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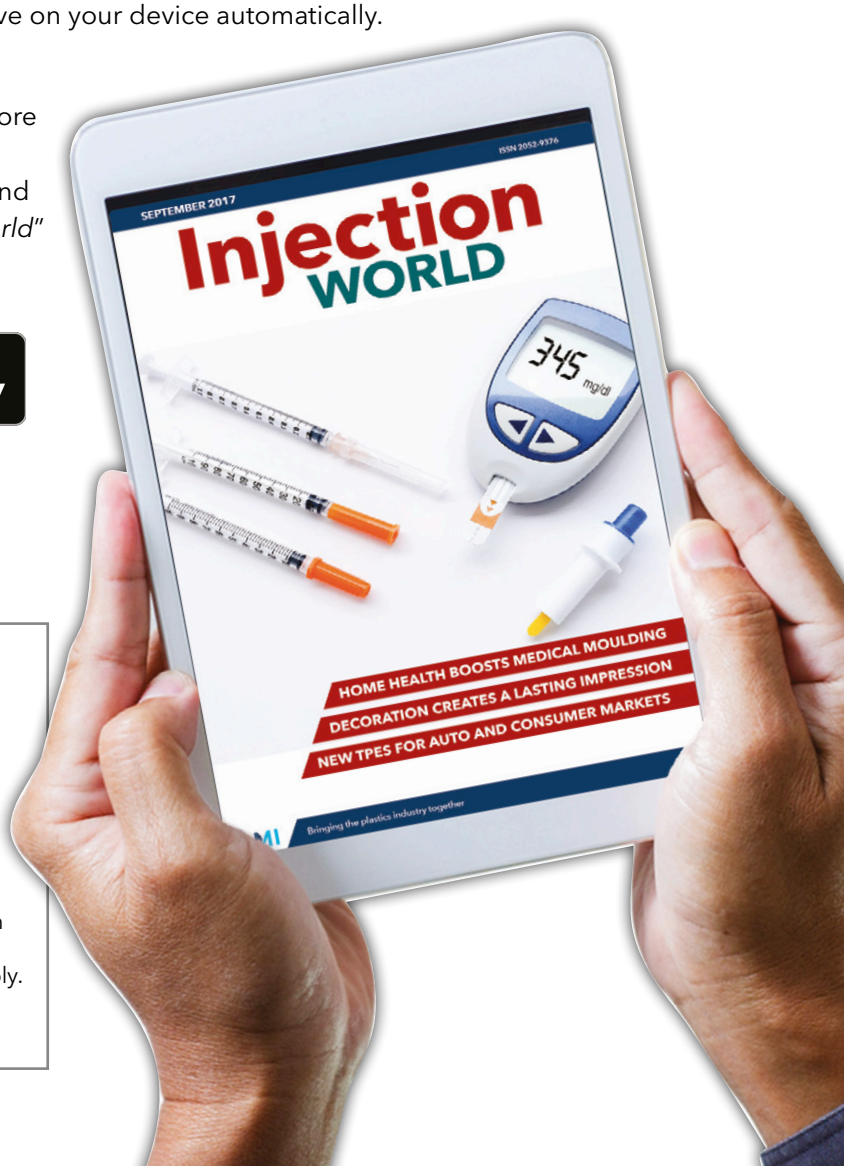

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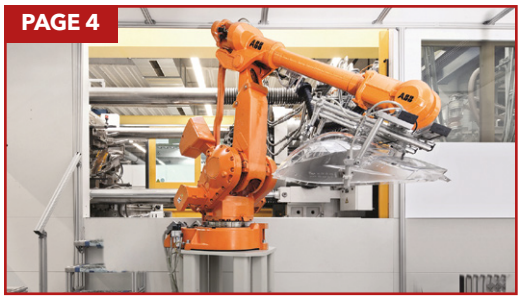

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KM to give Netstal its independence again

KraussMaffei Group is transferring all activities of KraussMaffei High Performance into an independent unit, which will operate under the traditional Netstal name. It said the business, which includes production of Netstal injection moulding machines at a facility in Näfels, Switzerland, will become an independent unit from 1 October.

The new subgroup will manage the Netstal New Machines and Service business worldwide from its subsidiaries. KraussMaffei CEO Michael Ruf said: "With this step, we are taking into account the wishes of our customers and reuniting the Netstal brand and the Netstal organisation under a common name.

"We are convinced that in the future Netstal will be able to respond to customers and their applications with even greater focus than before and offer them the added value for which the Netstal brand has stood for many decades."

Above: From 2019, the Netstal name has been used as a brand within KraussMaffei Group

The decision to transfer Netstal to independent operation under its own name comes only two years after the Netstal name became solely a brand within the group. As part of the former Mannesmann Plastics Machinery (MPM) group, KraussMaffei acquired a majority stake in Netstal in 1992. Since the break-up of MPM, Netstal has remained part of KraussMaffei Group through a number of group ownership changes up to its current ownership by ChemChina.

Injection World asked KraussMaffei if the newly independent status of Netstal meant it may sell the business in the future, but the company had not responded by the time of publication.

In its announcement, KraussMaffei said Renzo Davatz will head Netstal as CEO. It also said the medical and PET bottle markets that Netstal mainly serves are expected to continue their "strong growth".

› **www.kraussmaffei.com**

Revere acquires Ferguson

Michigan-based Revere Plastics Systems has acquired the previously family-owned Ferguson Production of McPherson, Kansas, its fourth such deal in the last 30 months. This came six months after Revere bought its first manufacturing facility in Mexico and brings its total number of sites to nine.

Ferguson operates 36 injection moulding presses ranging from 55 to 1,750 US tons at its 66,000 sq feet site, plus other secondary operations and assembly equipment. It mainly supplies the agriculture, automotive, consumer, lawn and garden, pet care and recreational vehicle markets, and has 80,000 sq feet of warehouse space. Revere, meanwhile, claims to be among the top 50 plastic injection moulders in North America by total sales, employing over 1,000.

› **www.rpsystems.com**

Berry to build Indian healthcare facility

Berry Global plans to establish a second manufacturing facility and R&D centre of excellence in healthcare near to its existing site at Bangalore, India, which opened in 2009. Construction should begin later this year, with the site due to be validated and ready for production by the summer of 2023.

The company said that this will enable it to extend its R&D expertise and scale-up production in several key healthcare sectors, such as ophthalmic, nasal pumps, inhalation, and injectable administrations. The additional capacity will supply markets throughout South Asia.

The centre will be designed to ensure that it achieves International Sustainability and Carbon Certificate (ISCC) Plus accreditation the first facility already has. This allows Berry to sell ISCC-certified packaging and plastic components that contribute to a circular economy approach based on advanced recycling and mass balance.

Alongside this, Berry will continue to focus on its current leadership in inhalation devices, including models with digital capabilities and the next generation of injectable devices. It also plans to introduce new nasal and ophthalmic spray pumps and healthcare packaging for various products.

The existing Berry Healthcare facility in Bangalore was opened in 2009.

› **www.berryglobal.com**


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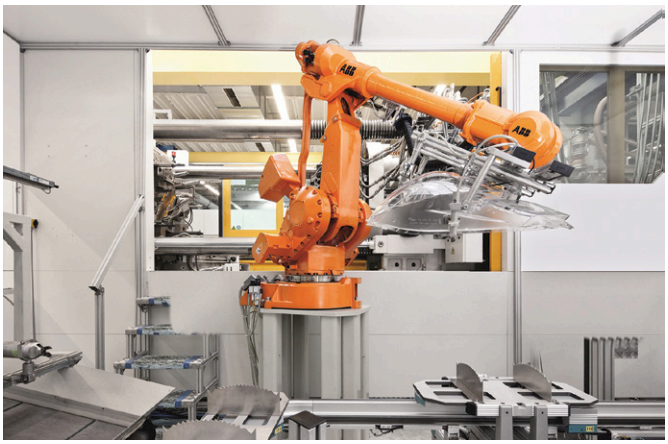
Faurecia plans to acquire Hella

Tier One automotive supplier Faurecia has agreed to launch a €60.96 per share offer for Hella – the German lighting and electronics specialist with injection moulding and other technologies – in a cash and shares deal that values Hella at €6.7bn. The firm said that this "marks an unprecedented step in Faurecia's ambition to accelerate its strategic transformation, by investing in high-growth segments and establishing leading positions there".

The Behrends "family pool", which owns 60% of Hella, will have 9% of the combined firm on an 18-month lock-up and one family pool member will join the board. The Hella board and management have supported the deal, but it will require shareholder approval at the AGM on 30 September.

IMAGE: HELLA



Above: Automotive lens moulding by Hella

The combined group will have sales of around €3.7bn and will be the world's seventh largest automotive supplier, with 24 production sites and 21 R&D centres. Faurecia envisages synergies that will boost EBITDA by an average of €200m per year from 2022 to 2025 and also boost revenue by €300-400m per year.

Faurecia added that it "recognises the strong technological dimension" of Hella's activities and will accelerate its multi-pillar business strategy by focusing both on the original equipment in lighting and electronics, and on the aftermarket, services and special applications. Hella's Lippstadt site will be the home of the Electronics, Lighting and Lifecycle Value Management business groups.

The combined group will develop a complete offer for electric vehicles (EVs) of all kinds, based on Faurecia's strengths in hydrogen and hybrid systems, and Hella's in energy management, sensors and actuators. Acquiring Hella will reduce Faurecia's exposure to sales of internal combustion engine vehicles from 25% now to around 10% in 2025.

It will also become a major player in dedicated electronics and software systems, employing some 3,000 software engineers, plus 18,500 engineers in other fields. Faurecia added that it will be able to reinforce its 'Cockpit of the Future' strategy.

› **www.faurecia.com**

Alpla to buy Wolf Plastics

IMAGE: WOLF PLASTICS

Austrian-based packaging and recycling specialist Alpla is purchasing the Wolf Plastics Group "to expand its product portfolio and sees growth potential in Central and South-Eastern Europe", subject to regulatory approval in Austria and Romania. Terms are not being disclosed.

This will bring Alpla additional facilities in Austria, Hungary and Romania, employing 210 people. Wolf, which was founded in 1973, has about 400 different product lines and particular expertise in the manufacture of plastic buckets and canisters, notably for the construction, chemical and food industries.

› **www.alpla.com**

Left: Wolf Plastics has facilities in Austria, Hungary and Romania

New owner for Flexan in US

ILC Dover has acquired medical device maker Flexan of Lincolnshire, Illinois, in a deal that it said would enable both to leverage their respective expertise and capabilities in medical device and biopharmaceutical markets. This is the company's second transaction since itself being acquired by New Mountain Capital last year.

Flexan is a full-service, contract design and manufacturing company active in high-precision silicone, rubber, and thermoplastic components for the medical device industry, with expertise in silicone moulding and thermoplastic extrusion.

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Rosti working with IDC

Rosti Group has announced a partnership with Industrial Design Consultancy (IDC), a London-based studio that is focused on industrial and medical design.

Rosti, which is headquartered in Malmö, Sweden, and has 3,200 employees across eight production facilities in Europe and Asia, said that this will enhance the offer from its 25,000 m² plant in China which houses one of its innovation labs. It means that industrial and mechanical design, electrical software and hardware design, prototyping and low volume production, and regulatory support will now be available in both Europe and China.

"By connecting the design expertise of IDC with the prototyping and production capabilities of Rosti, companies seeking cost-effective, innovative and schedule critical production have a new option to consider," said Pat Williams, SVP for Asia.

› **www.rosti.com**

Pacific Plastics doubles capacity in California

Pacific Plastics Injection Molding (PPIM), a division of Diversified Plastics, has almost doubled capacity at its facility in California to 46,000 sq feet. This brings the total at both firms' sites to 99,000 sq feet and is part of a three-year growth plan.

This follows a 5,000 sq feet expansion in 2019, in which PPIM added new manufacturing, assembly and office, more injection moulding presses and an automation system. However, the firm said, this was still not enough to meet growing demand

"While production has doubled, we did not have enough warehouse space," said general manager Rob Gilman. "As a short-term solution, we added cargo containers in the shipping bay and parking lot."

IMAGE: PPIM

Above: Growing demand is behind an expansion at PPIM

PPIM is also expanding moulding capacity by 20% by the end of the year. In mid-August, it began a transition to all-electric injection moulding presses in order to accelerate output. Later, a cleanroom will be added and ISO 13485 certification will be sought in order to broaden its medical device manufacturing, assembling and packaging capabilities at a second location.

› **www.pacificplastic.com**

Piovan begins building in China

Italy's Piovan held a signing ceremony with local officials on 15 July that will lead to the construction of a new plant in Suzhou, Jiangsu province. Covering an area of 10,000 m², this will be dedicated to the design and production of complete automation systems for plastics, food powders and refrigeration.

"The new building will be designed according to the best international standards,"said Flavio Zaghini, general manager of Piovan China. It will have offices, technological laboratories for testing, showrooms, warehouses, a production area designed according to lean methodologies and a new R&D department for development of innovative technologies.

The new facility will be the reference HQ for all the group's branches in Asia.

› **www.piovan.com**

Engel Duo helps raise recycling targets

Cascade Cart Solutions of Grand Rapids, Michigan, has said that the 4,400 US ton Engel Duo machine equipped with iQ weight control software that it bought in October 2020 has led to "an increase in production speed, process control efficiency, and part weight consistency". This has boosted the use of more recycled material and reduce scrap in its roll-to-kerb waste and recycling cart business.

After installation, Engel conducted a production trial of the iQ on a 96-gallon bin on a single cavity mould and in a 71 s cycle.

The iQ feature, Cascade added, means that it can increase its goals of using 10% post-consumer recyclate, as well as 40% scrap and other recyclable materials. The company has also recently installed a 2,500 US ton Duo at its West plant.

