uniform temperature that can cause flow imbalance, warp, and flow marks. Made with low-heat-conductible materials, Pressure Block is positioned between the hot runner system and the mold, increasing the clamp plate stiffness under load while also providing an optimal thermal profile along the whole hot runner system.

Husky Injection Molding Systems Ltd. has extended the range of its award-winning Ultra Helix series of valve gate nozzles with two new sizes. The new nozzles include the Ultra Helix 350, designed to handle between 5 to 20 grams per second of material, and the Ultra Helix 750 nozzle that can process between 50 to 250 grams per second. Husky offers two variations of the valve gate nozzle. The Ultra Helix VG version has all critical gate geometry contained within the tip, which has an outside diameter of 3 mm. The Ultra Helix VR version, meanwhile, can be retrofitted to existing cold halves, and virtually eliminates mechanical wear by keeping the valve stem centred on the gate. "Years ago, we determined that to deliver superior gate vestige quality and thermal balance from drop to drop, cavity to cavity, standard manufacturing practices could not be used, so we developed new approaches for this valve gate design," said Craig Reynolds, Husky's director of business development. The design of the

Ultra Helix simplifies cold-half machining requirements for mold integration, Reynolds continued, which shortens mold validation times. "The nozzle series is well-suited for medical applications," he added.

FINDING THE BLACK BOX

Mold Hotrunner Solutions has expanded its line of cooling-free, pneumatic Black Box valve gate actuators with the new VA6015. The technology solves a common problem, the firm said: In high-temperature applications, in which mold temperatures can reach 400°F and material processing temperatures can reach 800°F, cooling performance reductions can lead to a breakdown or inconsistent operation of the valve gate. The new Black Box actuator, which uses zero-maintenance actuators, eliminates this problem, and also eliminates the need for cooling lines in the hot runner assembly, thereby increasing the integrity of the mold, mold base, and hot runner. Part of the company's Rheo-Pro line of hot runners, Black Box is also said to be well-suited for stack molds, where the actuator can be placed inside the middle block and operate without lubrication, seals or maintenance; and for high-temperature and cleanroom molding.

Milacron Holdings Corporation has introduced colour change tips for Mold-Masters Sprint hot runners designed for high-speed closure molding. The new tips can speed colour change by up to 47 per cent relative to a standard gate tip, the firm said. The new tips are now standard for all Sprint systems, and are compatible with the current tips as replacements. Sprint is available with hot tips or valve gates.

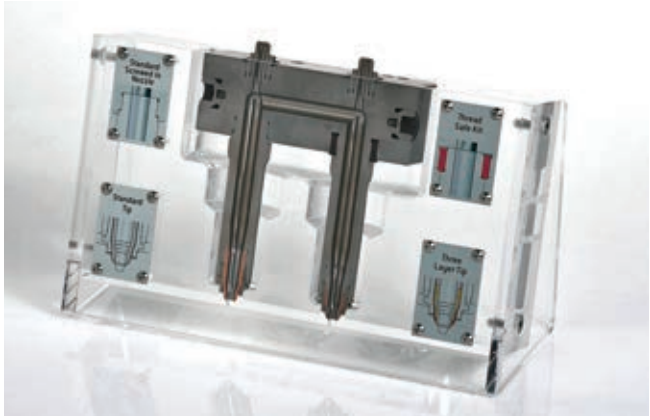


Photo Credit: HRSflow

HRSflow's 3-Layer Tip, designed to provide increased temperature at the gate, thereby improving processing of materials such as glass-filled fibre.

New from **Synventive Molding Solutions**, the SVG+ hot runner system is designed to offer superior performance, efficiency, and reliability for sequential molding of large parts. The system has a simple design, with no cooling lines or plates required, to deliver increased reliability in the molding process. Well-suited for family or modular molds, Synventive said, the benefits of the SVG+ include higher quality part surface finishes, the ability to mold parts with complex geometries and high dimensional stability, higher production rates, and clamping force reduction. The SVG+ is equipped with new modular actuators and SynCool3 technology, which provides indirect cooling of the actuators without the need for separate cooling lines, preheats without damage to actuator or seals, eliminates clogged or leaking cooling lines, and improves manifold temperature uniformity by removing the cooling plate.

