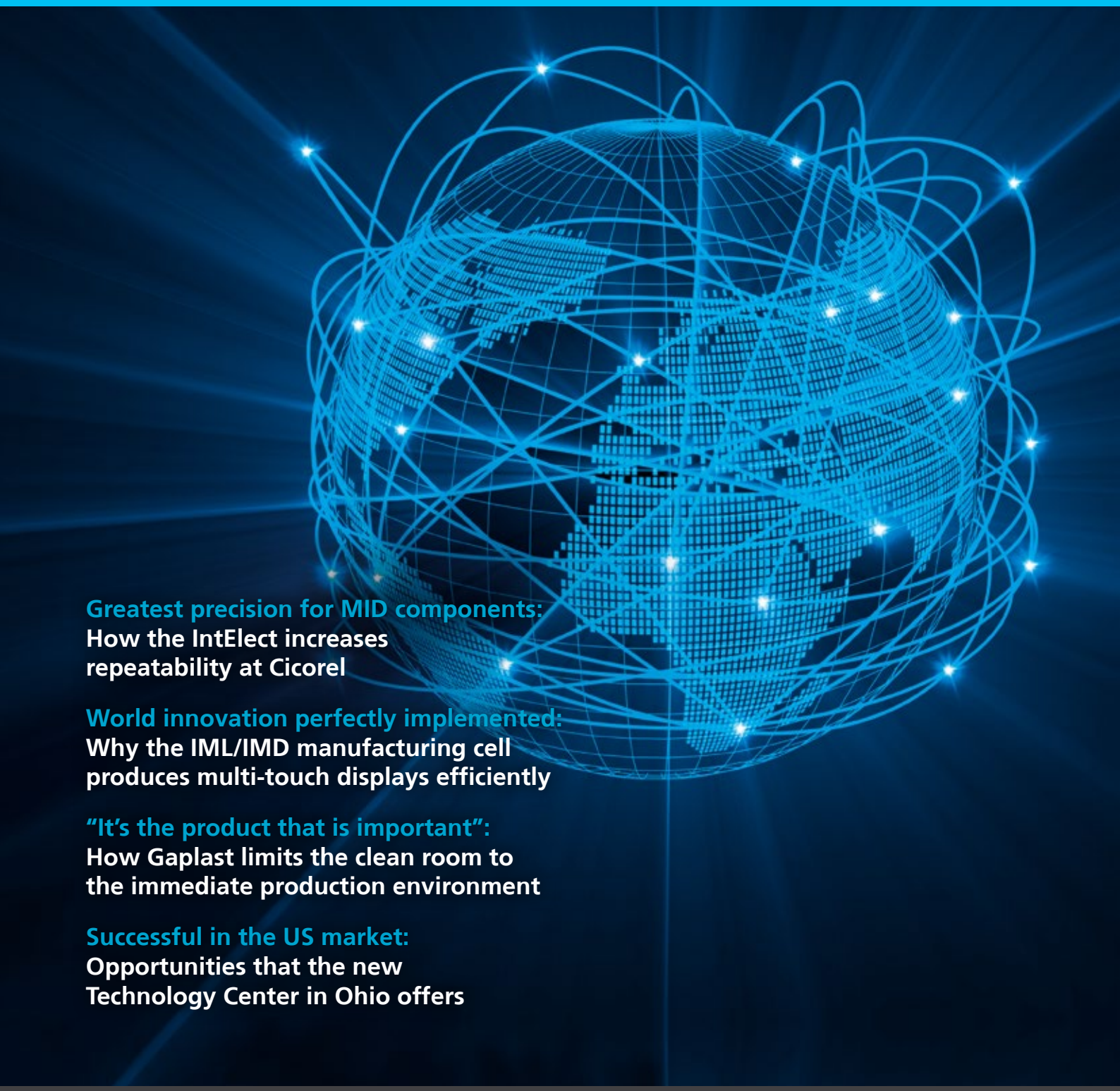
INJECT

Sumitomo (SHI) Demag – Magazine Issue 01/2013



Greatest precision for MID components:
How the IntElect increases repeatability at Cicorel

World innovation perfectly implemented:
Why the IML/IMD manufacturing cell produces multi-touch displays efficiently

"It's the product that is important":
How Gaplast limits the clean room to the immediate production environment

Successful in the US market:
Opportunities that the new Technology Center in Ohio offers

Sumitomo SHI DEMAG

Dear Readers,

For us, having a global nature means living in unbounded cooperation with customers. We follow up global trends and ensure your success with local solutions.

With more than 100,000 installed machines, Sumitomo (SHI) Demag is present in all important markets in the world. However, it is more than just leading-edge technical solutions that underpin these figures. Not only is there a lively technical exchange between our four production sites in Germany, Japan and China, we also know and overcome the challenges posed by the particular market. We understand the differences between the countries and offer local expertise, taking account of cultural practices. As far as we are concerned, there is no difference between know-how and know-where.

In this edition, you can read why Gaplast in Germany is entering new dimensions of productivity with its production of medical parts (page 5), how we have provided advice and practical support to the Italian drive manufacturer, Electro-Parts, with in-sourcing its injection moulding activities (page 10), and how the Swiss PCB specialist, Cicorel, manufactures high-precision 3D-MID elements with IntElect (page 14).

I wish you a successful second half of the year. Why not come and see for yourself the global nature of Sumitomo (SHI) Demag at the K 2013 exhibition as well? I will be happy to greet you in person in Düsseldorf.

Dr. Tetsuya Okamura
Senior Vice President, Sumitomo Heavy Industries (SHI) Ltd. Japan
CEO, Sumitomo (SHI) Demag Plastics Machinery GmbH

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High-Precision Manufacture of Optical Components on IntElect 100-340

Combined with its cooperative project "Optische Technologien" (optical technologies), K.I.M.W. from Lüdenscheid has launched operation of an injection moulding machine of the type IntElect 100-340 from Sumitomo (SHI) Demag Plastics Machinery GmbH. The current, third project phase is entitled "Process optimisation and automation in the manufacturing of optical precision components." This is realised by integrating an SDR series robot in the machine. The research activities are focusing on the use of the hot runner technology for the direct gating of optical components, automated production, online quality control as well as the influence of plasticising on component quality. Michael Talhof, Project Manager at K.I.M.W., is pleased with the long-term cooperation with Sumitomo (SHI) Demag: "We have already used an IntElect 100-470 for numerous test series during previous projects. Besides tool and process engineering, we also investigated suitable component geometries as well as the optical properties of various thermoplastics and silicones." ■

Michael Talhof, Project Manager at K.I.M.W.,Stefan Schmidt, Managing Director of K.I.M.W., as well as employees of Sumitomo (SHI) Demag, Andreas Schramm, General Manager Research and Development, Hans-Jörg Struth, Sales Manager Northern Germany and Sascha Stellmacher, Quality Assurance Manager (left to right).