› **www.engelglobal.com**

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Lanxess launches composite hollow profile technology

Lanxess says it is making the first customer prototypes for functional hollow profiles made with plastic-metal composites using an injection moulding process. The plastic-metal components have a much greater torsional stiffness and strength than could previously be achieved with other technologies for functionalising hollow profiles, the company says.

Lanxess sees potential applications in the automotive industry, including cross car beams, coupling rods, stabilisers, seat elements and other areas.


IMAGE: LANXESS

The process does not require auxiliary equipment or tooling technology, which keeps investment costs low. "With the aid of innovative tolerance management, we can prevent profiles of that type from damaging the mould or stop leaks occurring in the injection moulding cavity." said Matthias Theunissen, a lightweight design specialist at Lanxess.

When thin-walled hollow profiles are overmoulded, high pressures often exceeding 400 to 500 bar occur in the cavity which present a high risk of the profiles deforming or collapsing. "We have optimised the process such that the profiles withstand the pressures that occur and do not need to be supported from inside," said Theunissen.

For the hollow-profile hybrid technology, Lanxess offers highly reinforced PA 6 types such as the easy-flowing Durethan BKV60H2.0EF DUS060, which has a short glass fibre content of 60% by weight.

› **www.lanxess.com**

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Thermoplastics cope with the heat in thin parts

IMAGE: SHUTTERSTOCK

Automotive and electronic mouldings are becoming thinner and smaller, placing extra demands on thermoplastics in high-temperature applications. By Peter Mapleston

Latest introductions from suppliers of high temperature-resistant polymers and compounds are aimed at specific applications across many industrial and consumer sectors. Top of the target list, as usual, are the automotive and electronics sectors, for different reasons: in the former, resistance to high temperatures for long periods is required, along with top mechanical properties and resistance to oils and other automotive fluids; in E&E, high heat resistance needs to be matched with excellent electrical properties, such as tracking resistance and flame retardance, as well as the ability to fill extremely thin wall sections. Beyond these sectors, other end-use sectors calling for high temperature resistance are led by medical equipment.

"More data, less space – put in a nutshell, this is the major trend in consumer electronics," says Ivy Fang, head of business development Asia for polyphthalamides (PPA) at **BASF**. "Smaller and thinner parts have to be incorporated into even more compact designs to save assembly space while at the same time the power and data flow rates increase. Thus, the requirements on materials used grow, especially with respect to temperature and mechanical properties."

At Chinaplas earlier this year, BASF showcased a new grade of Ultramid Advanced N PPA (PA9T) exhibiting extremely low moisture uptake, excellent toughness and dimensional stability at high temperatures. Intended mainly for connectors, these properties ensure stable performance during post-processing by surface mount technology, the company says.

Ultramid Advanced N2U40G7 shows what BASF says is the ideal balance of high flowability, toughness and flame retardancy. It thus enables miniaturi-

Main image: Automotive under-the-hood plastics need to resist high temperatures for long periods

BASF's new Ultramid Advanced N2U40G7 is especially suited for connectors that are post-processed with surface mount technology (SMT) and used in consumer electronics

IMAGE: BASF

sation with thin-wall structures at high power and data throughput in electronic applications.

Due to its low moisture uptake and high heat deflection temperature, the new grade is especially suitable for surface mount technology (SMT) processes, as it prevents blistering or changes in dimensions of the processed part. According to BASF, Ultramid Advanced N2U40G "enhances the robustness, performance and reliability of power and data connectors in consumer electronics such as computers, laptops, servers, smart phones as well as smart household appliances and wearable devices."

"Our new Ultramid Advanced can withstand higher temperatures while maintaining its mechanical strength," says Fang. "It meets the heat distortion temperature above 260°C necessary for SMT." Low moisture uptake not only reduces the risk of blistering, but also guarantees high dimensional stability. In order to provide customers with the best-performing solution for high-precision applications using SMT, BASF has expanded its testing facilities with a simulation oven which imitates SMT processing circumstances.

The new high-flow material can be used to manufacture extremely thin-wall connectors, has a UL94 V-0 rating at 0.2mm and satisfies JEDEC Level 1 blistering test standards. Comparative tracking index (CTI) is 600 V. Ultramid Advanced N2U40G7 can be supplied in tailor-made colours. This supports colour correlation for safety reasons or component distinction often required in the E&E industry, BASF says. Colour stability during post-processing with SMT is said to be good when compared to other benchmark materials in E&E applications.

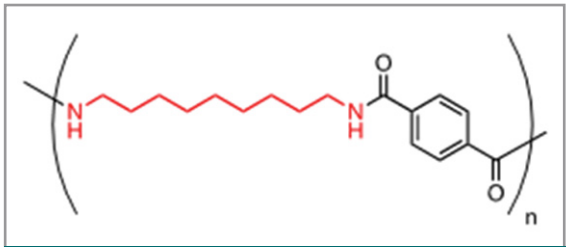
BASF has also been expanding its Ultramid Advanced portfolio with carbon-fibre reinforced grades with loadings of 20, 30 and 40%. It says they make for extremely lightweight parts, can safely replace aluminium and magnesium without loss in stiffness and strength and are electrically conductive.

"The new grades combine these properties with the advantages of Ultramid Advanced N, which makes them unique among carbon-fibre reinforced PPAs already available in the market: high dimensional stability due to low water uptake, excellent chemical and hydrolysis resistance, high strength and modulus," says BASF. The new grades can be used to manufacture automotive structural parts for body, chassis and powertrain, for pumps, fans, gears and compressors in industrial applications as well as for stable and ultra-lightweight components in consumer electronics.

Mechanical performance can be tuned by the choice and the content of the carbon fibre as well as by the additive technology. Ultramid Advanced N3HC8 with 40% carbon fibre filling shows a better strength and modulus at 80°C (conditioned) than magnesium or aluminium. "Our new PPA compounds with carbon fibres are the ideal metal replacement," says Michael Pilarski from PPA business management at BASF. "And this not only from a material property point of view. Lately, we have seen safety issues at magnesium producers in different countries, which makes the supply rather unpredictable."

PPA grades reinforced with 20 wt.% carbon fibres are about 20% lighter than PA6 or PA66 filled with 50% glass fibres. The tensile strength of a 20% carbon fibre reinforced Ultramid Advanced compound is either better or equivalent to a glass fibre reinforced PA filled with 50% while showing better processability, BASF says. Ultramid Advanced N3HC8, for example, is very stable after ageing at high temperatures: it retains nearly 100% of its tensile modulus after heat aging at 120°C for 5,000 hours or at 150°C for 3,000 hours.

Until BASF introduced Ultramid Advanced N at K2016, **Kuraray** was alone in supplying PA9T, with its Genestar family. It highlights Genestar GP2300S, a halogen-free flame retardant compound. This "electro-friendly" 30% glass fibre reinforced grade achieves a UL94 V-0 rating at thicknesses upwards of 0.15 mm through to 3.0 mm, making it suitable for SMT reflow connectors, including high-voltage



Chemical structure of PA9T
Source: Kuraray

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Spurring development in EV batteries

Giacomo Parisi, marketing director for advanced mobility solutions at **DuPont Mobility & Materials**, says the company's development work is steered by its "battery roadmap," which tracks near-term needs of the industry as well as the challenges related to technologies expected to emerge in the next 5-10 years.

Consumer hesitation to purchase EVs often is due to concerns about vehicle range and the time required to re-charge a battery. To boost the range and reduce the charging times of battery-powered vehicles, energy density in battery cells will have to increase. Increased density will help speed charging of fully electric and hybrid vehicles (collectively called xEVs), increase safety, and improve performance in extreme cold or hot weather.

OEMs have a handful of options to keep high voltage batteries cool for xEVs. These options all depend on thermoplastics and thermoplastic elastomers with a careful balance of thermal and dimensional properties.

IMAGE: DUPONT

Left: DuPont has built its own battery module to help new development at customers

To keep xEV batteries cool, four main methods are considered: passive cooling, air-forced cooling, indirect cooling with water/glycol or refrigerant, or direct immersion cooling.

DuPont is supporting customers in their developments for all of these but sees itself as especially well positioned for the latter two. Parisi says both require applications such as cooling plates, electric driven pumps, and other applications for which DuPont has optimised materials across its portfolio.

Company experts believe direct immersion cooling may offer the most upside, but they recognise that it also creates new challenges, including the need to re-design the cooling system and ensure it does not leak any of the dielectric fluids. Direct immersion cooling also will place higher demands on the materials in contact with those new EV fluids.

But the advantages – including faster charging, more precise temperature control, and improved cell lifetime – are very attractive to OEMs and could allay consumer concerns about xEVs' range and charging time requirements. At the Fakuma exhibition in Germany this October, DuPont will launch new grades of Electrically Friendly (EF) materials that it says offer the durability necessary to support manufacturers' ongoing developments.

types (see also *Injection World* September 2020). Genestar GP2300S can reach a CTI significantly higher than 600V (IEC 60112/UL 746 standard). In-house tests showed it performed better in this regard than rival PPAs such as PA6T and PA4T.

Kuraray says: "PA9T grades have an excellent water repellence combined with a high thermal stability compared to short-chain PPAs. Moreover, less benzene rings are present in the main molecular chain of PA9T compared to other short-chain PPAs. This results in less conductive graphite structures to be formed during the CTI testing."

Kuraray has a plant in Thailand due to start up late next year producing C9 diamine monomer as well as PA9T polymer. This will be its third PA9T polymer plant (the other two are in Japan and Thailand), bringing total capacity to 26,000 tpa. "From a Business Continuity Plan point of view, it is very important for us to have multiple production sites separately for ensuring supply reliability," a representative says.

Independent compounder **Lati** recently launched compounds based on PA9T, branded Laramid T. It says it is aiming at strategic industrial sectors, notably connectivity and e-mobility, where resistance to high temperatures are required alongside resistance to prolonged stress and aggressive environments.

The compounds offer a reliable mechanical performance up to a continuous use temperature of 150°C, which Luca Posca, Group Technical Assistance & Marketing Director, says is a very critical threshold for many fields. "This feature allows PA9T to compete with other PPAs and PPS as well in automotive, appliance, energy management, electronic and electrical devices," he says. "Laramid T is an already fully developed group of materials, featuring glass and carbon fibre reinforced grades for structural applications, thermally and electrically conductive as well as self-lubricant compounds. Halogen- and red phosphorous-free flame retardants are already available in both

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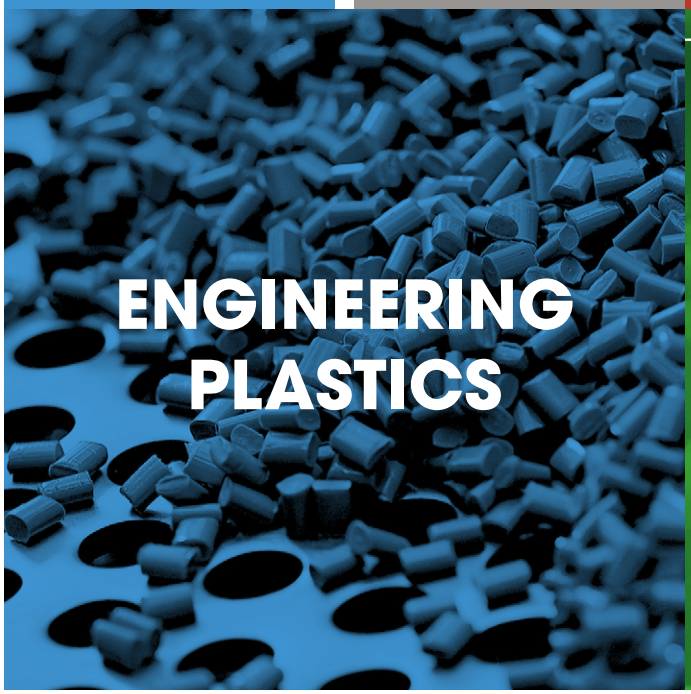

Plastics Engineer

www.tisan.com.tr

IMAGE: DSM

Above: ForTii Care from DSM can replace metal and ceramics used to manufacture medical rubber gloves, reducing operating costs and environmental impacts from manufacturing

reinforced and unreinforced versions and UL approval is on its way."

To improve electric vehicle motor efficiency, and ultimately reduce energy consumption, **DuPont Mobility & Materials** has developed an improved design for hybrid bobbins, an integral part of e-motors. The design benefits from the high insulation properties and chemical resistance of a grade of Zytel HTN specialty polyamide as well as the company's Nomex heat- and flame-resistant fibres. Motors designed with this technology can generate more power in less space thanks to lower volume of the bobbin in the corner areas. Manufacturing efficiency is also improved, with the design enabling automated production of the bobbins. DuPont's solution has already been adopted by one global OEM.

The company's expertise in thermoplastics as well as automotive adhesives, plus heat/flame resistant fibre technology, is proving a powerful draw for manufacturers tasked with advanced mobility applications, notes Giacomo Parisi, marketing director for advanced mobility solutions at DuPont.

This April, **DSM**, which is already active in the healthcare sector with various non-plastics products, launched a new portfolio of engineering materials for medical devices. The new family of advanced medical-grade material solutions includes Arnitel Care polyester-based thermoplastic elastomer (TPC), Arnite Care polybutylene terephthalate (PBT), and ForTii Care PPAs.

The materials are intended for use in a broad range of important non-invasive medical devices. They have been tested to meet or exceed important global standards such as US FDA food contact compliance, ISO-10993, and United States Pharmacopeia (USP) Class VI standards.

ForTii Care P1G6 is based on DSM's ForTii PA4T-based polymer. Key properties are mechanical strength, stiffness, high-temperature performance, and chemical resistance. DSM is offering it as a solution for metal replacement and surgical tools.

DSM says ForTii Care offers superior performance in a wide range of demanding devices, such as minimally-invasive surgical tools, handheld instruments, surgical robots and trauma fixation devices. With the ability to withstand mechanical stress at high temperatures (over 150°C) and corrosive chemicals (pH 0.5 to 13), the material achieves weight savings of 50% or more when used to replace metal alternatives.