So while hot runners remain a bit of a contradiction, they don't have to be a source of trouble — and a lot less hassle, certainly, than preparing for war. **CPL**

RESOURCE LIST

Ewikon Molding Technologies Inc. (Rockford, Ill.); www.ewikonusa.com; 815-874-7270
Hasco Canada Inc. (Toronto); www.hasco.com; 416-293-5044
Heitec Hot Runner Systems/Technoject Machinery Corporation (Bolton, Ont.); www.technoject.com; 905-951-7144
HRS Hot Runner Systems NA Inc. (Windsor, Ont.); www.hrsflow.com; 519-973-0212
Husky Injection Molding Systems Ltd. (Bolton, Ont.); www.husky.com; 905-951-5000
Mold Hotrunner Solutions (Georgetown, Ont.); www.moldhotrunnersolutions.com; 905-873-1954
Mold-Masters Ltd. (Georgetown, Ont.); www.moldmasters.com; 800-387-2483
Synventive Molding Solutions Canada Inc. (Toronto); www.synventive.com; 416-428-4693

By Mark Stephen, editor

A hard fact about extrusion processing is that feedscrews and barrels deteriorate and need to be repaired or replaced in order to maintain production and quality levels. The good news is, by understanding the causes of wear and learning to see the warning signs, you can minimize the damage.

Photos courtesy of battenfeld-cincinnati

Measuring wear in a twin-screw extruder (top left) and a single-screw extruder (above).

DON'T WEAR OUT

When Hamlet complained about the slings and arrows of outrageous fortune, he was really just acknowledging, albeit poetically, the wear and tear inflicted by everyday life.

It's something that extrusion shops can relate to. Whether you're operating single-screw units or twin-screw co-rotating machines, a hard fact about extrusion processing is that feedscrews and barrels wear out and need to be repaired or replaced in order to maintain production and quality levels. And since lowering output probably isn't an option, it's a problem you ignore at your own peril...and the result won't be pretty. At the very least, feedscrew and barrel wear leads to poorer quality components, increased energy consumption, and an eventual loss in profits; at worst, permanent damage can be caused during manufacturing to screws and barrels — including screw breakage — which can lead to a complete system failure.

But while a certain amount of wear over time is to be expected, extrusion processors can minimize the damage by taking measures to help decrease the wear rate and by identifying potential issues before they spiral into catastrophe.

THE USUAL SUSPECTS

The first step in fighting back against barrel and screw wear is to understand how and why they happen. Barrel and screw wear occurs between the top of the screw flight and the inside diameter of the barrel. As the amount of wear increases, the screw OD gets smaller and the barrel ID gets larger, which creates more clearance between the screw flights and the barrel. Operating an extruder in this condition means that the increased clearance allows plastic to pass over the flights of the screw instead of continuing forward.

The causes are many, and will probably vary from operation to operation, but topping the list is misaligned machine components. "Misalignment can be caused by a number of factors, including maintenance procedures, barrel and gearbox/motor installations, and machinery conversions and upgrades," said Ajay Beniwal, chief consultant at Extru-Tech Solutions Inc. "New machines can also become misaligned during transportation, particularly larger extruders,

which is why it's important for the customer to check the alignment after shipment."

Difficult-to-process materials are a second culprit. "Crystalline engineering polymers, fractional melt polymers, abrasive fillers, and potentially corrosive polymers and additives based partly on halogens are more conducive to barrel and screw wear," said Paul Rogers, sales manager, extrusion division with KraussMaffei Corporation.

Third, contamination can also play a role. "Foreign particles entering the melt, perhaps due to a lack of magnetic equipment to prevent entry through the hopper or even dislodged plating particles, can contribute to premature wear," said Dave Larson, president of Reiloy USA.