Packaging Day in the USA

In conjunction with the opening of its Technology Center in Strongsville, Ohio, the US subsidiary of Sumitomo (SHI) Demag opened its doors for a Packaging Day in April. The visitors received a programme all about the manufacture of packaging including technical presentations on innovative solutions for thin-walled packaging, in-mould labelling, screw caps and closures. Amongst others, the company had invited some representatives from Otto Hofstetter to speak about thin-walled packaging, some from Marbach Moulds and Automation to explain automation solutions for IML and barrier technologies and some from IMDvista to talk about optical high-speed testing of closures and barrier layers. Further topics covered included increases in productivity for thin-walled packaging as well as injection moulding of screw caps. Demonstrations of the injection moulding process on electric, hybrid and hydraulic machines took place throughout the day. The El-Exis SP from the hybrid range, for instance, demonstrated its precision, energy efficiency and productivity during ultra-high-speed injection moulding. An El-Exis SP 450 produced screw caps with a 96-cavity mould and an El-Exis SP 580 produced thin-walled containers. ■

Frank Schuster promoted to General Sales Manager

Christian Renners, General Manager Business Unit Sales & After Sales, Sebastian Dombos, Sales Manager Germany, Frank Schuster, General Sales Manager, and Rolf Zimmermann, from Strategic Sales at Sumitomo (SHI) Demag Plastics Machinery (left to right).

On 1 April 2013, Frank Schuster took over as General Sales Manager of Sumitomo (SHI) Demag. He had originally joined what was then Demag Ergotech in 2000 as a project engineer.

After occupying different positions in the company, amongst them Head of Key Account Management, the 42-year-old became Sales Office Manager in 2011. Frank Schuster follows Rolf Zimmermann, who is taking his experience into Strategic Sales. Frank Schuster now manages domestic and foreign operative sales and reports to Christian Renners, who is now General Manager Business Unit Sales & After Sales. Sebastian Dombos simultaneously took up the post of Sales Manager Germany, reporting to Frank Schuster. 35-year-old Sebastian Dombos has been working at Sumitomo (SHI) Demag for ten years.

After several roles in national and international sales, he successfully ran the Regional Sales Office South over the last few years. In his new position, Sebastian Dombos coordinates the activities of the Regional Sales Offices South and North as well as the associated back office. His team of more than 20 employees covers all of Germany and is also in charge of globally operating companies abroad. ■

Television Crew from Sat.1 Bayern Paying a Visit

Sumitomo (SHI) Demag was the filming location for a recording crew from Sat.1 Bayern. The main topics on the agenda for the TV programme "Wirtschaftstreff Bayern", a talk show on economics in Bavaria, included attractive working time models and family-friendly HR policies. 22 fathers of the company's staff have already taken advantage of the new federal law on parental allowances and parental leave (BEEG) and have taken paternity leave. Paternity leave not only creates a stronger bond with their own children, it also enhances the bond with the employer. The company retains its specialists as a result: a win-win situation which provides greater satisfaction to the employees as well as HR continuity to the injection moulding machine manufacturer. ■

The film crew from Sat.1 Bayern is recording a programme on the "Modern Working World" at Sumitomo (SHI) Demag.

VW Relies on All-Electric IntElect

Volkswagen AG recently launched the operation of their first all-electric IntElect 220-1100 machine from Sumitomo (SHI) Demag. The machine produces rotary light switch plates for the Golf VII. With its low energy requirement, it ideally matches the "Think Blue Factory" concept by which Volkswagen AG is continuously increasing the sustainability of all its production sites. In addition, the IntElect machine offers shorter cycle times during the production of precision components and a very low scrap rate. "Energy efficiency is playing an increasingly important role in our production processes along the value chain. And the all-electric IntElect machine is making a considerable contribution," explains Marco Heinemann, responsible for production start-up project management at the Baunschweig plant. Jens Pedersen, VW employee from plant engineering, adds: "With the use of the IntElect, we were able to cut the cycle time by 15 % compared to a hydraulic machine. At the same time, it enabled us to reduce the scrap rate thanks to increased accuracy and repeatability." Karsten Goebel who also works for plant engineering in Braunschweig, adds that the machine runs much more smoothly compared to a hydraulic machine. ■

Use of the IntElect has resulted in an increase in energy efficiency and repeatability in the manufacture of precision components.

(From left to right) Marco Heinemann, project management for production start-ups at VW, Andreas Barth and Markus Hausmann, both from Sumitomo (SHI) Demag, Michael Ahrens, VW electrician, Karsten Goebel, VW plant engineering - mechanical engineering, Jens Pedersen, VW plant engineering - induction and application engineering, Harald Alt, VW building services technician.

"The product counts, not what's happening all around it"

Gaplast at its new site – revolutionising clean room technology and more

Working with a view onto the Zugspitze? You will be close to impossible to replicate this amazing scenery, but what Gaplast GmbH have realised in their purpose-built premises in Peiting in Upper Bavaria might well serve as a model for other injection moulding companies to follow. The strict limitation of the clean room to the immediate product environment, the absence of pallets and cartons from the production area, the controlled building management as the key to consistent process quality as well as the integrated heating and cooling concept realised as an energy cascade are the results of the company consistently questioning conventional solutions. The manufacturer of primary packaging for the pharmaceutical, cosmetics and medical sectors has packed all this into a prestigious industrial architecture which offers scope for modular extension.

Technical Director Stephan Kneer and Facility Manager Sebastian Schmölzl: "The AirShowerBox enables us to concentrate the clean room in a minimum area."

Since Roland Kneer took over Gaplast in 1989 from the Geiger Group based in Murnau through a management buy-out, the company has undergone strategically controlled growth. Sales, for instance, have increased more than ten-fold since then; the workforce of 150 achieved sales of 20.5 million Euros last year.

The list of clients includes famous names such as Boehringer Ingelheim, Fresenius Medical, L'Oréal, Novartis, Ratiopharm, Roche and Weleda. Gaplast supplies these companies with primary packaging for tablets, capsules and coated tablets, packaging for liquid pharmaceuticals such as eye and nose drop dispensers, medication administration aids and disposables for medical technology, as well as customer-specific dispenser bottles for cosmetics. At 80%, customers from the pharmaceutical industry provide the largest turnover, with cosmetics at 12% and medical technology at 8%.

"We only entered the medical technology market six years ago and we are experiencing a very positive response", reports Stephan Kneer, son of the company owner and Technical Manager. "We aim to have three equally strong pillars to our production in future. Currently, pharmaceuticals are still dominating our business." One advantage that Stephan Kneer values particularly highly is the fact that Gaplast is proficient in four processing techniques. While injection moulding contributes the greatest proportion to sales at 58%, coextrusion blow moulding provides a further 23%, injection blow moulding 10% and extrusion blow moulding 9% of the business volume. "With these four directions we have a very versatile setup of complementing techniques and are able to offer a customer purchasing injection moulded parts also the matching extrusion blow mouldings or even complete systems incorporating parts made with several different techniques. For the eye drop dispensers for Ursapharm, for instance, we manufacture the bottles by injection blow moulding and the dripper unit plus screw cap with a tamper-evident element by injection moulding. Added to this is the fact that only very few market players generally produce hollow bodies by extrusion blow moulding," highlights the Technical Manager.

Aim: being able to expand in response to customer demands

Until early 2012, the injection moulding machines, injection blow moulding machines as well as the installations for extrusion blow moulding and coextrusion blow moulding were still all located at the main plant in Saulgrub-Altenau near Garmisch-Partenkirchen. But the highdemand order situation meant that Gaplast had reached the physical limits for its production there. The company finally found a plot in Peiting, some 20km away, where it would be able to construct a purpose-built plant which would also allow for future expansion.