DSM says ForTii Care outperforms polyacrylamide (PARA) and other high-performance PPAs and is more cost-effective than polyetheretherketone (PEEK). The material can undergo more than 100 cycles of steam sterilisation without significant impact to its mechanical properties.

Heat-stabilised "regular" polyamides can take on more expensive high-heat polymers in some areas. **Domo Engineering Plastics** points to its Technyl Red range of heat-stabilised polyamides, designed especially for automotive applications in IC and hybrid engines operating at continuous temperatures between 200°C and 220°C. The supplier says the compounds deliver superior thermal aging stability without compromising performance or cost-efficient processability. Recommended melt and mould temperatures are significantly lower than for competing polyamides and polyphthalamides, saving energy during processing and cutting part cooling time, Domo adds.

Technyl Red S PA6/66 is for applications operating at a continuous temperature of 200°C (2,000h) or even 210°C (1,000h), such as turbo air ducts, charge-air coolers and cylinder head covers. It has high impact resistance, high flowability, superior surface aspect and "excellent" weldability. It is designed to resist a continuous operating temperature up to 210°C (at 1,000h) or 200°C (at 2,000 hours).

Technyl Red J, which is based on PA66/6T, can operate at temperatures up to 210°C (3,000h) or 220°C (2,000h), making it suitable for applications such as air intake manifolds with integrated water charge air cooler, resonators, cylinder head and engine covers, as well as water charge air coolers and turbo air ducts. It flows like a PA66. It is well-suited for both vibration and hot gas welding, delivering high burst pressure levels.

In late July, **Solvay** launched a new grade of KetaSpire PEEK, KT-850 SCF 30, designed for precision brake system and e-mobility electronic pump components. The product was developed to provide better sealing performance over standard 30% carbon fibre filled PEEK grades. ›

Carbon fibre filled PEEK has traditionally been used for anti-lock brake system (ABS) and electronic stability control (ESC) components, such as tappets, poppets and plungers. Solvay says the new KT-850 SCF 30 grade enables further metal (aluminium) replacement by improving the flow characteristics of the material and the surface finish of parts.

ABS/ESC plungers play a critical role in the function of the system's hydraulic unit. The system combines an electronic pump, an electronic control unit (ECU), valves which control braking pressure at the wheels, and sensors that measure the speed of the wheels. The plunger is responsible for operating the valve's movement by controlling the brake fluid supply.

"The replacement of aluminium in precision components, such as ABS plungers, allows for overall cost reductions as well as improved productivity," says Brian Baleno, Head of Marketing – Transportation at Solvay's Materials Segment. KetaSpire KT-850 SCF 30 offers the flowability required for filling the parts, which are approximately 15 mm in length, while also meeting the tight tolerances required for ABS/ESC plungers. KetaSpire KT-850 SCF 30 outperformed the processability offered by incumbent materials, allowing for much higher production yields and an enhanced surface finish, enabling better sealing and mechanical performance.

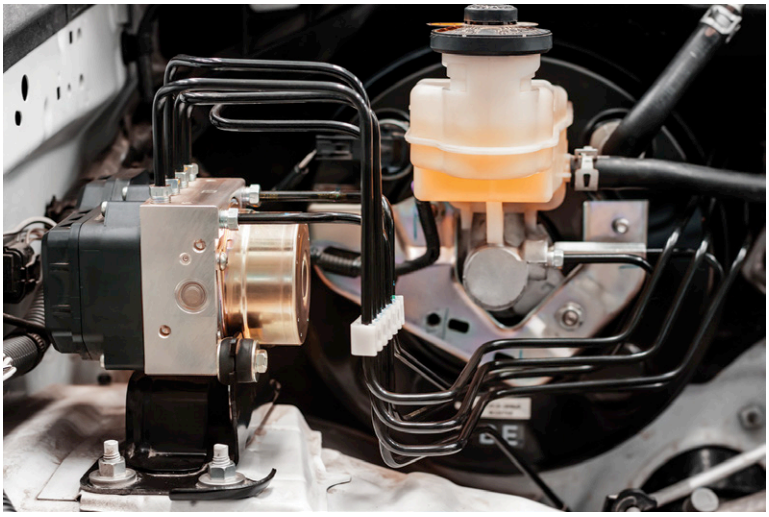

IMAGE: SOLVAY

Above: Solvay has a new KetaSpire PEEK grade for Precision ABS/ESC brake and e-mobility components

With its PEKK, PEK and ABPBI polymers, **Gharda Chemical** is aiming at metal replacement in demanding applications across various industrial segments, including aerospace, oil and gas, automotive, electrical and electronics. It says that

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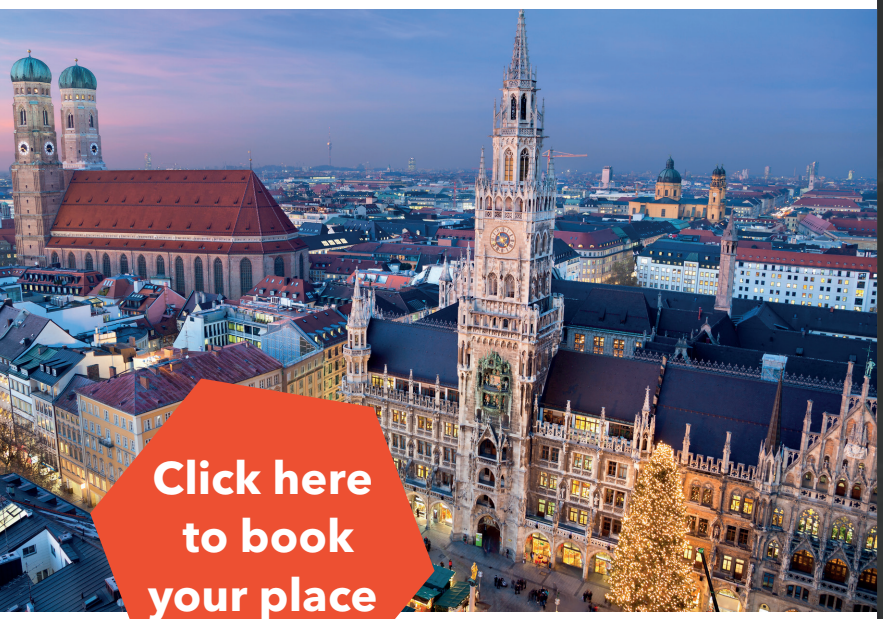

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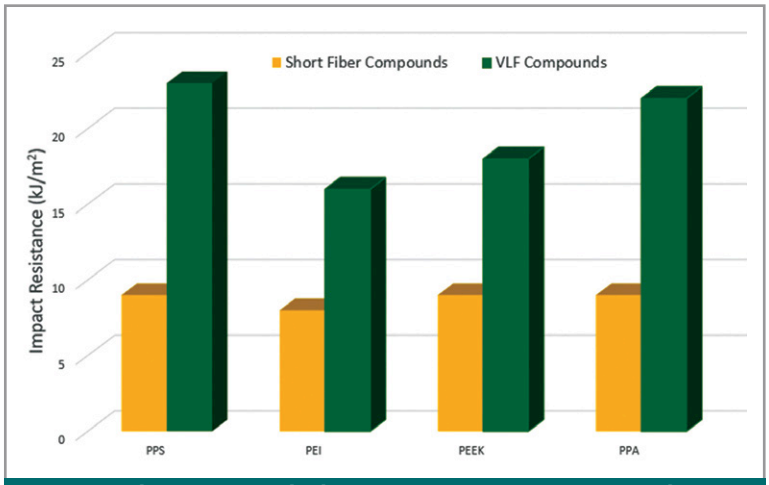
with many electronic components requiring surrounding materials to protect them against electrostatic discharge (ESD), it has developed a new ESD grade based on its GAPEKK material with a relatively low melting temperature (Tm is 305°C).

The grade, GAPEKK 6-3200G ESD, is a nano-composite containing multiwall carbon nanotubes with a surface resistivity in range of 10^6 to $10^9\Omega$. It can be used for extrusion and 3D printing as well as injection moulding. An additional advantage, according to Jaimin Zaveri, DGM for Marketing and Application Development, is that it has superior elongation: 51%, which is way in excess of many aryl ketone compounds containing carbon fibre.

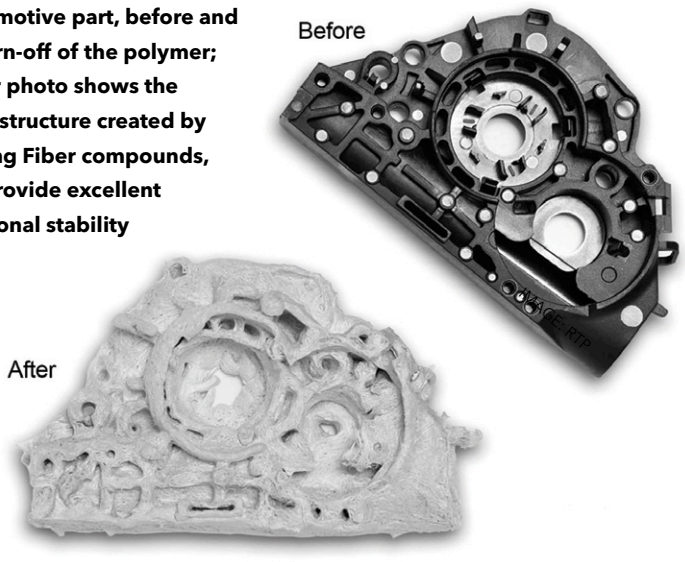
Turkish compounder **Eurotec** says it aims to play an active role in using high performance thermo-plastics to produce new solutions. PPAs, PEEK, and polyaryl sulfones (PES, PPSU, PSU) are included in the product line under the brand names Tecomid HT, Tecopeek PK and Tecotek ES, Tecotek EP and Tecotek EU, respectively.

Tecomid HT and Tecotron can provide continu-ous-use temperatures (CUT) up to 180°C and 210°C. One grade, TecomidNT40 GD40 BK009 XA61 (PPA, 40% glass fibre reinforced, flame retardant and heat stabilised), was approved by an automotive OEM for a new generation of inverter housing application where standard PBT and PET materials cannot provide the required CUT.



Very Long Fiber Compounds show superior impact resistance when compared to short fibre compounds based on the same polymer
Source: RTP

Several high performance polymers have inherent flame retardant behaviour, which allows them to meet stringent standards relating to heat



An automotive part, before and after burn-off of the polymer; the after photo shows the skeletal structure created by Very Long Fiber compounds, which provide excellent dimensional stability

release, smoke release and toxicity properties in the aerospace industry. Eurotec says polyaryl sulfones can be preferable due to cost advantage compared to, say, PEEK. For example, Tecotek ES20 WH100 HR 0A (PESU), and Tecotek EP20 WH100 HR 0C (PPSU) meet OSU heat release requirements OSU 55/55 and OSU 65/65, respectively. "If a higher service temperature is required in aviation, PEEK is the right material to withstand up to 260°C," says the company.

Additionally, PEEK grades stand out for their usability in metal replacement due to a good combination of lightness, high thermal resistance and mechanical properties for metal replacement. Glass fibre reinforced Tecopeek has a wide range of uses in structural applications.

In response to continuing interest in long fibre compounds based on high temperature polymers, **RTP Company** offers standard and custom engineered Very Long Fiber (VLF) Compounds that provide temperature performance and superior impact resistance compared to short fibre alternatives.

"Because they have fewer fibre ends, long fibre compounds offer advantages in applications where abrasion to the mating surface is a concern," says Brett Weishalla, Senior Product Development Engineer at RTP Company. "This can lead to significant improvement in the longevity of a plastic product and mating part."

When long fibres are incorporated, compounds based on PPS, PEEK, PPA and PEEK show all the same benefits as the more typical polyolefin and PA compounds. In fact, says RTP, parts moulded with VLF Compounds hold their dimensional stability due to the length of the long fibres, which form an internal skeletal structure that helps prevent part shrinkage after moulding.

Mocom says its new Alcom LB PC-HT 1000 WT1102-19 extends the Alcom LB product range of light-blocking materials to high heat polymers. Based on a high-temperature polycarbonate, it has a Vicat B50 of 182°C and an HDT/A (1.8 MPa) of 154°C – significantly higher than standard PC.

Alcom LB PC-HT was developed for applications such as reflectors and light wells of touch control displays of appliance applications with high heat requirements, but Mocom says it could also suit any other application where high reflection and very low light transmission in an environment exposed to high heat is required.

"This material can effectively separate light sources in a confined space and improve the light output at the same time with its high reflectivity of 92.5% and a transmission of only 0.3% through a 0.5 mm wall," says Mocom. It has a GWIT of 875°C at 1 mm, which meets the requirements for insulation materials for non-supervised appliances in contact with active parts (current over 0.2 A) according to DIN EN 60335-1. Its UL94 flammability rating is HB.

The company also has new grades of Tedur PPS with high levels of filler to provide EMI shielding. One of these, Tedur L 9904-1 BK0002-00, is said to have good dimensional stability at high temperatures as well as good processability. It has a UL94 V-0 rating at 3mm, thanks to the inherent flame retardancy of PPS.

PPS polymer does have a low comparative tracking index (CTI) though; normally it is around 100V. A high CTI decreases the minimum creepage distance of an insulator and so helps to reduce distance between electrical conducting parts in an apparatus. But Tedur HTR PPS 2465 IM 16049 BK0002-00 has a CTI of 600V, so it can be used in high voltage applications requiring high temperature resistance. "The increased thermal conductivity of Tedur HTR of 1 W/m.K complements the profile," says Joachim Bernhard, Director, Global Marketing, Electrical & Electronics.