TERRIBLE TRIO

However it happens, there are three main types of wear, the equipment vendors say: adhesive, abrasive, and corrosive. "Adhesive wear is caused by metal-to-metal contact, with two metals rubbing together hard enough to remove material from the less wear-resistant surface, causing material breakouts or eruptions," said Dr. Henning Stieglitz, chief technology officer with Battenfeld-Cincinnati.

Abrasive wear can be defined as micro-chipping, Stieglitz continued, and occurs when foreign or abrasive particles in the resin come into contact with the screw or barrel. "The scouring effect of the hard particles wears away the metal, most often in the transition section of the screw. Foreign particles such as screw flight particles, chrome plating, and other objects can also gouge the barrel or screw, or even break segments out of the screw flights," he said. "The abrasive particles in the resins can be reinforcements, such as glass fibres or spheres, calcium carbonate, and powdered metals or ceramics." Abrasive wear can also occur when processing non-reinforced materials if too much of the energy required to melt the resin is generated by shear. "Cold pellets moving into the transition section of the screw are compressed and sheared, causing a scrubbing action that results in abrasive wear," Dave Larson said.

Glycon Corporation's Electronic Measurement and Tracking (EMT) system.

Photo Credit: Glycon Corporation

Corrosive wear, meanwhile, is caused by chemical reactions inside the processing unit. "Corrosive wear is characterized by pitting, and usually occurs in the last few flights of the transition zone and in the metering zone," Larson continued. "The pits can also collect the melt and burn or degrade it, resulting in black particles in the parts." There are several resins that can generate acids at high temperature, leading to corrosion, including PVC, acetals, fluoroplastics, and cellulosics. "In addition, flame retardants, coupling agents, and some of the foaming agents release acids," Larson added.

RED FLAGS

If you're looking for an upside, it's this: The presence of wear will be revealed by some easily recognizable red flags. "Increased screw speed to maintain normal output, above normal melt temperatures, backing up of material in the intake zone, reduced product output or output variations, and poor product appearance — primarily streaks or dark specks — are all signs of wear in extruder operations," said Jeff Kuhman, president of Glycon Corporation. "The symptom that the machine operator will usually notice first, however, is the scrap rate going up. It varies from shop to shop, but in general if a processor goes from a one per cent scrap rate to a two per cent scrap rate, they might have a problem: if the scrap rate suddenly jumps to four per cent, they definitely have a problem."

The machine itself might also alert you to trouble. "If you start hearing unusual sounds — particularly grinding noises — from the extruder, wear might be the cause," said Chris Rauwendaal, president of Rauwendaal Extrusion Engineering Inc. "High motor load and/or high temperatures along the extruder also can be signs of wear problems."

The good news is, by understanding the causes of wear and learning to identify potential issues, you can minimize the damage. Begin by checking for component straightness and machine misalignment. Optical alignment tools and laser-based alignment systems are the two primary methods for getting it done. "Most equipment vendors have service technicians who can provide alignment visits, including screw and barrel checks accompanied with advice about the right screw geometry for your application," said John Christiano, vice president of technology with Davis-Standard LLC. "Also, make sure that screw and barrel finishes are matched, and that one is not trying to induce premature wear in the other."

Second, only use extrusion barrels and screws with the right surface treatment for the abrasive and/or corrosive nature of your application. "For single-screw extrusion, nitride barrels were used most often in the past, but today bimetallic barrels are state-of-the-art," said Dr. Henning Stieglitz. "On the one hand, the choice of alloy allows an

optimal adjustment of wear protection to the processing task; on the other hand, bimetallic barrels offer a higher wear reserve compared to the often very thin nitriding layers." For the screw channel, a variety of coatings are available. "Hard material layers based on titanium nitride, titanium carbonitride, or titanium aluminum nitride are most often used in today's coatings," Stieglitz continued.