"Looking to the future, the option of modular expansion was the crucial cri-

terion in the selection of the new site. With this decision, we are sending a clear signal to our customers and highlighting that we have room to expand in response to their needs," states Stephan Kneer. He explains that particularly in strategic project discussions it is crucial whether there is still scope for expansion and whether the customer believes that follow-on projects are feasible. "We are currently in discussions on a project that would require ten new complete production units. For space and logistical reasons, we would not have been able to cope with that in Altenau. Without the scope for expansion in the Peiting plant, we would not even have been in the running," Kneer says.

Photo: K-PROFI

Gaplast has been operating a second production site in Peiting since March 2012. The family company has achieved an energy efficient building and production concept with the highly modern new building.

Peiting plant starts with injection moulding and injection blow moulding

But the possibility of expanding step by step was only one of many objectives that Gaplast pursued with the new facility in Peiting. The demanding requirements catalogue also included the ability to make energy savings, to automate production and logistics to achieve a high level of process stability through controlled building management and a prestigious industrial architecture.

During its search for a suitable construction company, Gaplast came across Peneder Bau GmbH from Atzbach in Austria. "We realised straightaway that collaboration with Peneder would differ completely from that with other construction companies that we had considered. We started with a two-day workshop which included representatives from all trades and professions such as an architect, a project engineer, a planner for energy systems, air conditioning and ventilation as well as a specialist in energy efficiency. The results from the workshop were our property without anybody claiming intellectual property rights in them. So we could actually have chosen a different partner for the realisation. But Peneder's holistic approach convinced us so that we hired the company as general contractor," describes Stephan Kneer. The fact that


Photo: Gaplast

Gaplast offers the complete package: The bottles for eyedrops (middle and right) are injection-blown, while the droplet unit and screw caps are injection moulded. The snap-on bottles (left) are designed for spray and pump systems.


Photo: Gaplast

Gaplast produces a wide variety of snap-on closures for plastic, aluminium or glass tubes: as a childproof version, flip-cap variant, with spacer (as bellows or spiral), with desiccant chamber or capsule as well as with tamper-evident ring.

Each injection moulding machine has a service pole allocated to it for media and material supply. Directly behind is the section of the hall for product handling. Sumitomo (SHI) Demag is the partner for injection moulding. Gaplast relies on fully electric IntElect machines when it comes to new purchases.

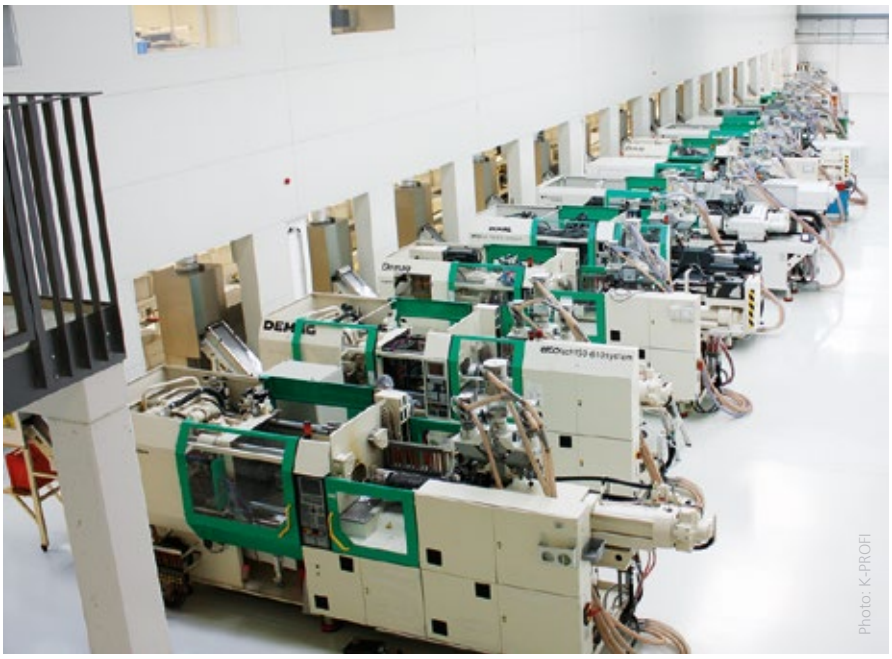


Photo: K-PROFI

the architect's thinking was based on processes and incorporated the plastics processing machines as integral part of the building particularly fascinated the Technical Manager.

After eleven months of construction, Peneder handed the new plant with its 5,100m² of production and office space to Gaplast as a turnkey facility. The packaging specialist invested around 8.6 million Euros in the modern manufacturing site in Peiting and has been reaping all the envisioned benefits which it was able to realise with the "new purpose-built facility", from March 2012 onwards. The Peiting plant currently houses the 25 machines for injection moulding and blow moulding as well as 40 of the 150 employees. "As a family business, we wanted to manage the investment with our own finances. Shutting the old site down completely in one step would have gone beyond our means. That is why we started by moving those technologies to the new facility that are relatively independent of other services within the company and for whose clientele the ultramodern production standards are also most relevant," explains Stephan Kneer.

Reuniting the entire business in Peiting sometime in the future is the explicit long-term goal – but this will require a doubling of the current production area. When this will be feasible highly depends on the future order situation. The Technical Manager is convinced: "The quicker the better because we are able to achieve massive energy savings here at Peiting and we would like to extend that to the entire production."

Cost savings through energy cascade

The significant cost reductions involve several factors. Firstly, there is the building itself which has been positioned with a deviation of only three degrees from the ideal north orientation. This ensures optimum utilisation of sunlight while avoiding solar heating in the production area. Of course, the integrated heating and cooling concept which was realised in the form of an energy cascade plays a major role: Gaplast uses the thermal property of well water to cool its moulds. In the height of summer, the return can be used for cooling the building before it seeps away. Conversely, the heat from the hydraulics cooling system is used to help heat the building. The waste heat from the air compressors is introduced into the water heating system. "Thanks to this energy cascade, we were able to drastically reduce our heating and cooling costs. Although we are now running two plants, we have the same costs overall as we previously had with just one plant," explains managing partner Roland Kneer.

Control station provides the interface between plastics processing and building services

However, all these measures are only as good as the ability to control and regulate them. This is where Peneder brought in Stiwa Group from Attnang-Puchheim in Austria as a partner for the automation and building control technology. Stiwa, or more precisely its subsidiary AMS Engineering GmbH, developed not only a tailor-made ventilation concept but also an energy monitoring system and a central building automation system. A control station with inbuilt MES functionality (Manufacturing Execution System) provides the necessary interfacing between production process and building services. Ambient conditions and energy flows can thus be matched precisely to the current production requirements. The temperature of the inlet water for the mould cooling, for instance, is adjusted precisely to 17.5°C +/- 0.1°C, using the well water and a cooling buffer. Regulating the maximum inlet and outlet air volumes to between 45,000 and 43,000m³/h guarantees a constant overpressure in the production halls, thus minimising the particle concentration in the air. Sebastian Schmölzl, responsible for the building control technology at Gaplast in his role as Facility Manager, demonstrates his enthusiasm with respect to the possible applications. "MES allows us to access the entire ventilation system, with set points for inlet and outlet ventilators, the temperatures of the internal and external air, filter parameters, heating and cooling systems and even the lighting which is regulated on the basis of the external light level.