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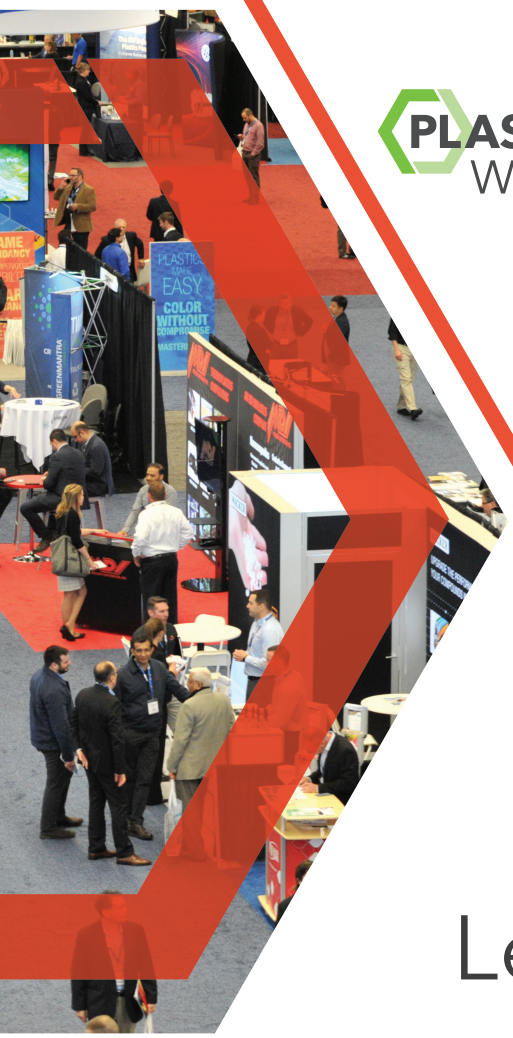

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Precision and progress in medical moulding

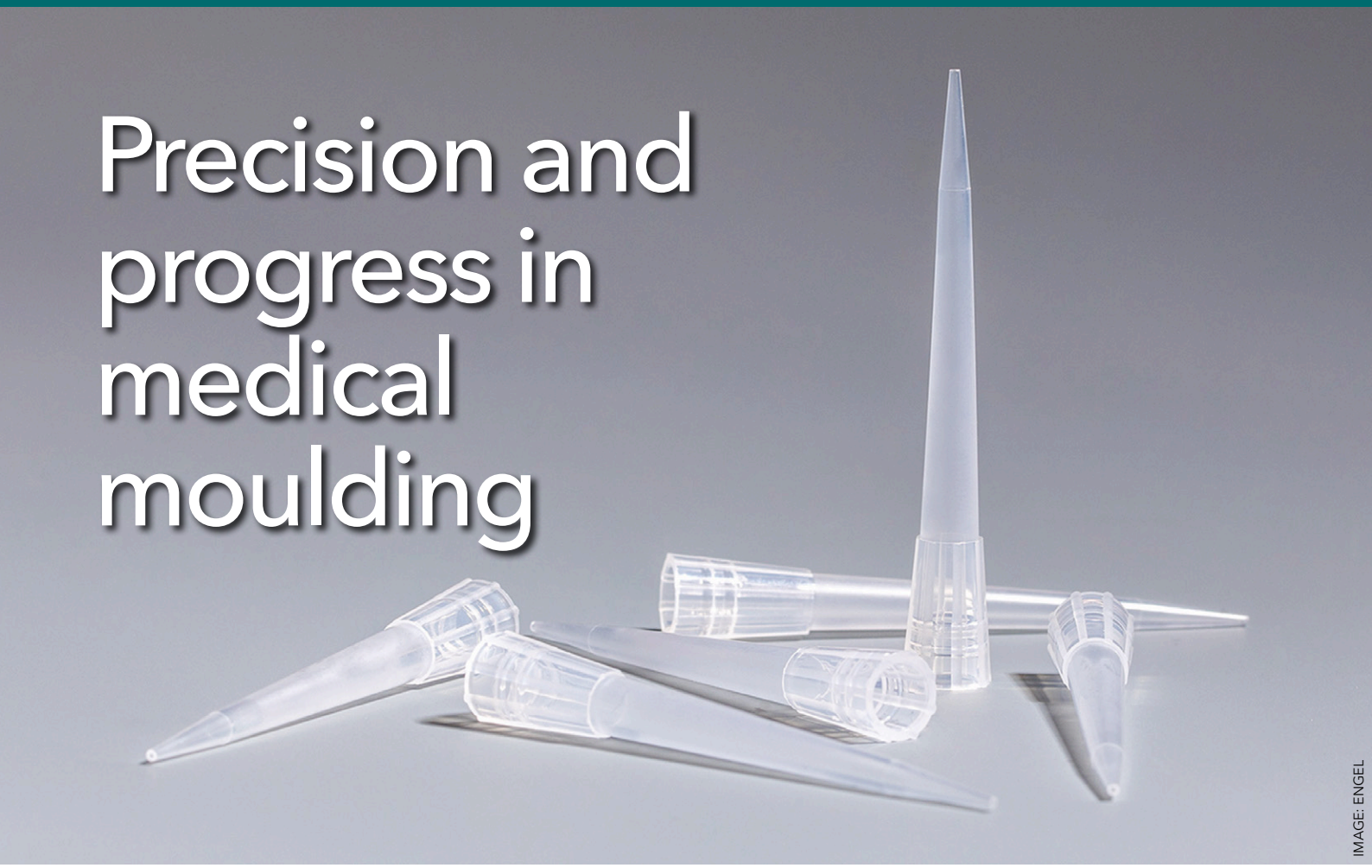

IMAGE: ENGEL

Demand for medical innovation has never been higher and injection moulding can deliver the high-quality devices and components that the industry requires. By Mark Holmes

Injection moulding machinery manufacturers continue to see a buoyant medical moulding market in the years to come. The global medical injection moulding market size was valued at $1.38bn in 2019 and is expected to grow at a compound annual growth rate of 8.2% between 2020 and 2027, according to a Grand View Research report in September 2020. Much of this growth is being driven by advances in the home healthcare sector and an ageing population, which the World Health Organisation predicts will double by 2050.

Plastics moulding continues to be used for many medical applications, including manufacturing implantable components, test tubes, beakers, casings and housings for laboratory and medical equipment, drug delivery components and surgical equipment, reports **Sumitomo (SHI) Demag**. "Rising demand for medical devices across hospitals and laboratories during the Covid-19 pandemic has had a positive impact on market growth," says Darren Herron, National Sales Manager, Sumitomo (SHI) Demag UK. "Within Sumitomo (SHI) Demag, demand for medical technology solutions rose by almost 50%. Here, the focus was on delivering machines to support the production of applications for in-vitro diagnostics to support the devices which perform Covid-19 tests. The main products are pipette tips and PCR-plates. In addition, for our customers like Avenue [see below], specific growth applications include various airway delivery components, diagnostic test kits and moulded parts for IV fluid delivery sets. Surgical medical device components are another growing area within their business."

New technical developments in medical moulding include advanced batch tracking, contact-free inspection using cameras, and highly automated assembly to meet the market's precision and quality control requirements. "As a high liability market, traceability is not just about mandatory information and supply chain tracking," adds Herron. "Real-time traceability is about being able to call up data and verify the exact settings used on the injection moulding machine when that individual plastic part was made."

To achieve such traceability, a Manufacturing

Main image: For the demonstration of Engel's next generation E-mac machines, an E-mac 265/180 produced pipette tips

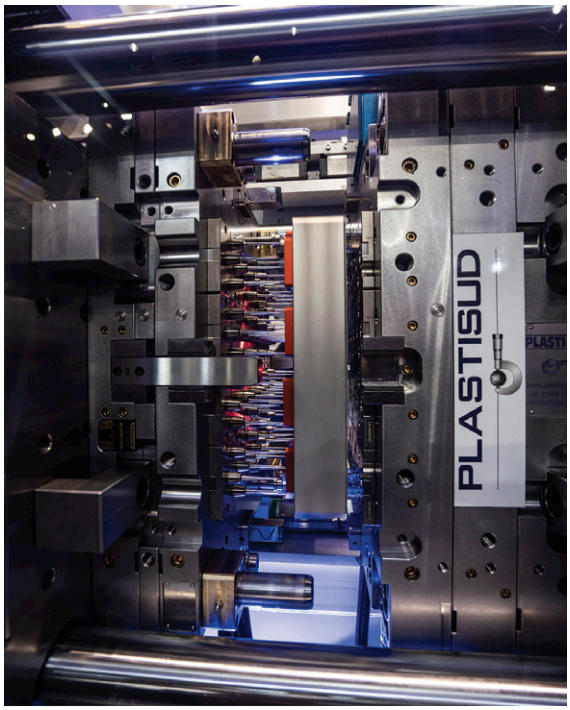

IMAGE: SUMITOMO (SHI) DEMAG

Right: Producing pipettes on Sumitomo (SHI) Demag's complete turnkey medical IntElect machine

Execution System (MES) is needed. "For example, when parts are being produced on multi-cavity tools, like pipettes, robots are programmed to remove and place the components into cavity-assigned racks. This means that if an issue with cavity 1 arises, the rack containing all corresponding cavity 1 parts can be isolated and the rack recalled, with all the production information stored in the MES."

He says: "In today's globalised multi-site production facilities, the ability to monitor and reconcile data from numerous machine sources is becoming imperative. Having access to this data via a single gateway can assist production managers to better manage inefficiencies, reduce costs, improve Total Cost of Ownership, troubleshoot and resolve equipment issues and minimise machine downtime. During the last 18 months, machine features such as remote diagnostics have been extremely valuable to customers as they strive to maintain operational efficiency and save money, while adhering to health and safety guidance and ensuring machine assets are safeguarded."

The company is also getting ready to launch some new features at Fakuma 2021, including machine condition monitoring tools and a new automation solution. Herron says: "Machine learning is also starting to show promise and is something our R&D department is focused on. Understanding the data independencies and interoperability will be critical to predicting and reacting to different production scenarios."

The company adds that its strategic decision to push ahead with new and further developments in the all-electric IntElect machine series a few years ago has been beneficial as moulders reacted to different demands during the current pandemic, including heightened demand for oxygen sensors, blood monitoring equipment and facemasks, as well as test kits. Expertise in the all-electric range, combined with an optional package developed specifically for a typical medical production environment, has enabled moulders to implement a clean production cell rapidly and capture the opportunities in hygiene-sensitive markets.

Below: Avenue, a Nolato Company, has taken delivery of a 75 tonne IntElect all-electric injection moulding machine at its site in Ireland for medical start-up projects

IMAGE: SUMITOMO (SHI) DEMAG

Sumitomo (SHI) Demag says that an installation at the Injection Moulding & Extrusion Pilot Plant of **BASF** in Ludwigshafen, Germany is a good example of how advanced robotics can assist hygiene-sensitive markets. Here, for operative safety and efficiency, a linear SDR 5-35S robot serves two purposes, selecting and placing one of 12 interchangeable mould inserts from a magazine located within the cell. After the part is moulded on a new Sumitomo (SHI) Demag IntElect 100 injection moulding machine, the same robot, fitted with a multifunctional gripper, gently extracts the test specimen from the mould. This is then passed to the small six-axis articulated-arm Yaskawa GP8 robot for precise cut of the specimens from the gate using a servo spindle drive punching machine.

Sumitomo (SHI) Demag has also recently supplied a 75-tonne IntElect all-electric injection moulding machine to **Avenue** (part of Nolato), in Sligo, Ireland. The investment will support growth in the company's healthcare division, providing dedicated capacity to mould precision parts during the product development phase. With demand for its medical device injection moulding and tool-building services on the rise, in summer 2019, Avenue installed a new 100 m² ISO Class 8 cleanroom area. This expansion necessitated an increase in capacity for moulding tools for producing components such as vials, test trays, luer lock fitments and connectors, as well as shell housing

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IMAGE: ARBURG

Above: A hybrid Arburg Allrounder 470 H with a hot runner mould produces 48 tips per 6-second cycle

mouldings and mating components, for medical device assemblies.

The IntElect machine met Avenue's brief for a small footprint machine for carrying out test runs during the development phase of projects. "All medical programmes are lengthy as it can take two to three years to obtain approvals from the authorities, so there are many months of testing before a component or mould is ready to be scaled up to mass production," says Gerard Henn, Avenue's General Manager. "Test runs might be anything from 10,000 to 100,000 units. In order to satisfy this range of volume requirements, the mould size and cavitation suits this press perfectly."

Sumitomo (SHI) Demag adds that the machine's small footprint is down to the use of its own motors and drives. The model also has particularly wide tie bar spacing and high clamp force for its size, allowing the use of larger moulds than would normally be accommodated by a 75-tonne machine. The IntElect also comes with a choice of five screw diameters for maximum flexibility, meaning Avenue can run a variety of tools with different shot weights. Several add-on options were also selected – activeFlowBalance, activeRemote activeLock and a VNC connection – to enhance control over the moulding process and guarantee the dimensional precision that is demanded by the healthcare industry. The activeFlowBalance uses machine-control technology to balance filling fluctuations, ensuring shot-to-shot consistency, and activeRemote in conjunction with the VNC (Virtual Network Cable) allows remote diagnosis from Sumitomo personnel for both technical and process issues on-line.

"The medical industry demands that components are produced within extremely tight tolerances and the allowable tolerances are getting tighter all the time," says Henn. "We find that these process control features are invaluable in ensuring customer acceptance of tools, instilling confidence that that they will work as intended to produce a precision component with high repeatability and accuracy."

The medical technology market continues to grow dynamically and offers opportunities for development in multiple directions, according to **Arburg**. "On the one hand, this is because new materials continually enter the market and expand the areas of application," says Martin Manka, Senior Sales Manager Medical. "While, on the other, we are also constantly seeing technical advances in mould technology and in processes that can be applied to medical technology, for example in micromechanics and microfluidics. The operative terms in this context are silicone processing, micro injection moulding or multi-component processing. The areas of healthcare, personal care and diagnostics are all showing significant growth. This includes smartwatches and other measuring devices that can be used to check and evaluate information such as pulse, calorie consumption, movement and sleeping patterns at any time. Other popular products are insulin pens for diabetics and filters for dialysis."