For counter-rotating twin-screw units, there are also several solutions available to improve wear protection. "Depending on the raw material, fillers, and masterbatches used, vendors can recommend a combination of coatings for screws and barrel to reduce wear," Stieglitz said. "Battenfeld-Cincinnati offers a nitride layer made in-house, for example, as well as a hard metal anti-wear superior tungsten carbide coating suitable for processing highly abrasive and corrosive materials."

Feedscrew finishes, meanwhile, can range from high-quality steel for standard applications to superalloys such as Inconel and Hastelloy for highly corrosive applications, the vendors say. Heat treatments such as flame hardening and nitride are also available.

And to improve the wear characteristics on extruder flight tips, Davis-Standard can in-lay a variety of substrates such as stellites and Colmony 83 for improved abrasion resistance. "Root surface treatments such as chrome and spray coatings for extreme wear conditions are also available," John Christiano said.

Third, after addressing the causes of wear and taking corrective measures, preventive maintenance and inspections should be performed at regular intervals to avoid unplanned downtime. "Screws should be pulled and the flight OD and barrel ID checked on a regular basis as part of routine maintenance," Paul Rogers said.

MEASURE ONCE

The clearance between the screw flights and the surface of the barrel is also critical and should be closely monitored. Most vendors offer free machine evaluation services that include measuring and inspection services to assess the condition of extruders. On the do-it-yourself level, precision screw and barrel wear measuring instruments are highly accurate and easy to use, even by unskilled people. A new device from Glycon fits the bill. The firm's Electronic Measurement and Tracking (EMT) system measures the wear-induced radial clearance gap between the screw and barrel via a handheld digital measuring device with a probe — called FliteScan — that's inserted into a specially designed port drilled through the barrel wall and barrel liner. "FliteScan uses an electronic signal to take a measurement of the distance from the probe tip to the nearest metal surface, and can take into account both the screw flight and the root of the screw while the screw is rotating," Jeff Kuhman said. "The probe's measurements are then compared to an initial baseline reading to determine the degree and rate of wear. The process of collecting the measurement data takes about 15 minutes, and data can be collected during either process startup or shutdown, or even while the machine is near processing temperature."

In the end, while some extrusion processes are inherently prone to wear and others are relatively gentle, a certain amount of screw and barrel degradation is inevitable in any machine. But if you take the right alignment and surface treatment precautions at the outset, and monitor your process after that, you won't get shut down. No matter how many slings and arrows come your way. **CPL**

RESOURCE LIST

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

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

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

Extru-Tech Solutions Inc. (Brampton, Ont.); www.extru-techsolutions.com; 647-687-0859

Glycon Corporation (Tecumseh, Mich.); www.glycon.com; 517-423-8356

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

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

Reiloy USA (Maize, Kan.); www.reiloyusa.com; 800-247-1144

What you need to know at a glance

PLAST-EX® 2017

When:

Tuesday, May 16, 2017
10:00 a.m. — 5:00 p.m.
Registration opens at 8:00 a.m.

Wednesday, May 17, 2017
10:00 a.m. — 5:00 p.m.
Registration opens at 8:00 a.m.

Thursday, May 18, 2017
10:00 a.m. — 4:00 p.m.
Registration opens at 8:30 a.m.

Where:

Toronto Congress Centre,
650 Dixon Road,
Toronto, Ontario

CO-LOCATED WITH: ATX Canada, Advanced Design & Manufacturing Canada, PackEx, and Toronto Powder & Bulk Solids

http://admtoronto.com/plastex

Ontario's only plastics industry event is also Canada's only dedicated plastics trade show this year. Plast-Ex 2017 gives you a chance to discover the latest innovations, processes, and techniques in injection molding, extrusion, blow molding, auxiliary equipment, assembly, robots and automation, biocompatibility, materials, adhesives, 3D printing, and thermoforming. Top companies and startups will be exhibiting state-of-the-art solutions, which makes this your chance to understand the technologies, processes, and services that can help you improve product quality and reduce your time, waste, and costs.