In the product room: The AirShower boxes (right) permanently blow an air shower onto the injection moulded articles before an employee seals the filled boxes and puts them onto the fully automatic box transport system (left).

The MES also incorporates a production control station with live data from all machines. We even map our inventory management with this system." "For us, controlled building management is the key for constant product quality," states Stephan Kneer. If the machines generate excessive waste heat, the ventilation system makes the necessary adjustments. If the external air is too cold or too hot, for instance, there is even the possibility of warming or cooling the inlet air. "In the production halls at Altenau, temperatures could differ by up to 20°C between summer and winter. This makes process validation considerably more difficult. On occasion, we needed seven to eight hours before we could clear a production line for operation at Altenau. Here at Peiting, the average is 30 to 40 minutes. There is a great deal of potential in building services. Those who know how to put them to good use gain clear commercial advantages besides the quality benefits," stresses the Technical Manager. A certain amount of investment will therefore pay off. Integration of the machine data into the MES required some work on the company's part. As the existing injection moulding machines did not have Euromap interfaces, the Gaplast electricians had to pick up the available signals directly and wire them up to the MES hardware.

Three production hall sectors in the grey zone

In Peiting, Gaplast currently operates with 20 injection moulding machines (250 to 2,500 kN) from Sumitomo (SHI) Demag as well as five injection blow moulding machines from Uniloy. The concentration on one injection moulding machine supplier is apparently mainly due to the good service. Some older hydraulic Ergotech injection moulding machines, two hybrid-drive El-Exis machines as well as several all-electric IntElect injection moulding machines are neatly arranged in order of clamping force in two rows like organ pipes. Between the two rows is the so-called product area. In this central section of the hall, the produced items are collected in plastic transport boxes and transferred to an automated box transport management system.

Every injection moulding machine has its own service funnel for the feeding of media and material which comes down from a suspended ceiling above the product area. The company made a deliberate decision not to use tanks at floor level which might accumulate dirt in their cladding. To facilitate cleaning, the machines are slightly elevated and accessible from all sides. The injection moulded parts fall directly onto enclosed conveyor belts in the machine base through the mould shaft and are transported to the product area.

And how does Gaplast ensure the clean room quality required by the pharmaceutical, cosmetics and medical sectors? As usual, both personnel and visitors must pass through a clean-room lock. Once they have put on clean-room-compatible protective clothing, washed and disinfected their hands and passed over a tacky mat, they proceed into the grey area. Nothing new in this process. But in this plant, the injection moulding machines are also located in the grey zone – without additional enclosures or use of the familiar laminar flow boxes.

AirShowerBox is the name of the new clean room solution

Stephan Kneer lets us in on a secret: "Our approach is as follows: clean room conditions where the product is located which is why we have installed a completely new clean room solution here." The high energy consumption and high fixed costs associated with conventional clean room concepts caused Gaplast to look for alternatives. In response, Stiwa devised the concept of the so-called "AirShowerBox" which protects and cools the product from the moment it is ejected until it is packaged in bulk.

This is how it works in detail: For each injection moulding machine, an AirShowerBox was placed next to the service funnel at the boundary between the machine and the product area. Its opening covers both the end of the conveyor belt and the product box. Clean air is drawn in from the air conditioning system through the opening and blown over the collection box. The air flow continues under the conveyor belt cover up to the point where the items drop out of the mould, thus preventing contamination of the products between mould

and box. As soon as the box is full, it is closed with a plastic lid.

"In fact, we restrict the clean room to this small volume. Clean room conditions are only in place where they are necessary where the product is," underlines the Technical Manager. Not only does this save Gaplast money, it also saves on personnel. Although employees who come into direct contact with products are subject to stricter rules on clothing, all employees can move flexibly between different departments within the grey zone and perform various tasks without having to pass through any locks.

Gaplast is currently checking whether they might be able to achieve classification to EN ISO 14644 in spite of the unorthodox clean room concept. Considering the particle numbers and sizes measured in the indoor air alone, the Peiting operation is clearly within the limits of ISO Class 8 (max. 100,000 particles of size 0.5µm per cubic foot). The particle numbers measured in the grey zone around the machines are around 20,000 to 40,000, in the area of the AirShower-Boxes near the products merely 10,000. But even without official classification to ISO standard, the customers are impressed by the novel clean room concept according to Stephan Kneer.

The finished parts are transferred to the dispatch station in a foil bag from the clean room behind the transfer hatch. Only at this point cardboard packaging is used. The monitor provides information about the article and its dispatch specification.

Photo: K-PROFI

Production entirely without pallets or cardboard boxes

One further special feature of the new Gaplast plant is that the production involves no pallets or cardboard boxes. In line with the aim of reducing particle numbers, an automated box transport management system was installed for the transportation of the injection moulded products. "In the product area, the tasks to be performed by the personnel concentrate on closing the collection boxes and transferring them onto the conveyor belt as well as on preparing empty boxes – which are lined with plastic bags," explains the Technical Manager. The production orders are monitored shot by shot with the inventory management program of the MES. The employees print labels for the semi-finished or finished products at the control station, affix these to the plastic boxes and marry them up with the box contents via a handheld scanner. From the label data, the warehouse management system identifies whether the box contains semi-finished products to be transported to the assembly area or finished products to be transferred to the shipping warehouse.

If the parts are semi-finished products intended for assembly, the box is routed to the assembly clean room within the grey zone. Various flaps or chutes in the external wall mark the access points to the appropriate assembly station behind. Each flap has a monitor next to it which displays information through the warehouse management program about the semi-finished part to be passed through. The boxes delivered via the transport management system stop automatically at the appropriate flaps. The operator performs an additional plausibility check; he or she scans both the chute and the box and does not open either until given the go-ahead to pour the semi-finished parts from the plastic bag into the chute. Both finished assemblies and finished injection moulded parts are packed exclusively into plastic bags in the grey and white zones. The employees from the grey or white hygiene zone place the bags in a transfer hatch leading to the "dispatch station" assigned to the particular product outside the clean room. Only once they have arrived there will another employee place the bags into the final shipping cartons, label those and stack them onto pallets. There is a further monitor located in this area which provides the employee with all the relevant details relating to the shipping specification.

And so the logistical perfection continues beyond the grey zone as well. An automated guided vehicle system (AVG) from S-Elektronik from Wangen in Allgäu collects the ready-packed pallet from its platform, drives it to the stretch wrapping station, recharges its capacitors, picks the wrapped pallet back up, hands it over to the finished goods warehouse and then fetches another new pallet to put in place at the vacated shipping station – and all this is performed in a fully automated manner.

"Although we are using a rather unorthodox clean room concept, the auditors were delighted with the new plant. No doubt this was helped by the fact that the principle itself is plausible and easily understood without requiring much explanation. Anybody who pays a visit to our production facility realises immediately how the material flow, personnel flow and product flow operate. The crucial thing is perfect clean room quality for the product, not everything going on around it. After all, our customers don't want to pay more than necessary," asserts Stephan Kneer.

Author

Sabine Rahner, Dipl.-Ing. (FH)

INJECT thanks the trade magazine K-PROFI for its kind permission to reproduce the article.