Manka adds that lab-on-a-chip technology, which has revolutionised diagnostics, is also a dynamic development trend, which Arburg will show at Fakuma 2021 in October in Germany. It is increasingly replacing conventional laboratory diagnostics and also making it possible to realise more individual therapies. Furthermore, products are becoming increasingly complex, which requires new mould solutions, such as cube-mould technology.

Another trend is the use of single type instead of mixed materials. This also allows for an increased recycling rate. Considering the amount of plastic waste generated in hospitals, for example, and a current recycling rate of only around 10%, there is much more to be done to increase this percentage. In future, the increased use of bio-based, recyclable and biodegradable materials will be of help in this respect.

In terms of new technical developments, traceability and process reliability are particularly important in the field of medical technology. To meet the needs of this sector, Arburg offers a wide range of injection moulding technologies, from standard solutions and high-speed, high-performance machines to Allrounders in stainless steel and tailor-made turnkey systems and cleanroom solutions. Machines docked to the cleanroom provide significant energy efficiency advantages; because of the reduced cleanroom volume, considerably less energy is required for cyclic air exchange.

The trend towards more individual therapies

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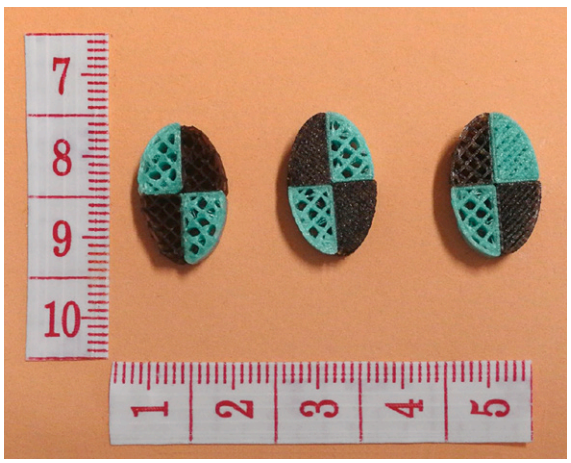
increasingly requires production of small-volume batches, down to one-piece flow, which suits Arburg's Freeformer additive manufacturing technology. "The Freeformer is in high demand for custom implants made of biocompatible, resorbable, sterilisable and FDA-approved original materials, individual orthotics and models for surgery preparation," says Manka. "Geometric freedom, combined with material freedom, enables the open system to achieve entirely new plastic applications – including for use within the human body. Droplet size and process control can be specifically influenced, resulting in individual customisation options."

Arburg also helps with the demands of unique device identification (UDI), which requires manufacturers of medical devices to provide proof of complete batch traceability. He says: "The Arburg host computer system ALS ensures this shot-for-shot. Not only process parameters are being monitored, but also machine statuses and maintenance intervals."

The company has turned its attention to COP and COC plastics, which were developed as glass substitutes in medical technology. With these plastics, the manufacturer's instructions explicitly refer to processing with nitrogen as an inert gas to avoid black particles in the parts. In terms of process technology, nitrogen flushing first requires a gas extraction station on the injection moulding machine. Arburg has recently designed a compact unit with integrated flow measurement for Allrounders for this purpose. The desired nitrogen feed to the injection unit's material feed zone can be easily adjusted via a pressure regulator. In production, only a gas connection with a maximum of 40 bar needs to be provided.

IMAGE: UNIVERSITY OF EAST ANGLIA



Above: Potential Freeformer applications include the individualisation of medication that could be optimised in terms of dosage, type of release and even combination of active substances

IMAGE: ARBURG

Above: Arburg's Freeformer for additive manufacturing has a large potential for medical technology. The machine can be used in cleanrooms and processes FDA-approved original plastic materials

In mass production, efficient processes are key due to the high-cost pressures in the medical market. Arburg says that the hybrid and electric Allrounder Hidrive and Alldrive injection moulding machines, which are also available in a packaging version, are designed for efficient and high-quality series production and are ideal for mass production. They offer short cycle times, reproducibility and reduced energy requirements, as well as process stability and a long service life. They also have better emission ratings than hydraulic machines.

There is also a rising demand for turnkey projects in the field of medical technology. Integrating quality inspection and assembly equipment downstream of injection moulding is eliminating human intervention, which still represents the greatest potential for product contamination.

The Freeformer and Arburg Plastics Freeforming (APF) are the company's solution for the individual treatment of patients with precisely tailored medical products made of plastic. The range covers auxiliary products to medication or implants. Another process for medical applications is Liquid Additive Manufacturing (LAM). In the LAM process from InnovatiQ LSR, material can be 3D printed directly. This company has been a member of the Arburg group since February 2020.

Arburg's portfolio of injection moulding machines also includes Allrounders for medical micro-injection moulding applications. Regardless of whether the application involves thermoplastics or elastomers, the company says that the solutions provide for maximum precision and reproducibility.

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Benvic Luc & Bel makes the connection

Compounding group Benvic acquired Italian medical moulder Luc & Bel in 2020. Benvic says its new subsidiary has developed a safety connection solution for infusion medicine containers.

A critical step during connection between infusion lines and a medicine container is when the connecting spike pierces the container's connector cap. Luc & Bel designed a patented solution to secure the connection, and reduce the risk of contamination involving a snap-off spike diaphragm which is sterilised by ETO prior to assembly. A filter with different gauges, 1.2 µm and 2 µm, maintains sterilisation during storage. Before connection, the user pulls out a protective element by holding a dedicated strap, and then engages the spike into the connection. A pre-cut helps make cap removal easy and reliable. The risk of exposure to contaminating agents is reduced almost to zero and makes the spike connecting step to the medicine container fully secure, says Benvic.

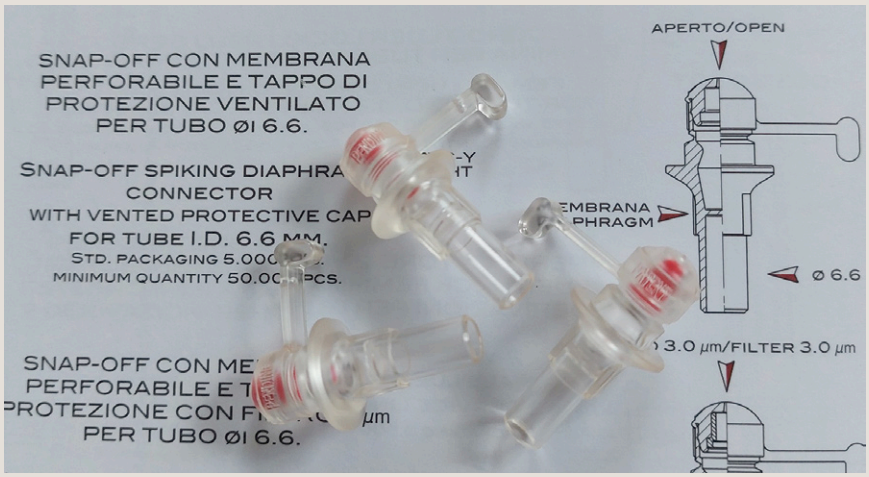


IMAGE: BENVIC LUC & BEL

Safety connection for infusion medicine containers reduces contamination risk

The device is manufactured in Luc & Bel's class 8 clean room facility with precision moulding technology and fully automated assembly lines with end-of-line testing. The safety connection can manage all types of medicine, including UV sensitive ones.

Powder injection moulding for dental applications is another field of significant interest for Arburg in medical technology. Examples of such injection-moulded metal or ceramic products are dental root pins (jaw implants) and dental crowns.

According to Arburg, the Freeformer and APF achieve entirely new plastic applications – including for use within the human body. This includes the individualisation of medication that could be optimised in terms of dosage and type of release of the active substance, or even of combinations of active substances, to meet the requirements of patients and therapy. A research group of the School of Pharmacy at the University of East Anglia in the UK uses a Freeformer for producing personalised tablets.

Another example is resorbable, FDA-approved original material from partner Evonik which is made to imitate human bone. A Freeformer 200-3X machine has processed the Resomer LR 706 material – a composite made up of poly L-lactide-co-D,L-lactide and ß-TCP – to implant plates for use directly in the body as a means of repairing fractures, says Manka. Further applications are medical PLLA (Purasorb PL18) to produce facial and cranial implants or TPE (Medalist MD 12130H from Teknor Apex) to make individually adapted ventilation masks. The products can also consist of several components, such as a hard/soft combination, and be equipped with a support structure, if required.

SABIC's high-temperature plastic Ultem 1004 is ideal for medical technology due to its versatile sterilisation possibilities and biocompatibility (ISO 10993, USP Class VI). As an example, this material can be used to additively manufacture patient-specific sawing templates, which are then used as fixing aids during knee surgeries.

At Chinaplas 2021, Arburg demonstrated the fully automated manufacturing of pipette tips. A hybrid Allrounder 470 H with a hot runner mould produced 48 tips per 6s cycle. Arburg developed the turnkey system together with local automation partners, and it has been designed to produce several product variants. The turnkey system has a modular design that makes it easily adaptable to changing requirements and different product variants. The automation consists of three modules for removal, camera inspection and order picking.

In addition, a flexible Arburg micro-production cell can produce extremely small parts and micro implants required for minimally invasive procedures, using a precise, economical and reproducible production process. As an example, an electric Allrounder 270 A, equipped with a size 5 micro injection unit, an 8 mm screw and an LSR cartridge with a capacity of 290 mm, produced delicate LSR caps for microswitches, each weighing just 0.009g. ›

The components were injection moulded directly in an 8-cavity mould using a cold runner system with shut-off nozzle. A clean air module with ionisation, situated above the clamping unit, prevented electrostatic charges. A sensor integrated in the feeder ensured additional process reliability. The recorded values were graphically displayed and monitored by the Selogica ND control system. After integrated camera inspection, the robot system transferred the good parts to a packaging station.

The Allrounder Cube machines, which are specifically adapted for use with cube moulds, are well-suited to the packaging sector and ideal for the production of medical technology products. Their servo-electric toggle-type clamping unit allows for high-speed cycles with reduced energy requirements – an ideal basis for efficient high-volume production at reduced unit costs. The cube machines are used in medical technology in the production of caps and pharmaceutical containers, for example.

Wittmann Battenfeld reports that Covid-related products still dominate the medical market. "Although it also seems that this global need for medical products has convinced non-medical moulders to enter the market," says Gerald Plöchl, Project Engineer for Medical. "For example, we have seen a significant number of our customers that have started medical or cleanroom production or are currently in the process of doing so."

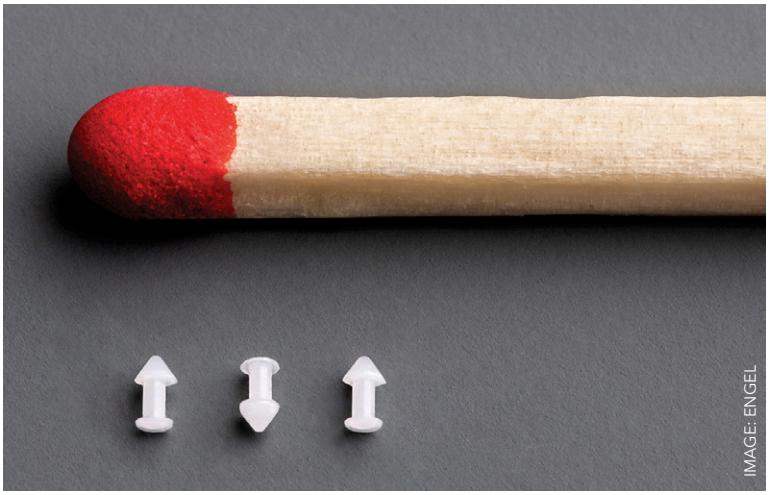
Plöchl adds that current market trends for plastics in medical applications include miniaturisation, especially for devices carried by patients, as well as digitalisation for implementation of data collection. In terms of new technical developments in equipment and processes in injection moulding for medical applications, Plöchl highlights the growth in demand for complete cleanroom automation cells, including moulding machine, part removal by robot, quality control, cavity separation, packaging and labelling.

Engel has developed a new micro-injection unit for LSR, offering maximum precision for the lowest shot weights with many advantages for medical applications. In a demonstration, Engel produced the smallest precision components for the field of ophthalmology with an individual part weight of 0.0013 g. An all-electric and tie-bar-less Engel E-motion 50/30 TL injection moulding machine was used. The company says that the new LSR micro-injection unit combines high precision with maximum flexibility and cost-effectiveness. The micro-injection unit extends the range of applications for its injection moulding machines to include even lower shot weights. The innovation, which Engel has developed with Austrian company **ACH Solution**, enables the production of precision components made of LSR with shot weights of well below 0.1 g.

For the demonstration, a 32-cavity valve gate cold runner mould was used to produce connecting elements used in ophthalmic diagnostic instruments. The filigree parts measured 1.7 mm in length and 0.9 mm in diameter and weighed just 0.0013 g. The Engel E-motion 50/30 TL machine was equipped with a LSR metering pump by ACH Solution, an Engel Viper 6 linear robot for micropart removal and depositing on a conveyor belt, and a camera system for quality control – also from ACH Solution. The focus during the development of the micro-injection unit was on a high degree of flexibility. Due to the quick coupling system, the unit can be exchanged for a conventional screw injection unit in less than 30 minutes to maximise the production uptime of the injection moulding machine.

A further advantage of the Engel solution is the large platens of the tie-bar-less machine. Since there are no tie bars in the way, the platens can be fully utilised, right up to the edge. This means that large multiple-cavity moulds fit on comparatively small injection moulding machines, which reduces the system footprint and increases productivity per unit of area. This in turn ensures the lowest unit costs. The target group for the tie-bar-less, all-electric E-motion TL machine in combination with the new micro-injection unit includes medical technology.