Plast-Ex 2017 also offers plastics professionals and top suppliers from across the industry opportunities to meet and network, and to connect with leaders and visionaries at the forefront of the industry. Top attendee titles include engineer, executive manager, owner, machine maintenance, mold design, production manager, manufacturer, purchaser, research and development, and quality control consul.

Educational opportunities on the show floor will cover the latest breakthroughs in automation and robotics, design and manufacturing, packaging, plastics, and processing. Attend presentations, demonstrations, roundtables, meet-ups, and innovation tours that can help you unlock the full potential of your projects. This is your opportunity to discuss critical industry trends, learn best practices, and hear from top plastics thought leaders right on the show floor.

If your company manufactures plastic materials, or uses them in the products you make, you need to visit Plast-Ex 2017. **CPL**

PLAST-EX® EXHIBITORS

(as of March 20, 2017)

COMPANY	BOOTH #
Absolute Haitian	2022
Absolute Machinery Corporation	2138
AceTRONIC Industrial Controls Inc.	1932
Acrolab	2266
Advantage Engineering Inc.	1962
Ametek – Creaform	2059
Bekum America Corp.	2044
Berg Chilling Systems Inc.	2327
Bluewater Heater Inc.	2265
Boedeker Plastics Inc.	1972
Brabender Technologie Inc.	2018
C.W. Brabender Instruments	2212
CAG Cooling Solutions	2066
Cambridge Materials Testing Ltd.	2070
Cambridge Materials Testing Ltd.	2070
Canadian Association of Mold Makers	2314
Canadian Plastics Industry Association	2064

COMPANY	BOOTH #
Cancoppas Ltd.	2270
Chillers Inc.	1962
Clariant MB	2043
Cold Jet	2328
Creaform	2059
Dongguan Jingchun Mould Plastic Company Ltd.	2330
Dongguan Zhiteng Plastic Co. Ltd.	2169
Drader Manufacturing Industries Ltd.	2347
Engel	1810
Erema North America Inc.	2122
Ernesto São Simão Lda.	1872
Exxel Polymers Inc.	1969
FD Plastics Canada	2166
Felix Compounds	1952
Firing Industries Ltd.	2159
Folia Plastics Inc.	2165
Fultech Machinery Inc.	1910

COMPANY	BOOTH #
Fultech Machinery Inc.	1910
Goodyear Mold International Ltd.	1963
GP:50 New York Ltd.	2238
Heaters, Controls & Sensors Ltd.	1559
Hotset America	1932
ICS Laser Technologies Inc.	2071
Ingenia Polymers Corp.	2037
Instron	2152
Integrity Testing Laboratory Inc.	2148
ITM Instruments Inc.	1965
Kal-Trading Inc.	2137
Kendy Mold Industrial Ltd.	1959
Kongskilde Industries Inc.	2038
Lab Integration	2160
Lindner reSource America LLC	2320
Lorenz Conveying Products	2260
Macchi S.p.A.	2032
Micro Interface Design	2063
Modern Machinery	2163
Moretto USA LLC	1922
MRC Polymers	1961
Oasis Alignment Services Inc.	2254
PCP Aluminium	2114
PCS Company	2340

COMPANY	BOOTH #
Pingyi County Xinling Plastic Industry	2051
Piovan Canada Ltd.	2010
Polymer Solutions Inc.	2069
PTi Processing Technologies International LLC	2053
Rainbow Rubber & Plastics Inc.	1918
Regloplas	2234
Reifenhauser Inc.	2214
RTP Company	1860
SelfLube Mold and Die Components	2147
Sepro Canada Inc.	2110
Shanghai Deborn Co. Ltd.	1970
Standex Engraving Mold-Tech	2072
Stäubli Corp.	2028
Taizhou Huangyan Jingke Mould Co. Ltd.	1960
Tantus Corporation	2170
Thermal Care Inc.	2170
Tria America LLC	2313
UBM Canon Events	x100
UBM's Advanced Manufacturing Group	x100
Vecoplan LLC	2216
Vortex Valves North America	1938
Weima America Inc.	2047
Wellton Plastic Mould	1866
Wittmann Canada Inc.	1928

AUXILIARY EQUIPMENT

Affordable mold temperature controller

The new *RQE* series mold temperature controller from **Thermal Care Inc.** is designed for applications that require simple operation at an affordable price.