Everything from a Single Source

Electro-Parts made the right decision on whether to "make or buy"

About ten years ago, the management of Electro-Parts S.p.A. in Bossolasco (Italy) had to make a decision: outsourcing or insourcing its plastic injection moulding operation? Today, the injection moulding department manufactures everything from brush heads to insulators to gear boxes – supported by seven injection moulding machines from Sumitomo (SHI) Demag.

In an area of approximately 9,000 square metres, Electro-Parts produces linear actuators, gear motors, PMDC motors, electric fans as well as brushless motors

Founded in 1983 by the father of the current Managing Director and CEO Marco Falcone, the company started out manufacturing DC motors for the automotive industry. It then expanded into the automation industry, and Electro-Parts now sells linear actuators, gear motors, PMDC motors, electric fans as well as brushless motors. The actuators are used by some customers to adjust the height of desktops. Another possible application of actuators is in electric window regulators for cars. Besides the electric motor, actuators contain other mechanical elements. Many of these mechanical components are made from plastic – and the company now manufactures those itself by injection moulding.

Marco Falcone explains that in metal processing, errors are rarer and when they occur they are detected more quickly. "With plastics, errors tend not to be immediately obvious; that is why we decided ten years ago to purchase our own machines, train our own personnel in injection moulding technology and set up our own maintenance department." The step from outsourcing to injection moulding in house meant greater flexibility and less scrap for the company.

Effective support from Sumitomo (SHI) Demag thanks to the close partnership

Roberto Sallemi, Managing Director of Macam srl, the Italian Sumitomo (SHI) Demag distributor based in Rivoli in Torino Province, first of all assisted Electro-Parts with advice regarding the injection moulding machines; then, he also supported the company in its negotiations with the Italian raw material supplier Radici Plast. "Before each purchase, particularly in the case of equipment as sophisticated and high-powered as injection moulding machines, we obtain at least three quotations. We were pleasantly surprised by Mr Sallemi's professionalism. To him, providing advice was always more important than the actual selling. This type of conduct makes you stand out from the rest!" stresses Marco Falcone.

"We were sure that the Falcone family would benefit from our machines in a variety of ways – that is how the contact first came about," says Roberto Sallemi looking back. "Of course we talked about the production efficiency of the machines and about the energy savings potential that the electric drive offers compared to the traditional hydraulic

Coil assembly on several lines

Gear wheels made from plastic with metal inserts

drive. We also discussed aspects such as operator training and the provision of advice on optimising the shapes on the drawing board or those already in production. Another topic of conversation was the use of machines in unmanned production – which we have subsequently realised."

"Ten years on from the management decision, we now have a department that also works in unmanned shifts. The seven injection moulding machines from Sumitomo (SHI) Demag, one of them an all-electrical machine, has not had a single malfunction in 13,500 hours of operation. Today, we produce 99% of the plastic parts we need for the products assembled on our production lines ourselves," underlines Luca Avataneo, Head of Plastics Production. A workforce of around 90 ensures the smooth operation of the plant in Bossolasco. What factors have contributed to the company's success? Innovation, modern equipment, a highly trained workforce as well as the fact that Electro-Parts now manufactures all plastic components itself. ■

Author:
Angelo Grassi – Excerpt from the article "L'importanza della partnership" with kind permission of Tecnoplast

Luca Avataneo, Head of Plastics Production at Electro-Parts (on the left), and Roberto Sallemi, Managing Director of Macam srl, the Italian distributor of Sumitomo (SHI) Demag

View into the injection moulding production

For ten years, Electro-Parts has been using injection moulding to produce the plastic parts to be incorporated into the actuators

"Our Claim: Made in Germany Our Presence: International"

Sanner embodies German quality standards, from development to production and from sales to service

Sanner develops and manufactures a wide range of packaging, focusing mainly on the pharmaceutical industry and on medical engineering. Besides plastic injection moulding, the company's core competence comprises the manufacture of desiccant caps. Sanner is the world leader in this section. With three production sites in Germany, Hungary and China which all operate according to the "Made in Germany" principle, Sanner has a worldwide presence and offers its customers standardised and tested quality, clean-room manufacture and a high level of service. Shaun Dean, COO at Sumitomo (SHI) Demag Plastics Machinery GmbH, and Stephan Greif, Vice President Demag Plastics Machinery (Ningbo) Co., Ltd., spoke to Holger Frank, CEO at Sanner GmbH, Bensheim/Germany, and Ralf Tiemann, Vice President Asia at Sanner Pharmaceutical & Medical Packaging Materials (Kunshan) Co., Ltd., on behalf of INJECT.

Editor: What do you understand by the "Made in Germany" principle?
Holger Frank and Ralf Tiemann: What we understand by that is that we do not compromise in matters of quality and service, wherever Sanner is involved. Our products have the same level of quality everywhere, and the technical standard is also the same worldwide so that customers can procure identical products from all Sanner plants.

How does Demag support you in fulfilling this "Made in Germany" claim?
Demag supports us by sticking to the same principle. The machines manufactured in China allow us to manufacture products at our site in Kunshan (Shanghai) in the same quality as in Bensheim or in Budapest. It is also important to us to provide a top class service to ensure that production can continue without interruptions.

In which countries do you currently manufacture? And why did you choose those particular locations?
The company's head office is in Bensheim which is also traditionally the location of our largest manufacturing plant and of our Development and Innovation Management. Our site in Asia is important because we realised back in 2000 that there is an enormous growth market there. Hungary provides our foothold in Eastern Europe.

Since when have you been manufacturing in China? And how were you able to guarantee clean-room manufacture there?
We have been manufacturing in China since 2000. There are international standards (ISO) for clean-room manufacture, and we adhere to those standards in our production there as well. In some areas there are further requirements placed on us by the local SFDA authorities (State Food and Drug Administration) in China. When we set up the clean rooms, we did not compromise in any way and we imported components that we could not procure in the required quality locally.

Do you intend to expand your presence to further sales markets such as India?
We are currently in the process of expanding our sites in Germany and China. In Germany, the main issue is energy efficiency; in China, it is the aim of doubling our production capacities. These projects will be completed by the end of 2013. We are already planning further steps for the subsequent period to expand and consolidate our market leadership in Asia. Of course, this will include new sales markets such as India, but there is also potential in other growth markets in South America and in the CIS countries.

In which areas do your sites benefit from our international presence?
Our employees receive training on the machines from Sumitomo (SHI) Demag in all locations, and Demag also performs the maintenance and servicing of the ma-


Photo: Sanner

In the 1970s, the desiccant cap from Sanner revolutionised the packaging of effervescent tablets. Today, Sanner is the global market leader in this segment and manufactures packaging solutions for a great variety of requirements at three locations.

Ralf Tiemann, Vice President Asia at Sanner Pharmaceutical & Medical Packaging Materials (Kunshan) Co., Ltd., (on the left) and Holger Frank, CEO of Sanner GmbH, in front of Demag machines in the plant in Bensheim, Germany.

chines which enables us to manufacture in the same quality – the aforementioned "Made in Germany" quality – at all sites.

Who are your customers and how do you support them with product development?

Our customers are pharmaceutical companies as well as companies from the healthcare and diagnostics sectors. For one, we have a wide-ranging portfolio which satisfies many packaging requirements involving integrated desiccant in these sectors. Secondly, we also run R&D departments at the individual sites where our technicians, engineers and designers collaborate with the customers to develop individual solutions ready for mass production.

Which technically sophisticated solutions do you offer your customers?