Engel has also developed the next generation of its all-electric E-mac machine series and has demonstrated its potential in a challenging application for the manufacture of pipette tips. Offering maximum flexibility for individual customer requirements, the company says that the E-mac is now even more compact. The quality of pipette tips largely depends on the precision of the injection process. At the same time, the long cores in the



Below: The LSR component made on an Engel machine measures 1.7 mm in length and 0.9 mm in diameter and weighs just 0.0013 g

IMAGE: ENGEL

Above: The compact, all-electric Engel E-mac machines are equipped with particularly powerful servo-motors for optimum overall efficiency

mould require absolutely precise movements of the mould mounting platens during opening and closing. All-electric injection moulding machines are therefore the preferred solution in this application segment, where cost-effectiveness is a decisive factor in choosing a machine.

The E-mac is an all-electric machine that combines high output and energy efficiency with an extremely compact machine design, ensuring the lowest possible unit costs even in a cleanroom environment. Engel has also reduced the footprint of the E-mac machines even further. Due to an optimised toggle lever geometry, the E-mac 265/180 used for market launch is 450 mm shorter than the previous 180-tonne version, without reducing the opening stroke. Engel says that among the all-electric machines on the market, the E-mac machines of the new generation are the most compact worldwide in their respective performance segment across the entire series. All movements of the Engel E-mac – including the nozzle movement and ejection – are performed by servo-electric drives. This means that the machine achieves high overall efficiency. If required, a servo-hydraulic unit can be integrated into the machine frame without requiring additional space. The Engel E-mac injection unit was developed from scratch with a focus on even better dynamics. It is available in three performance classes. As a result, the machine can be precisely adapted to requirements in order to achieve the highest overall efficiency for the widest variety of applications.

The E-mac 180 demonstrated the performance of the next generation machine with the production of pipette tips made of PP in a 64-cavity precision mould by Swiss company Tanner. The cycle time was 6 s. For precision applications with cycle times of more than 4 s, the E-mac is often the most economical solution in the field of all-electric injection moulding machines, according to the company.

Automation also contributes to the small footprint. An Engel Viper 20 linear robot removes the 64 pipette tips from the mould and transfers them to the integrated compact cell for cavity-sorted depositing. The new automation cell can be custom designed. It houses all automation components and downstream process units, such as quality control, a tray server or box changer, and is significantly narrower than conventional safety guarding. Its standardised build-up allows for speedy mould set-up of the production unit in case of a product change.

Production cells can be precisely tailored to the application and include solutions for digitalisation and networking, in addition to the injection moulding machine and automation. For the production of pipette tips, the production cell is equipped with the iQ weight control and iQ flow control smart assistance systems. While iQ weight control readjusts the melt volume for each individual shot, ensuring consistently high quality of the injection moulded products, iQ flow control automatically adjusts temperature differences in the cooling water manifold circuit. To do this, the software uses the measured values determined by the E-flomo temperature control water manifold system. This results in constant temperature control conditions and significantly improved energy efficiency, as the speed of the pumps in the Engel E-temp temperature control devices is also automatically managed to reflect requirements.

The demand for plastics injection moulding in the medical market has increased exponentially, reports **Husky**, and manufacturers now need technology to enable scalability, in particular for high growth, single-use critical medical products like syringes and drug delivery devices. "Technology innovation must be connected to two things in the medical industry – production advancements and risk reduction," says Mike Ellis, Global Business Manager, Hot Runners and Controllers at Husky.

"We have all witnessed exponential increases in demand driven by Covid-19. When moulding medical parts, risk is a major factor in making decisions because it directly translates to approval timing, usage safety and cost. Technology that enables more production with lower risk is key in today's medical environment. How OEMs can reduce this risk and ultimately enhance the master process is crucial. This is where innovation plays a key role by ensuring that parts are more consistent dimensionally, with a perfect balance and by having a more stable, predictable and controllable process," he says.

Husky has developed UltraShot hot runner technology, which offers a number of important advantages for the medical market. These include increasing scale faster with lower risk, which helps

customers get to market quicker, as well as increasing yield by reducing scrap rates. Husky adds that UltraShot also eliminates subsequent manufacturing steps and enables new part designs and new resin usage – parts can be manufactured based on function and not injection moulding limitations.

The company says that UltraShot allows for perfect melt management and cavity filling, which is key to final part quality and overall equipment efficiency. With the UltraShot, Husky has moved the shooting pots in close proximity to the gate, allowing for greater, highly precise moulding control. The UltraShot Injection System pressurises the resin near the cavities, reducing the influence of resin compressibility and shear, and thermal variations on balance and part quality. Eliminating these influences, the UltraShot Injection System achieves optimal balance and good part quality. The discrete injection circuit design is scalable to 128 cavities, providing the same process conditions regardless of mould size. Elimination of the scaling effects leads to faster qualification time from pilot to product tooling while reducing risk. Compared to conventional hot runners, melt in the UltraShot Injection System experiences fewer high-pressure injection cycles, preserving the original resin properties. This leads to lower moulded-in stress and better mechanical and optical properties in the moulded part.

According to Husky, the UltraShot technology enables moulders to design for part function instead of being limited by process capabilities, which leads to a higher quality and finer products. Now product designs can be further optimised for function enabling new quality and safety standards. In addition, connecting innovation with risk reduction, the UltraShot offers repeatability with pressure monitoring and traceability, so any issues are traceable and caught in real time. This virtually eliminates the 'high-risk' scenario, says Husky.

In a recent project, UltraShot was used to develop a medical diagnostic tool in a high-pressure mould. The objective was to increase production to 80m parts per year. Process limitations included four cavity tools with up to 8% scrap rate, a narrow process window that was unstable due to high pressures, and a high temperature and corrosive resin. The UltraShot solution involved an eight-cavity tool producing three different parts each cycle. Compared with a conventional hot runner system, UltraShot allowed a reduction in mould pressure from 2,500 to 1,200 bar, and a reduction from a 14 shot to 9 shot moulding cycle with melt temperature reduced from 440°C to 375°C. A 60% reduction in part cost was achieved.

Husky adds that risk can also be minimised by eliminating artificial boundaries that are created by integrating different subcomponents, such as a mould, hot runner or a machine, into a production cell. "We are leveraging its capabilities in injection moulding systems, together with the historical expertise of the Schöttli brand for medical tooling to completely re-design and bring to market fully integrated medical injection systems," says Ellis. "The latest result in this direction is the development of a new platform – ICHOR – for the production of blood collection tubes, which combines the performance of a high output system, with the accuracy and quality requirements of the medical market."

IMAGE: HUSKY

Left: Husky has developed UltraShot hot runner technology, which offers a number of important advantages for the medical market

He says: "The system, which will be launched by the end of 2021, integrates mould, hot runner, injection moulding machine and auxiliaries, making it the first integrated one-stop solution. Additionally, the production capabilities will be maintained through the entire lifecycle through Advantage + Elite, Husky's unique remote monitoring and proactive service solution. Advantage + Elite allows full visibility and traceability of all key equipment and process variables and parameters. Preliminary tests indicate a cycle time performance equal to or below 5.8 s on a 48-cavity system. This is on a platform that will be able to accommodate moulds from 32 up to 72 cavities, before moving to a larger machine platform."

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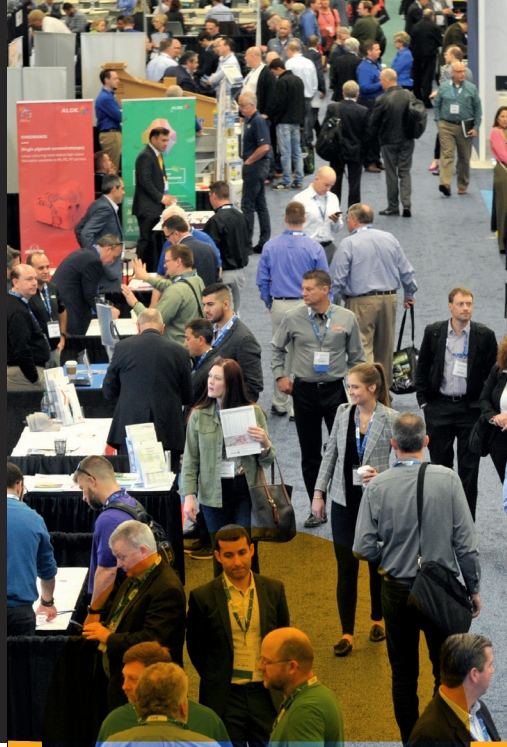

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AMI

IMAGE: AMI

New expo puts focus on polymer testing

The first Polymer Testing World Expo takes place in Essen this month. We take a look here at some of the highlights at the free-to-attend conference and exhibition

The Polymer Testing World Expo makes its debut at Messe Essen in Germany on 29-30 September 2021. The free-to-attend conference and exhibition is intended to provide a new forum for scientists and researchers that develop, test, and analyse polymer materials, formulations and finished products.

Organised by *Injection World* magazine publisher AMI, the Polymer Testing World Expo runs alongside the Compounding World Expo, Plastics Recycling World Expo, and Plastics Recycling World Expo. In total, there will be more than 200 exhibitors and more than 100 speakers to choose from across the four exhibitions and their five focused conference theatres.

"When we ran the Compounding World Expo and Plastics Recycling World Expo in Essen in 2018 we had 4,024 visitors, and more than 40% of these – 1,722 to be precise – were involved in R&D and materials testing," says Andy Beevers, AMI's Events Director. "We therefore decided to add an area within the event focused specifically on polymer testing and analysis, where visitors can explore new lab technologies and stay up to date with best practices and the latest standards."

Conference programme

The dedicated conference programme for the Polymer Testing World Expo features two days of expert presentations covering a range of developing testing technology topics and providing useful practical advice and tips.

Speakers from some of Europe's leading research centres will lay out their latest findings in the area of lifetime prediction and failure analysis for plastic materials and components. For example, Christoph Zekorn from **IKV** will discuss failure analysis of plastics with a particular reference to instrumental techniques. In addition, Arjen Boersma from **TNO** will focus on assessing degradation behaviour of polymers and its impact on their lifetime. Accelerated ageing of polymers will be covered by Wilma Hahn from **SKZ**, who will speak about high-pressure autoclave testing, while Kim Bini from **Elastocon** will focus on developments in

Main image: The free conference theatres at the Essen expos are expected to prove popular

Speakers at the Polymer Testing World Expo conference include (clockwise from top left): Christoph Zekorn, Head of Microscopy at the IKV Centre for Analysis and Testing of Plastics; Wilma Hahn, Project Manager at SKZ; Kim Bini, Laboratory Manager at Elastocon; Jessica Wiertz, Applications Manager at Brabender; Fresia Alvarado, Sustainable Plastics Researcher at Wageninger Food and Biobased Research; and Ole Jan Myhre, Market Manager at Norner

stress relaxation and lifetime estimation of rubber.

Quality control testing will be another major focus of the Polymer Testing World Expo conference programme. Testing of plastics according to specific ASTM and ISO standards will be addressed by Georg Font from **Schütz + Licht,** while the use of optical inspection and measurement techniques for polymer quality control will be detailed by Oliver Hissmann and Oliver Kraushaar from **OCS Optical Control Systems.** Gilad Roter from **Inspection Technologies** will explain an innovative solution for in-line sorting of pellets and **Aimplas** will cover combined analytical techniques for analysis of foreign particles and defects in plastic parts and films.

Two presentations will cover some of the most recent developments in polymer characterisation. Alexander Sagidullin from **Oxford Instruments** will focus on advances in bench-top NMR instruments, while Marco Grundler from **ZBT** will examine methods for the characterisation of compounds with high thermal and electrical conductivities.

Testing of biobased materials is another topical subject being addressed. Jessica Wiertz and Matthias Mayser from **Brabender** will be looking at product and process development of biobased polymers using lab-scale extrusion systems, while Fresia Alvarado from **Wageningen Food and Biobased Research** will cover the use of in-line rheology in development of starch-based mixtures.

Staying in the area of sustainability, the analysis of recycled plastics will be another major theme of the conference. Ole Jan Myhre from **Norner** will present on quality analysis and improvement strategies for recycled material, while Michael Soll from **Frontier Lab** will look at analysis of recycled materials, covering polymers, additives and RoHS relevant contaminants. The sensor-based polymer identification of PET flakes will be addressed by Michael Perl of **Sesotec**.

A number of speakers at the Polymer Testing World Expo will discuss the testing of specific materials for particular applications. For example, Amir Khamsehnezhad from **TWI** will present a paper covering improved specimen geometries for evaluating the performance of butt-fusion joints in PE pipes. Moritz Grünewald of **SKZ** will explore the latest research into oil-filled microcapsules for self-lubricating plastics, while Kees van Leerdam from **Nouryon Chemicals** will focus on polymer film structures.

To download the full conference programme for the Polymer Testing World Expo, plus details of the speakers in the additional conference theatres focused on plastics compounding, recycling and extrusion, please click **here**.

Exhibitor line-up

Exhibitors at Messe Essen will include suppliers of a wide variety of materials testing and analysis products. Examples include Aboni, Brabender, Dynisco, Fontijne Presses, Frontier Lab, Konica Minolta, Lauda Scientific, Nouryon, OCS Service, Oxford Instruments, PSL Rheotek, Richard Hess MBV and Schütz + Licht.

In addition, a number of Europe's leading research and testing organisations have booked stands at the expos and will be available to discuss their capabilities and projects. These include IKV/RWTH Aachen, Kunststoff-Institut Lüdenscheid, London South Bank University, Norner, SKZ and TNO. Several exhibitors will also be highlighting lab-scale processing equipment, such as extruders and compounding lines. These include Collin Lab & Pilot Solutions, Eurotech Extrusion Machinery and Labtech.