The RQE comes with a controller with easy-to-use buttons, clear LCD display, and adjustable tuning parameters for uniform temperature control, regardless of external loading. Every unit is built for dependable performance using quality components, such as flow pumps that can provide up to 70 per cent more flow without increasing pump size, for even more cost savings.

Units are available in 12 kW, 0.75 hp, and 2 hp, and come with a 3-year warranty as standard.

Thermal Care Inc. (Niles, Ill.); www.thermalcare.com; 847-966-2260
D Cube (Montreal); www.dcube.ca; 514-831-6623
Tantus Corporation (Pickering, Ont.); www.tantuscorp.com; 647-258-9657

App for interactive 3D imaging of auxiliary equipment

A new app for smartphones and other handheld devices will enable individuals in the plastics industry to transform 2D images of equipment from affiliated companies **Maguire Products Inc.** and **Riverdale Global** into 3D models that can be manipulated simply by using the touchscreen.

Called *Maguire 5D*, the app is downloadable from Apple and Android stores and from a special webpage at http://www.maguire.com/page.php/5d.htm. Once installed on the device, the app is activated by special images in print advertisements in industry media or by images posted on the Maguire webpage.

After clicking on the app, the user can generate a 3D model by aiming the camera at the 2D image of the equipment in the ad. Touchscreen manipulation makes it possible to examine the interior of components, view material flow through the system, obtain a 360-degree "turntable" view, and examine specific areas of the equipment in close-up. A button for obtaining more information provides a form for messages sent directly to Maguire.

Maguire Products Canada Inc. (Vaughan, Ont.); www.maguirecanada.com; 866-441-8409
Barway Plastic Equipment Inc. (Vaudreuil-Dorion, Que.); www.barway.ca; 450-455-1396

INJECTION MOLDING

Compact injection unit and clean design

The new all-electric *EcoPower 110/350* from **Wittmann Battenfeld** combines a compact injection unit and the clean design of its clamping unit to offer a highly efficient direct drive for fast, precise injection and repeatable holding and back pressure for standard, high-performance, and cleanroom applications.

The EcoPower "clean package" consists of a water cooling system for the entire machine with a closed cooling circuit, nickel-plated clamping plates, food-grade lubricants, and special paint that is resistant to detergent and disinfectant. The control unit can be operated remotely.

The machine also comes with a laminar airflow box, a reject separator, and an encapsulated cleanroom conveyor belt installed below the clamping unit. Outgoing air is evacuated through pneumatic valves and conduits outside the cleanroom area.

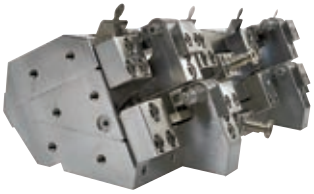
The unit is part of the EcoPower series machines, available in sizes ranging from 55 to 300 tons of clamping force, and features the kinetic energy-recovery system, an efficient direct-drive, compact clamping system, and a mold space free of grease through linear guides and enclosed toggles.

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

EXTRUSION

Dies ensure a more precise process

A new design for dual or multi-layer versions of **Nordson Extrusion Dies Industries**' *Premier* and *Ultracoat* fluid coating dies makes it easier to achieve parallel alignment of the lip faces, which is critical for maintaining uniform, defect-free coating and preventing impingement of the lips against the roll.



In the standard design for Premier fixed-lip and Ultracoat adjustable-lip slot dies, operators make changes to the die gap by inserting thin metal strips, or shims, between the die bodies, then using more shims at the rear of the die to eliminate the resulting offset of the lip faces and ensure that they are once again in the same plane.