We are the market leader in the area of desiccant packaging and have unique expertise in this field. We combine this know-how with the market requirements and with our technical skills in order to maintain our ability to keep presenting new packaging solutions to our customers. Our desiccant container "360° Capsule", for instance, was developed in response to our customers' demands for improved patient safety combined with improved product safety. In the case of our new flip top for effervescent tablets, the needs of older people were at the centre of the product development.

How has your product portfolio developed over the last few years?

We have consistently extended and expanded our product portfolio in our core sectors of test strip packaging, packaging for effervescent tablets and packaging for OTC medication and pharmaceuticals. We now have a well-developed portfolio in all three segments, ranging from entry-level solutions to customised premium packaging. We shall continue to follow this course consistently over the next few years.

Why did you decide in favour of Demag machines?

There were a number of reasons. For one, the good price-performance ratio, but also the international availability as well as the fast response times.

When did you buy your first Demag machine?

That was in 2003.

Which types of machines did you buy?

Depending on the end product, we use different types of machines from Sumitomo (SHI) Demag at our production sites. At our German site, we use the hybrid high-speed machine El-Exis amongst others, in Hungary all-electric IntElect machines, and in our Chinese manufacturing plant we have a mixture of Sumitomo (SHI) Demag machines from Germany and Chinese-manufactured Sumitomo (SHI) Demag machines from the Systec C range. ■

Photo: Sanner

Holger Frank, CEO at Sanner GmbH, (on the left) and Ralf Tiemann, Vice President Asia at Sanner Pharmaceutical & Medical Packaging Materials Co., Ltd., at the production facility in Kunshan.

Brief profile of Sanner GmbH

Sanner GmbH, has its headquarters in Bensheim, a town in the southern German state of Hesse. It was founded as a family business in 1894 and is now in its fourth generation. Today, over 450 employees in Germany, Hungary, China, Indonesia and the USA generate sales of over 50 million euros (2012). Sanner develops and manufactures high-quality plastic packaging and components for pharmaceutical, medical and healthcare products. Over 2 billion items of packaging leave the Sanner plants every year.

As the global market leader with over 50 years' experience, Sanner offers customers unique expertise in the area of desiccant packaging and the certainty of collaborating with one of the best and most efficient manufacturers. Due to the Sanner packaging ranges for effervescent tablets and test strips, the company is now a global name. Sanner offers its customers an extensive product portfolio in its traditional segments but is also engaged in developing individual packaging solutions that satisfy the highest technical standards. The company is renowned for extremely high quality in conjunction with high volumes and product requirements.

The production facilities are located in Bensheim/Germany, Budapest/Hungary and Shanghai/China.

Greatest Precision for Smallest Components

Reproducible machine settings ensure reliable injection moulding process at Cicorel

The Cicor Group is one of the leading suppliers of electronic assemblies worldwide. With its four divisions Printed Circuit Boards (PCB), Microelectronics (ME), Electronic Solutions (ES) and Asia, it assists numerous customers with the development and production of highly complex PCBs, 3D-MID solutions, film circuits and electronic modules. The group employs a total workforce of around 1,300 at twelve production sites at locations in Switzerland and Germany as well as Romania, China, Singapore, Indonesia and Vietnam.

At Boudry in Switzerland, there is a production and administration building which houses Cicorel SA, a company of the PCB Division, where the former Boudry and Unterägeri locations were jointly relocated with additional capacities. The PCB division specialises in the manufacture of printed circuit boards. It develops and manufactures these on behalf of customers, from the idea to the product being ready for mass production. The product portfolio includes small-scale and large-scale series as well as standard and customised products. The PCBs are used in a variety of applications in all industries, from medical technology to communication technology, from watches to automotive engineering and other transport systems.

Tailor-made technology adaptation

Cicorel places a great deal of importance on the ability to work with a cross-divisional approach in its development activities where required and to exchange know-how. Its current development project also involves several technologies. In 2011, a development group headed by Nouhad Bachnak was set up in Boudry with the task of putting 3D-MID technology into practice. Although Cicorel is new to injection moulding, the implementation is worthwhile. "Many companies master one technology which they offer for applications that can be realised using that particular technology. We are looking at it from the opposite perspective. We know the applications from the area of electronics and we are thinking about the technologies we need to realise them, to optimise them or to make them suitable for use in other areas of application."

Bachnak about the advantages of the so-called Moulded Interconnect Devices (MID) for special applications: "3D-MID technology is only useful if you need to construct something involving the third dimension or if miniaturisation is required," he explains. "This is where classic printed circuit boards verge on their limits." At the same time, systems can be simplified, and the end result is a

The specially developed demonstrator shows the flexibility in designing geometries for 3D-MID; and all individual process steps can be tested specifically for each material using the test piece.

Photo: Cicorel

The IntElect 50-80 impresses many with its high accuracy both in product development and in mass production, and it covers all common sizes of 3D-MID elements.

The new technology offers numerous starting points to discuss details of this process (from left): Urs Kocher (Mapag), Nouhad Bachnak and Reto Leist, both from Cicorel, and Thomas Brettnich, from Sumitomo (SHI) Demag.

During the project meeting, Reto Leist explains that the set parameters will be reproduced by the IntElect with great precision and will allow flawless production.

One of the 3D-MID circuit substrates which are being developed and manufactured at Cicorel, in detail.

manufacturing process that creates the desired electronic circuit substrate in fewer steps and generally at lower cost. In Boudry, the basic material of the 3D-MID technology is a thermoplastic material doped with an organometallic compound. Around 40 types of plastic with various metal doping options have been released for the process of Laser Direct Structuring (LDS) by the patent holder LPKF Laser & Electronics AG. Amongst others, these include PC/ABS, PA or LCP which are already in use at Cicorel or which are currently being tested for future applications. For this purpose, Bachnak's team has developed a demonstrator that all process steps are tested and individual steps are demonstrated with.

After the injection moulding process, the main body is processed during the Laser Direct Structuring using an IR laser.

The action of the laser roughens the surface so that the metal coating will subsequently adhere well to the surface. At the same time, the additives are activated and the metal atoms will become the nuclei for the subsequent reductive copper-plating. Cicorel uses an LPKF infrared laser with a wavelength of 1064nm. The beam diameter is 80µm which means that every future track is traced twice to mark the full width. In series operation the technology is currently able to produce a track width of 150µm and similarly small spaces. The goal for 3D-MID technology is to achieve even greater miniaturisation and enable even smaller track widths.

In terms of component design, 3D-MID allows greater scope than classic PCB technology as the possible shapes are only restricted by the ways the laser can be guided within the three dimensions. One prime example is the creation of aerials in hearing aids. Conventional aerial technology can be replaced by 3D-MID which can create the appropriate structure directly on the housing in a very space-saving manner. Once painted over, the structure is functional but no longer externally visible.

The third process step is the chemical plating where the conductor is built up in several stages. A base layer of copper is applied which is covered by a layer of nickel which is in turn covered by a final layer of gold. Once the metallisation has been completed, the circuit substrate can be equipped with components to produce a complete assembly.