You can view the full list of the 200-plus exhibitors at the Essen expos **here**.

Register for your free ticket

To register for your free ticket to the Polymer Testing World Expo, which will also give you access to the other three expos and all five conference theatres, please visit: **www.ami.ltd/ami-plastics-expos-eu**

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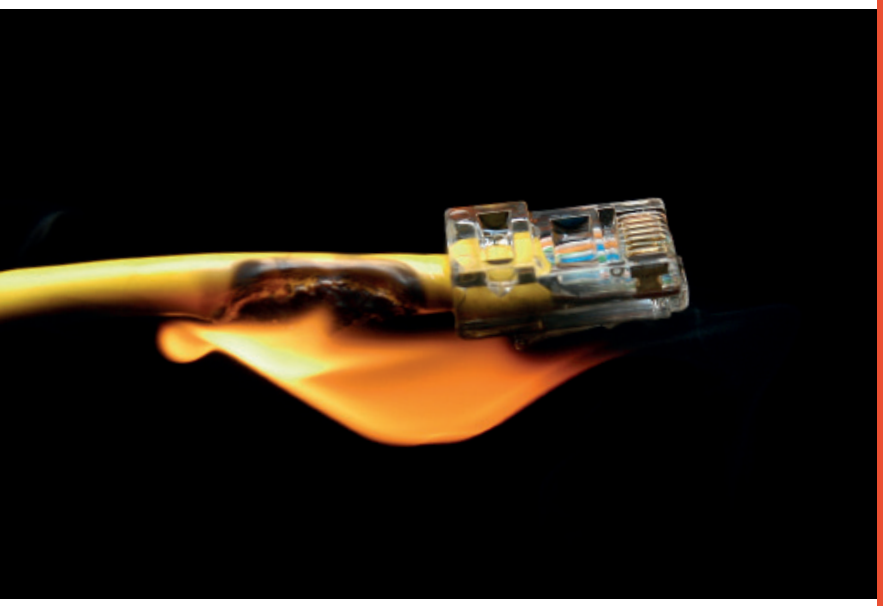

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Greater automation in movement of materials

Injection moulders are demanding more from their materials handling equipment to meet productivity, quality and digital goals. Mark Holmes reports

IMAGE: BRABENDER TECHNOLOGIE

Moving materials efficiently and accurately to where they are needed is essential for the productivity of a modern plastics injection moulding facility. Ancillary equipment manufacturers are developing systems and devices to facilitate these objectives with increasingly sophisticated solutions. These include high efficiency and trouble-free conveying and control, with high accuracy, greater automation and reporting structures that can interface with an Industry 4.0 compliant operation.

According to **Conair**, the market for materials handling equipment in injection moulding is moving towards more sophisticated controls, better user interfaces and higher degrees of automation. "Compared to five years ago, when controls were relatively simple, with limited i/o capabilities, customers now are asking for controls that are much more sophisticated and can automate, report on, and manage more aspects of the conveying process," says Nick Paradiso, Conveying Products Manager. "Conair introduced its latest conveying control, called SmartFLX, in January. The SmartFLX platform supports intelligent features including system self-configuration to aid installation, system simulations and modelling to manage system growth, and self-diagnostic and trouble-shooting capabilities that eliminate most on-site service calls. The SmartFLX platform also provides a foundation for a wide range of new product additions, such as the AutoWave feature and material proofing."

Paradiso adds that pressure from government, consumers, and industry is definitely driving greater emphasis on recycling and a wider use of recycled materials. As a result, there is a greater need than ever for systems that are capable of handling recycled materials, which include a wide range of regrind, flaky, and dusty materials that are more difficult to handle and do not flow freely through conveying systems, typically requiring new ways of assisting flow.

There are also other trends and influences driving development in materials handling. "From a development standpoint, there is the need for more sophisticated controls and reporting, and the desire by customers to read and write to the control with manufacturing planning and execution systems," says Paradiso. "In addition, though, there

Main image: Handling recycled materials is a new challenge for which technology suppliers are offering solutions

Right: Conair is implementing a new common control platform, featuring an HMI that offers a consistent user experience regardless of the machinery involved – the SmartFLX conveying control screen is shown

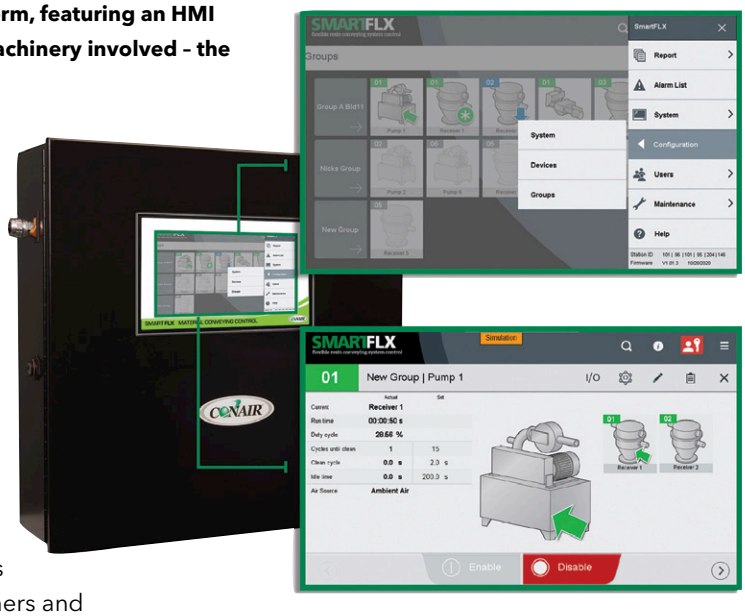


IMAGE: CONAIR

continues to be a tremendous need for error proofing. In the past year, Conair has delivered two new proofing solutions: a truck-fill proofing system, and an RFID proofing system."

He continues: "The driver for better controls, more automation, more proofing and the rest, is the fact that it is so difficult for so many processors – both before and after Covid – to attract, train, and keep experienced plant personnel. Facilities tend to be more lightly staffed, so owners and managers are trying to adopt systems that minimise the need for training and ultimately reduce the possibility for an error to occur with proofing. For example, it is important for operators to be properly trained in how to introduce a new material into a processing system. But with so many new or inexperienced operators, there is a greater likelihood of errors due to limited training. So, proofing systems are one way that greater automation, provided by more sophisticated material handling controls, can help to reduce the training burden and help prevent operators from making serious and costly processing mistakes."

He says another antidote to personnel and training issues is the development of a common control across many equipment types. "At Conair, we now offer a common control platform and user interface across many of our product lines: TCUs, dryers, blenders, and our Smart FLX conveying systems. Ultimately, that means that operators who have been trained on one Conair product – a dryer or TCU – will find that there is a similar menu structure and approach for blenders and conveying systems as well."

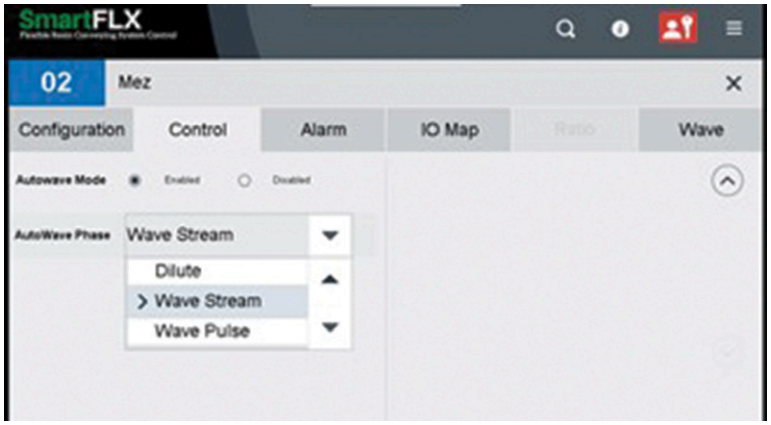
Paradiso adds that there continues to be a greater need for conveying systems that can actively minimise the resin loss or "attrition" – angel hair, streamers, broken pellets, fines and dust – that is caused by high-speed dilute phase conveying. As a result, Conair has introduced Wave Conveying, a slower-speed, dense-phase resin-conveying technology that uses deep vacuum and advanced controls to move large material throughputs at low and controlled speeds – from 300 to 2,800 feet per minute (91.4 - 853.4 m/min) in dense phase – so resin attrition and system erosion are virtually eliminated.

With the addition of AutoWave, a bolt-on option for the SmartFLX conveying control, Conair says that it now enables processors to automate, rather than manually program, the conveying parameters required to move resin from source to destination at controlled speeds in any of three phases: dense-phase "pulse", dense-phase "stream" and conventional "dilute" phase. In addition, the AutoWave feature continually monitors and adjusts every conveying cycle in real-time to ensure in-phase performance and optimise them for future use.

The combination of Conair's SmartFLX control and the AutoWave feature results in a conveying control that eliminates the need for manual air-material adjustments to maintain conveying performance after material changes. The knowledge required to make those air-material adjustments requires training and experience, so the ability of the AutoWave feature to automate the process enables Wave Conveying systems to run more reliably for longer periods of time.

Brabender Technologie has introduced a

IMAGE: CONAIR



Now, with Conair's AutoWave feature, users need only select the desired conveying phase from a drop-down menu and AutoWave does the rest

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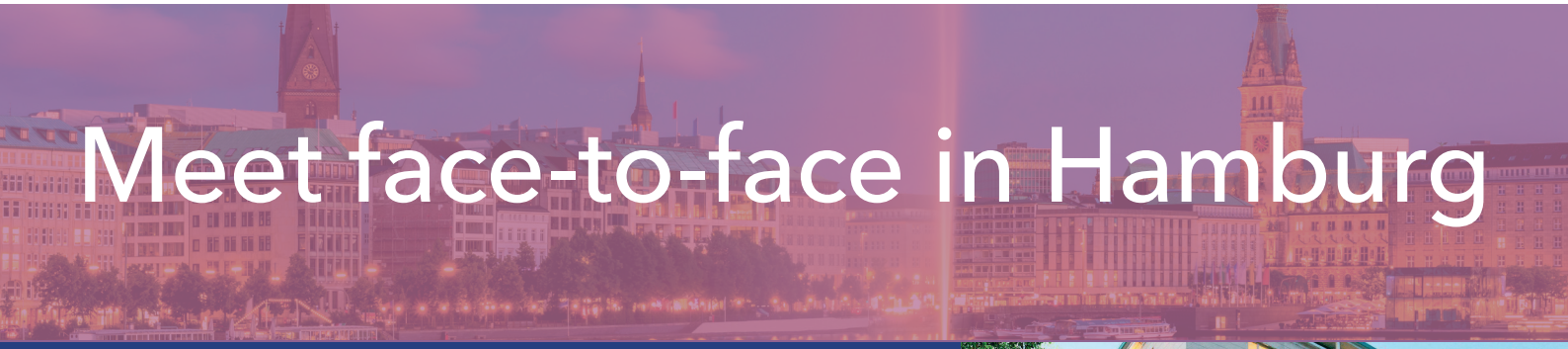

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number of new developments for its materials handling equipment. These include making servo motors standard for additional feeders. The company says that compared to standard AC motors, the flexible servo drive provides a wider speed range, while maintaining torque. Servo motors have the advantage of having their full torque available at low speeds and having negligible speed fluctuations during high torque demand situations. For these reasons, the servo drive is desirable as it eliminates the need for a second pair of screw and tube, which reduces changeover downtime of the system.

Flex connections made from highly durable, tear-resistant liquid silicone rubber (LSR) are essential for sealing upstream and downstream process. When hazardous ingredients are used, the connections prevent toxic dust from escaping. Brabender Technologie had developed a new design that provides highly flexible characteristics essential for ultra-low feed rates below 50 g per hour. The flex connection material thickness is specifically designed to be extremely thin in the flexible area and more robust where attached to the clamps. This a necessary item for precise weighing and dust control, says the company.

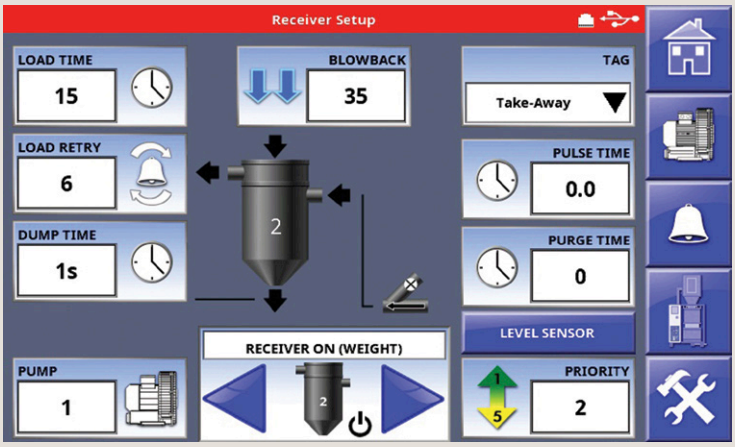
The recently developed shaft sealing system can be used wherever screw or agitator shafts are required. Brabender Technologie has now added a purge system to its radial shaft seal. It consists of an inner pressurised chamber. This means that in the rare event of a seal leak, dust always remains in the chamber. The shaft seals act as a barrier in both directions: on one side towards the motor and on the other side in contact with the ingredient.

Koch Technik has developed its own concept of a permanent central vacuum system. The company says that it offers a particular advantage over classic central conveying systems operating with a start-up phase and FIFO principle. The system can operate up to eight separators at the same time and convey many times the amount of material. Throughput is between 2 and 10 tonnes per hour. The initial investment may be a little higher, but from an energy point of view, the permanent central vacuum has a huge advantage, says Koch. Significantly less energy is needed for the same performance. In addition, the maximum possible throughput is many times higher.