The new design makes such calculation unnecessary, ensures a more precise lip face alignment, and prevents human error, by reconfiguring the die bodies of multi-layer Premier (pictured) and Ultracoat systems so that the offset blocks, where the offset shims are inserted, are now in the same plane as the lip face. As in the past, body shims and offset shims are available in thicknesses ranging up to 0.060 inches (-1.524 mm). With the new design, the accuracy of the offset adjustment is independent of body shim thickness.

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

MATERIALS

High-temperature nylons for under-the-hood applications

Two new glass fibre-reinforced polyamide compounds from **Teknor Apex Company** are designed to provide superior flame retardance and thermal stability for injection molded under-the-hood automotive components such as engine covers.

Chemlon 904-13 GVNH and *204-13 GVNH* are glass-filled nylon compounds with low halogen content that meet

the UL-94 V-0 standard by passing the vertical burn test at a thickness of only 0.031 inches (0.8 mm). Chemlon compounds yield a smooth surface, are 15 per cent less dense than conventional counterparts, and are readily processed for parts with long flow paths or thin walls.

Equally valuable for under-the-hood applications is the thermal stability of the new compounds: Chemlon 904-13 GVNH is an especially high-temperature material, with a heat deflection temperature of 245°C or 473°F and a high degree of property retention at elevated temperatures, which provides a continuous use temperature that is much higher than specification.

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

MOLD TECHNOLOGY

Smallest injection molding cavity pressure sensor

A new *6 mm cavity pressure sensor* from **RJG Inc.** is designed for high cavitation molds with small, tightly packed ejector pins, and allows customers to measure cavity pressure in order to improve quality and reduce costs.

There are two models available: the first rated to 50 lbs for use with the ejector pins up to 2 mm diameter, and the second rated to 250 lbs for pins up to 4.5 mm diameter.

The 6 mm sensor is a robust, indirect pressure sensor that works in conjunction with RJG's eDart system to assist molders in diagnosing processes and automatically sorting suspect parts. The 6 mm sensor head is said to be the smallest strain gauge sensor available, permitting the use in molds that may have tight clusters of pins with limited room.

The new model is designed with a sensor head that matches the dimension and installation pocket of the Piezoelectric 9211 6 mm button — meaning that it contains all of the capability of the Piezo at a more cost-effective price. Unlike Piezo, however, the connector cables can be bent and folded without damage, making them more flexible and easier to maneuver around obstacles.

The order-to-length 6 mm sensor is part of RJG's multi-channel strain gauge sensor line, and is not susceptible to moisture or contamination.

RJG Inc. (Traverse City, Mich.); www.rjginc.com; 231-947-3111

advertising index

Notes of a missionary

By Allan Griff, consulting engineer

I'm on a mission to find out why the public is so down on plastics. I'm tired of having to remind people of all the good things our products do — lighter automobiles that save fuel, medical devices that save lives, packages that protect foods and beverages — and I've become painfully aware that my audiences don't want to listen. They don't want to believe that these "artificial" materials can be good for us, and they resent my efforts to tell them otherwise.

And "they" is sometimes us. We are now all worried about *sustainability*, that conveniently vague term that means anything that appears to benefit our health and the environment as long as it will make our products look more acceptable to the public.

This may be good marketing, but it's not responsible care of our health and environment if we scorn and revile the materials that help us so much. Ask yourself: Do you believe plastics are harmful, even slightly, and that we should use as little of them as possible? Do you know people who think that way? Do you ever ask them why?

I decided to do just that, and have been telling people that *there are no toxic plastics — none*. I tell this to strangers of all kinds: my seatmates on airplanes, telemarketers, store clerks, and my favorites — the phone helpers who are trained to ask: "Is there anything else I can do for you?" "Yes," I reply. "Don't let anyone tell you that plastics are toxic, because they aren't. None of them."

I try to be polite, but it isn't easy. I don't raise my voice, but I may fight fire with verbal fire, such as telling someone who is worried about killing fish in the world's oceans that they should be campaigning against eating them and picketing the fish markets.