Purposeful selection of the injection moulding machine

"From the very start, we had targeted the IntElect in terms of equipment," says Bachnak. "It was clear that we needed a high-precision machine for this type of technology – and the IntElect fulfilled all our requirements in this respect." Reto Leist, Manager of Injection Moulding Processing, already had some experience with the all-electric IntElect. The company therefore immediately contacted MAPAG Maschinen AG in Bern which distributes injection moulding machines from Sumitomo (SHI) Demag Plastics Machinery GmbH in Switzerland. Leist brings over 15 years of experience in injection moulding of precision components to the team and is familiar with the high demands placed on the injection moulding machine, particularly by small components, small structures and high surface qualities. "Around 80 per cent of all our applications are small, and the plastic components involved must be up to the mark – not just in terms of size but also with a functionality that is stable and reliable in the long term even for the smallest tracks," explained Bachnak in detail.

The precision of the IntElect is also important for the surface quality of the end products because that plays a major part for laser structuring. "We optimise the surface quality by means of the injection conditions and we set the parameters appropriately," explains Leist. "Whatever settings we choose the injection moulding machine will realise accurately with outstanding repeatability." As the surface is the critical element, the prototypes and test pieces from new material batches are closely examined. "The surface layer of a component is crucially important for successful laser processing and subsequent metallisation," explains Bachnak. "We are only talking about 30

to 40µm, but they have a large impact." Cicorel examines this surface layer regularly during the product development process by taking sections in order to be able to assess its quality. In Boudry, the development work does not involve any automation. This means that equipment and machines remain highly flexible and can be adapted speedily to new requirements. Depending on production volumes, automation does not become cost-effective until production starts and is therefore only realised at that stage. The development activities are performed in air-conditioned rooms but not in a clean room environment. "Before each laser operation, the component is cleaned of dust using air," explains Bachnak. The laser system itself is equipped with a tilting rotary table so that the table movements can be adjusted individually for each component.

Efficient transition from development to production

For Bachnak, the IntElect is more than a guarantee for successful development. As the technology is relatively new to Cicorel there are no production lines as of yet. The IntElect installed in the Technical Center is already mass-producing fully developed circuit substrates using 3D-MID in addition to test series and trial runs. "Operations that run smoothly here will be transferred to our production lines in China in the future," he says. But they are not there yet as the required IntElect machines are yet to be installed in their plant in China. "The machines currently installed there are partly electric but they don't come anywhere near the precision of the IntElect. Cicorel will therefore install the same type of machine in China so that the changeover of production can be achieved speedily and smoothly by transferring the parameters to the machines there." That way, Cicorel will also ensure the same high product quality at the same time.

There are already two products being mass-produced at Cicorel at the moment, a third was started in November. The volumes are between 100,000 and several million per year, depending on the application they supply. One part that has already made it to mass production is a component for a plug connector used by Fischer Connectors SA. The connector combines so-called signal pins and power pins. Thanks to the particularly compact construction, Fischer was able to realise a design that was much smaller than a standard product with the same number of contacts. Compared to a conventional product with the same dimensions, the new plug connector from the MiniMax range accommodates three times the number of contacts. The size of the finished plug connector is roughly the same as that of a pin board pin.

High-precision miniaturised components in mass production

What makes this possible is the way the pins are formed. Injection moulding is used to create two comb-like structures which are then fitted together. "This design trick fulfils two tasks at the same time," explains Bachnak. "For one, it allows the creation of the extremely thin pins from LCP material. Secondly, the pins are slightly offset after the fitting together so that the required isolation distance between them can be realised in a very small space." With this idea, the new type of connector accommodates 20 signal pins and four power pins in the smallest of spaces. The component itself weighs 0.2g and is produced with a 10+10-cavity mass production mould. The mould is manufactured by a company in Singapore which is part of the Cicor Group. "As the information flow takes place within the group, it is very intense and detailed, and our demanding requirements are realised to the letter," says Bachnak about the collaboration.

"With applications such as this connector, the machine behaviour of the IntElect is a great advantage for us," states Reto Leist. "As the profiles can be executed very accurately and dynamically, we are achieving outstanding accuracy. It is also important to us that each cycle is absolutely reproducible to ensure that the component quality remains consistent." Each machine setting can be reproduced

Using a number of sections, the surface quality of the materials is examined as this has a major impact on the subsequent laser structuring.

Cicorel developed a new, injection-moulded LCP structure for the pins and created the tracks using 3D-MID for the compact design of this plug connector from the Fischer Connectors MiniMax range.

with 100% accuracy which facilitates the creation of a reliable injection moulding process for every component. "In the case of small components, we frequently work with an injection time of just 0.15s, for instance which needs to be adhered to without any deviation to avoid scrap." On the IntElect, the required adherence to such precise tolerance limits can be achieved thanks to very high sampling rates.

On the same machine, Leist also manufactures the 30g demonstrator with an injection time of 2.2s and a constant melt cushion of 0.22cm³. With configurations such as these, he is utilising the entire manufacturing range that the machine permits. The transfer of new parameters into the NC5 machine control system works perfectly, and after a tool change, a previously defined process sequence runs smoothly within a very short space of time.

A further mass produced item will protect card readers by preventing unauthorised access to customer data more effectively. The space-saving design of the protective cap replaces a structure where multiple PCB layers are stacked over each other. The third product also serves a security purpose; it will detect malfunctions in plant equipment to protect personnel from injury. In addition, Bachnak is currently overseeing some ten development projects.

Bachnak and Leist are both certain that the decision in favour of the IntElect has been worthwhile for Cicorel. The possibility of transferring production processes developed in Boudry 1:1 to further machines of the same type will allow the company to establish the newly implemented 3D-IMD technology fully and offer it to its demanding clientele around the world. ■

Sumitomo (SHI) Demag at Trade Fairs in 2013

Technology Day Germany South with GWK
› Schwaig, Germany
› 11 June 2013

PDM
› Birmingham, UK
› 18 - 19 June 2013

Kunststoffen
› Veldhofen, the Netherlands
› 25 - 26 September 2013

Expoplast
› Bucharest, Romania
› 2 - 5 October 2013

MD&M Minneapolis
› Minneapolis MI, USA
› 29 - 30 October 2013

Dongguan DMP
› Dongguan, China
› 13 - 16 November 2013

K Messe
› Düsseldorf, Germany
› 16 - 23 October 2013

Promising World First Perfectly Implemented

The innovative IML/IMD process combination from PolyIC for multi-touch displays benefits from tried and tested cell concept

Sumitomo (SHI) Demag impressed the expert audience with a global innovation in process engineering at the Fakuma 2012 exhibition. Multi-touch displays were being produced in a single production step. The technology which combines the two processes IML and IMD and uses transparent conductive foil, was developed by two companies from Fürth, Leonhard Kurz Stiftung & Co. KG and PolyIC GmbH & Co. KG. The technology has been realised perfectly within a complex production cell by the German-Japanese injection moulding machine manufacturer in cooperation with further partners. The result is compact, fully automated machinery of entirely modular construction which is based on a tried and tested concept and ensures reliable and highly efficient production of these innovative electronic components.

Photo: PolyIC

Touch functionality via IML, decoration via IMD. The two processes have been combined to manufacture this multi-touch display in a single shot.