The company adds that it has also implemented an interesting, energy-saving solution for some customers who have installed combined heat and power (CHP) plants for energy generation. A heat exchanger transfers excess energy from the CHP in the form of warm water or air to the drying systems. ❯

Maguire dryer controls get new software

IMAGE: MAGUIRE



Along with materials handling technology, suppliers are developing and refining controls of other ancillary equipment. **Maguire** says it has made its Ultra dryer touchscreen controller even more powerful and feature rich by integrating its FlexBus Lite software into the platform's Arm Cortex microprocessor. FlexBus Lite is a standard feature on all touchscreen blender controls, and on the Ultra dryer controls it allows users complete pump and receiver control in a cell, in a user friendly and straightforward control system.

Above: FlexBus Lite software is integrated into Maguire's Ultra dryer touchscreen controller

FlexBus Lite allows control of one vacuum pump and full system functionality control of up to ten materials receivers. The icon based touchscreen shows each of the receiver's activity in real time, whether it is calling for material, receiving material into it, or showing material discharging. The pump and receiver settings can be easily adjusted in real time by the operator.

"With the dryer, vacuum chamber and material retention hopper on load cells – you are able to completely regulate the drying rate to the process rate. This allows the operator to program a shutdown to any specific day and time," says Frank Kavanagh, vice president of sales and marketing.

"The control system then monitors the rate so that the loader will stop calling for material and the dryer will be empty. With the control system monitoring the rate, this makes material changes even easier."

Each drying container receives warm air from the CHP at 75°C instead of the usual 40°C and it is then heated up to the desired drying temperature of 80-90°C. The dryer's heater is used much less frequently, which provides a significant reduction in energy costs. CHPs are not often employed, but when they are, the use of the available heat is a good solution.

Koch says that it has also achieved large energy savings with its KEM direct colouring units. Through the introduction of a touch panel with a stepper motor on the KEM, the speed-controlled motor saves around 70% of the energy compared to the previously used gear motor and masterbatch metering is even more precise.

Maguire Products has purchased a minority share of OA Newton, a provider of bulk material handling systems to the wood-plastic composite, flexible and rigid PVC, and carbon black markets. Based in Delaware, USA, OA Newton engineers, fabricates, and installs complete systems for the unloading, storage, conveying, and blending of process ingredients, including controls and ancillary equipment. The company will continue to operate separately from Maguire Products, but the investment has the potential to expand the capabilities of Maguire in the material handling phase of the process industries.

In addition, Maguire Products has introduced the Bridge Breaker for its three largest blender series, those with maximum throughput capacities of 5,000 kg/h (11,000 lb/h), and capability of blending up to 12 ingredients. The Bridge Breaker consists of a hopper insert that directs material straight down onto the dispensing valve. It also has a rotary device that operates automatically while the dispense valve is open. The device rapidly pulses between clockwise and counter-clockwise movement, enhancing material flow through the dispense valve. The hopper insert, which provides a vertical alternative to the sloping wall of the hopper, can be retrofitted in any blender currently in operation. To make up for the space occupied by the insert, the complete hopper assembly includes an extension to accommodate the desired quantity of material.

"The new bridge breaker addresses the growing demand for recycled content in plastic products and the increasing use of regrind as a means of reducing production costs," says Frank Kavanagh, Vice-President of Sales and Marketing. "More and more processors have been finding it a challenge to keep such materials flowing consistently. In fact, we developed the bridge breaker to help one of our customers solve a problem with trim scrap."

The three large-capacity Maguire blender families, the 1200, 2400, and 3000 Series, blend up to 12 ingredients, using a wide range of removable hopper and feeder configurations and numerous dispensing devices. The blenders handle raw materials in a variety of forms, including regular pellets and regrind, bulk powders, flake, and ingredients that are especially bridge-prone, such as wood flour. Like other Maguire weigh scale blenders, once all ingredients are dosed into the weigh chamber, the batch falls into a mixing chamber. A microprocessor makes corrections from batch-to-batch, including adjustments to compensate for variations in extrusion rate or bulk density, maintaining overall batch accuracy to within ±0.1%.

Movacolor has developed a new version of its software for dosing plastic additives. The new software includes extra features such as sensor neck integration, fast calibration options and a single shot test button for taking verification samples. It is also now possible to contact the support staff from Movacolor directly via remote control. The company adds that the development has allowed it to serve its customers remotely during the Covid pandemic, with the software able to temporarily take control of a machine. The new software is available in 20 different languages and is also provided free of charge.

The company adds that the MCTC 8-in touch screen controller plays an important role in the reliability and stability of the dosing process. The robust, easy to start-up (and operate) controller works under all circumstances in injection moulding and extrusion applications. Features include quick calibration, recipe storage, manageable user levels, EBM synchronisation and sensor neck control. The MCTC touch screen controller is equipped with MCConnect, which connects the controller directly with Movacolor Expertise Centre via remote control plugin.

Movacolor has also launched a new version of its micro dosing system MCNexus. The modifications in the design of the optometric dosing

IMAGE: MOVACOLOR

Right: Movacolor has launched a new version of its micro dosing system MCNexusr

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system are based on feedback from customers active in the micro extrusion and injection moulding market. The adjustments to the design ensure that an even larger part of the dosing system can be manufactured using 3D printing. This results in a higher vacuum level and better intake of the masterbatch by the dosing disc. Improvements in the material flow have also been made. All product codes for the MCNexus remain unchanged, and the improved components are backward-compatible with previous versions.

Wittmann has developed monitored Codemax coupling stations to ensure that the implementation and results of material changes meet the most stringent quality standards. The company says that a mould change on processing machines is often accompanied by a change of material as well. The latter should proceed as quickly, easily and safely as possible. A single mistake can lead to serious problems, which in most cases are not instantly detected and cause high extra costs in terms of faulty parts.

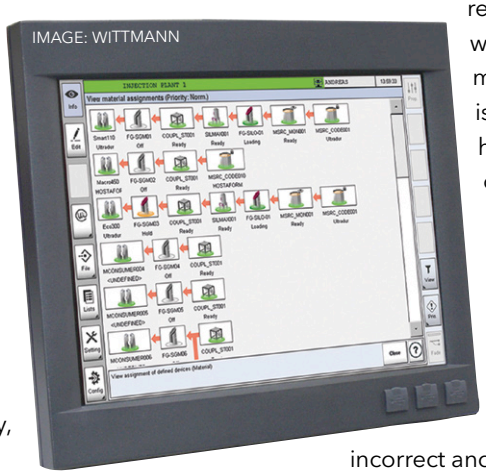
IMAGE: WITTMANN

Left: The M8 control network manages Wittmann's Codemax RFID coupling stations

The mechanical design of material distribution systems can vary greatly and may be planned individually. Moreover, these systems can be made from a wide range of different materials, such as entirely from stainless steel, but also from a combination of hardened stainless steels with glass elements, depending on the requirements. Wittmann dispenses with welding in producing its material distributors. Codemax coupling stations offer a pluggable version with sealed pipe clamps, which permits subsequent exchange of pipe elements and the use of wear-resistant parts where necessary.

Special fast camlock couplings for material transport pipes are manufactured exclusively for use on Wittmann Codemax coupling stations. They are aluminium and fully sealed, produced without sensitive threading and mounted on stainless steel pipes. This is the only way to ensure that any individual requirements specified by customers can actually be met, such as exclusively stainless steel for parts coming into contact with products. Their extremely sturdy design also copes with rough handling of the couplings in operation. Material hoses and couplings that are dropped must still be able to withstand such incidents without any deformation or other kinds of damage. The camlock couplings ensure safe connections without leakages and can be re-plugged quickly.

RFID antennas and tags on every coupling make sure that correct connections are established between material feeding pipelines and processing machines. The connections are monitored via the Wittmann network control for material handling systems and checked against the input from the system's operator. If a coupling process is triggered on the network control system without operator input, this immediately generates an error signal, and the material transport affected is stopped. This reliably prevents feeding of the wrong material to a processing machine. The same procedure is followed if a material change has been triggered via the control system and the wrong material is connected to the coupling station. Before a coupling process is carried out, the system operator is shown which material hose must be connected to which distributor unit. Both incorrect and open connections are visualised on the control system's graphic display. All of this ensures in every single case that the processing machines are always supplied with only the required material, and leakages caused by open connections are eliminated.

Mounted inside an aluminium housing and overmoulded with a shock-absorbing layer of plastic, the RFID antennas are protected against shocks. Existing material distributors can also be retrofitted with RFID antennas, and subsequent extension of monitored coupling stations present no problems.

The company adds that Codemax is easy to operate, and all currently available coupling options can be retrieved from a central point. With the help of such a system, fast material changes can be achieved, material sources such as dryers, roller containers or external silos can be used by several customers and RFID monitoring ensures a faultless production process.

Colortronic has relocated its headquarters from Friedrichsdorf to Isny in Germany as part of further consolidation within the **Motan Group**. The merger of Motan and Colortronic started in 2006 in order to exploit synergy in products and know-how. Over the past 15 years, the companies have grown together culturally and organisationally to form a corporate group. "However, the integration of the products into the Motan portfolio led to declining sales of Colortronic products in recent years. The Covid crisis accelerated this trend," says Sandra

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IMAGE: MOTAN

Left: Motan has developed the Metrovac SG conveying station for smaller conveying systems

Füllsack, CEO of the Motan holding company. With the retirement in 2021 of long-time Managing Director Manfred Raith, the business decision to relocate was made at the end of 2020.

Motan has developed the Metrovac SG conveying station for smaller conveying systems. Consisting of a vacuum blower, a control and a cyclone dust filter, up to eight hopper loaders can be connected to the PLC control. The Metrovac SG station is available in various blower sizes between 0.85 and 4.3 kW. The company adds that due to the maintenance-free blower and in combination with a cyclone dust filter, the station is versatile and can be easily adapted to the size of the conveying system and expanded if needed. To generate a reliable and constant vacuum, the conveying station uses side channel blowers. Especially with short to average conveying distances, these are ideally suited for placing directly next to the processing machines with low noise. The FC filters combine cyclone dust separators with a fine dust filter. The transparent dust collector makes removing accumulated dust quick and easy. When using the optionally available bypass valve, filter cleaning is carried out automatically. Likewise, the filter cartridge is regularly cleaned by implosion air that flows through the cartridge.

Piovan Group has signed an agreement with local government in China for the construction of a new production plant (also see page 8). The company has been in the Chinese market for over 20 years. The new plant is in Suzhou and will cover an area of 10,000 m² and will design and produce complete automation systems for the treatment of plastics. It will have offices, technological laboratories for testing, showrooms, warehouses, a production area designed for lean methodologies and a new R&D department.

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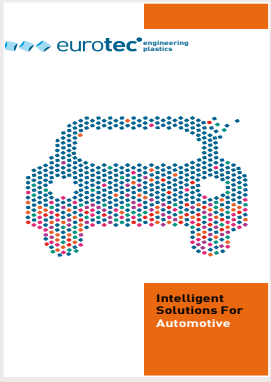

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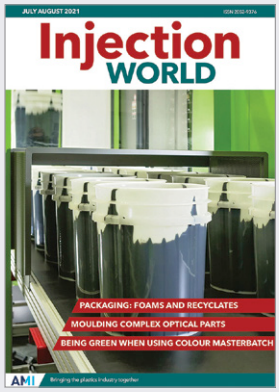

Injection World
July/August 2021
The cover story in the July-August issue of Injection World looks at how foams and recyclate are increasingly being used to mould sustainable packaging. Other features are about meeting the demands of complex optical parts and the latest in colour masterbatch.

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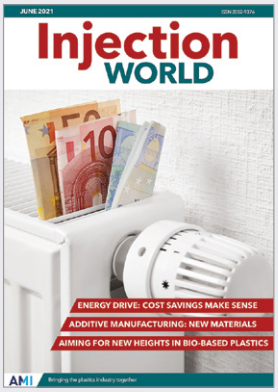

Injection World
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The June 2021 edition of Injection World magazine looks at how to save energy in the moulding plant, including the often overlooked financial drain of scrap granulation. It also explores the latest innovations in bio-based plastics and additive manufacturing technology.

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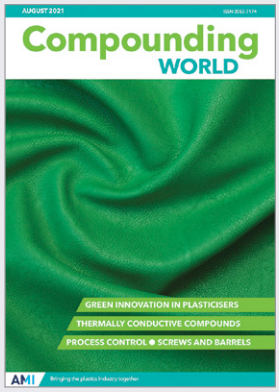

Compounding World
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The August edition of Compounding World looks at the latest developments in PVC plasticisers. It also explores the latest innovations in thermally conductive compounds, process control and performance alloys and coatings for screws and barrels.

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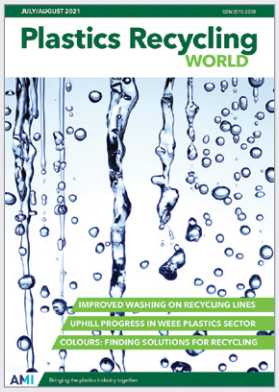

Plastics Recycling World
July/August 2021
The July/August edition of Plastics Recycling World looks at the latest developments in washing systems technology and waste water treatment. It also explores investments and innovation in recycling of waste electrical equipment (WEEE) and investigates colouring of recycled materials.

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Pipe and Profile
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	3-4 November	Compounding World Expo USA, Cleveland, USA **NEW DATE**	www.compoundingworldexpo.com/na/
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	15-18 November	Arabplast, Dubai, UAE **NEW DATE**	www.arabplast.info
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	8-11 March	Plastimagen, Mexico City	www.plastimagen.com.mx
	16-17 March	Injection Molding & Design, Detroit, MI, USA	www.injectionmoldingexpo.com
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20-21 October 2021	Plastics Recycling Technology, Vienna, Austria
30 Nov-2 December 2021	Fire Resistance, Dusseldorf, Germany
22-23 November 2021	Performance Polyamides Europe, Munich, Germany
23 - 24 November 2021	Conductive Plastics Europe, Munich, Germany
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