The plastophobes (as I call them) seldom have anything quantitative to say, unless it's to reference one or two studies that said there will be more plastic in the ocean than fish by 2050. Not unless plastics learn to lay eggs like fish, I may answer, but that will only annoy them and intensify their plastophobia. When confronted with my "Declaration of Harmlessness", they'll either be polite and silent or start to squirm. They may refer to the so-called "Great Garbage Patch" in the Pacific Ocean, but that myth is simply plastic in their minds; they don't care that PET bottles don't float, and think that plastics concentrate poisons in sea water that end up in the fish. If we talk about degradation, they want it both ways: either it never breaks down or it does break down and the little bits kill the fish. Plastics "leach" toxins, they say, although they can't tell me what or how (except bisphenol A, a building block of PC and epoxies that's too expensive for plastic film or bottles).

I like to call myself a realistic environmentalist. I don't believe in profit at any cost, I want responsible regulation of industry, and I want to see our parks and wildernesses maintained and supported. I fish (with extruded monofilament) and eat what I catch. But I'm not afraid of GMOs, nor do I expect their DNA to jump into me if I get near them. I want enforced regulation and responsible people to keep pesticides and herbicides out of our food, and am grateful for the higher productivity and lower costs that, in an atmosphere of free competition, should lead to lower prices for the general public. I value the chemicals that give us health (we call them medicines), and refuse to believe that simple is better (look at the formulas for hemoglobin vs. carbon monoxide).

But plastiphobes don't want to hear it. They/we distrust science because it challenges magic. Mystery is OK — there is a lot we don't know, and science is constantly searching there. But magic is impossible. My theory? Most of us *need* to believe in the impossible for our own sanity, otherwise the world would be too terrifying. We can't disprove the impossible, in short, and this helps explain the resistance to the artificial materials we know and use.

I support recycling for most (not all) products and materials, and am a consequent foe of degradability on environmental grounds. The words "natural" and "organic" bother me, as there are plenty of natural poisons, and organic foods cost more and distract from the most important keys to good health: a balanced diet and quantity control.

So this is my mission. If you also believe there are no toxic plastics, try some missionary activity yourself. Tell a stranger or a friend, and see what happens. And if you don't really believe in plastics' nontoxicity, read up or talk to the experts. But don't get caught in micro stuff; this is "big picture" stuff, public health and common sense stuff, and includes seeing the parts of all of us that are afraid of losing the stability that comes from believing in things. I don't expect to change the world, but I'm committed to the laws of science, and recognize the anxiety and ambivalence they cause in the general public. **CPL**

Allan Griff is an independent consulting engineer and plastics extrusion expert based in El Cerrito, Calif. He is presenting a one-day "Intro to Extrusion" seminar in Toronto on June 6. For more info, visit www.griffex.com, or contact him directly at algriff@griffex.com or call 301-758-7788.

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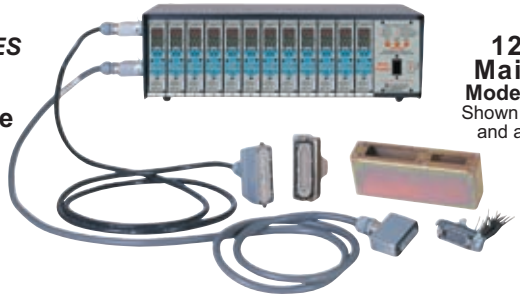

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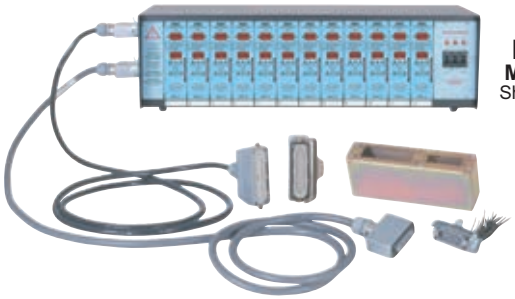

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