The development of transparent and conductive foil has enabled entirely new applications for the electronics sector, also by allowing considerably greater freedom in terms of design. PolyIC is marketing the foils as PolyTC brand. The foils represent a promising alternative – particularly in the continuously growing market of touch sensors.The foils are based on PET, covered with a thin metal layer and incorporate high-resolution conductive structures; these characteristics facilitate the manufacture of very thin, flexible and transparent touch sensors. In addition, the PolyTC foils can replace the ITO (tin-doped indium oxide) foils used in most current touch sensor applications. As indium is a heavy metal which is rare and expensive worldwide, ITO alternatives create a great deal of interest.

Cost-effective: functionality via IML, decoration via IMD

With the PolyTC foils, PolyIC, a subsidiary of the Kurz Group, has created the basis for the cost-efficient production of multi-touch displays. For one, the foils can be mass-produced cost-effectively by the roll-to-roll method in spite of their customisable layout. In addition, the functional foils are suitable for use as individual labels in the in-mould labelling process (IML). This allows the touch sensor functionality to be applied directly to components via the foils in the injection moulding process. PolyIC and the foil specialist Kurz have now brought this design freedom to perfection by combining it with the in-mould decoration technique (IMD). The combined IML/IMD technology unites function and decoration in a single manufacturing step in the course of the injection moulding process.

To be able to apply such complex technology cost-effectively requires flexible and highly efficient manufacturing concepts. Sumitomo (SHI) Demag, well-known for its competence in the different in-mould decoration techniques, is exactly the right partner with the appropriate experience. For the combined IML/IMD manufacturing process, Sumitomo (SHI) Demag collaborated with other specialists and devised a modular plant centred on the versatile hydraulic injection moulding machine Systec. Apart from PolyIC (functional foil) and Kurz (single image decorative foil and IMD foil handling), the partners included HBW-Gubesch Kunststoff-Engineering GmbH, Emskirchen, as developer of the injection mould, SAR Electronic GmbH, Gunzenhausen, as system integrator for the robot-supported automation, Max Petek, Radolfzell, for the clean room solution and Kist Maschinenbau GmbH, Dresden, as supplier of the modules for the UV foil hardening and cleaning.

Perfect example: production of a multi-touch display frame

The great potential of the technology is illustrated by the manufacture of a multi-touch display including frame on a Systec 210-430 (2,100kN) using a single-cavity mould from HBW-Gubesch. For the IMD element, the feed unit from Kurz which is mounted on the clamping side and above the mould space, introduces a carrier foil for individual images

with a decorative coating into the cavity. This foil which is also manufactured by Kurz, is aligned accurately during the closing movement of the mould. At the same time, a suspended six-axis robot TX90 from Stäubli picks the PolyIC foils which are equipped with touch functionality, out of a magazine as individual in-mould labels and positions them onto the mould on the injection side. The foil is fixed in place in the mould with 0.2mm precision using a vacuum.

The display is then produced by injecting PMMA through the foil gate using the variotherm mould temperature control from GWK. The fully controlled, hydraulic Systec machine performs the accurate and reliable injection operation. Its equipment package for processing transparent plastics with multilayer screw coating as well as a four-part, coated non-return valve ensures high melt quality and therefore the excellent visual qualities of the component.

During the injection moulding process, the decorative part of the IMD foil detaches from the carrier foil and is bonded onto the front of the component. The IML functional foil, on the other hand, is rear injected and forms the back of the display. That way, a transparent multi-touch display is produced in one shot, including its decorative frame, whose wafer-thin contacts provide the connection for the electronics.

Holistic: clean room module plus sealed-off working areas

To ensure perfect operation of the multi-touch display, clean room manufacture is absolutely essential. Therefore, a laminar flow module from Max Petek Reinraumtechnik cleans the air drawn in from outside and prevents the ingress of particles via an FFU (Filter Fan Unit), achieving an air purity level of clean room class ISO 7. However, the cell concept considerably exceeds the basic requirements of this clean room class which cover the clean room module comprising the machine and the automation area as well as the use of special, easily cleaned profiles and surfaces for the protective enclosure of

The manufacturing cell was designed around a 2,100kN Systec machine. Energy-efficient production is ensured by the dynamic power adjustment of the hydraulic drive via activeDrive, a combination of a frequency-controlled electric motor and a highly dynamic variable capacity pump.

Numerous modules for robot, foil handling, clean room, automation enclosure, conveyor as well as foil cleaning and UV hardening are working together efficiently within one cell.

A single suspended robot with a multi-sided gripper system performs all the handling tasks involving the component and the functional label.

The endless carrier foil with decorative coating which passes downwards through the mould, is aligned accurately within the mould.

The foil feed unit from Kurz which is located above the mould, ensures the accurate positioning of the decorative foil.

the automation equipment. All subsequent post-processing steps such as degating, UV hardening and cleaning, take place in sealed plant modules closed off by partitions.

Sophisticated: highly detailed solutions achieve component perfection

Even though the injection moulding process itself represents the impressive innovation, the subsequent steps taking place outside the mould make a considerable contribution to the ultimate component quality. Once the six-axis robot equipped with a three-sided gripper system has removed the moulded display frame from the mould and inserted a new label, it places the component onto a work carrier. The component is then transported into the enclosed laser separation station where a CO_2 laser with air extraction ensures the clean and fragment-free removal of the foil gate.

A separate conveyor transports the detached foil gates directly out of the cell, while the component itself is taken back into the robot's envelope on the work carrier. The robot picks the display up again and transfers it into the UV hardening unit of the Cleanmaster 3D from Kist where the top layer of the decorative foil is hardened. During the next step, the robot picks the component up once again and transfers it to the cleaning station of the combined Cleanmaster 3D unit located below the UV station. Here, brushes perform the meticulous and gentle removal of any remaining fragments of foil and create clean edges all round; any particles loosened in the process are extracted, leaving no residue.

"We are relying on a thoroughly tried and tested as well as reliable cleaning process in IMD production," explains Markus Hausmann from Technical Sales at Sumitomo (SHI) Demag: "Trials have demonstrated that it is a good idea to perform the cleaning after the UV hardening in order to avoid leaving any marks on the surface that has not yet fully hardened, particularly for high-gloss surfaces such as Piano Black. However the UV hardening and cleaning modules form a combined unit which means that the sequence can be adjusted depending on the sensitivity of the material and its tendency to flake."

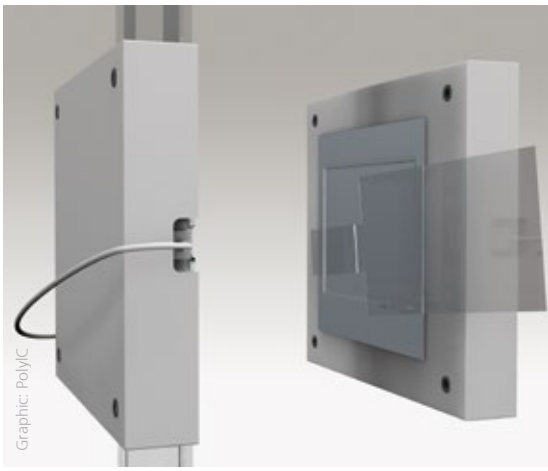
Adaptable: modularity provides degree of automation

The entire manufacturing cell is of modular construction, making it possible to realise a single cell concept anywhere in the world. Depending on the desired degree of automation or the labour costs at the manufacturing location, the basic equipment can be complemented by a greater or smaller number of optional modules. Particularly for users with operations in different parts of the world, this flexibility is a distinct advantage.

Field-tested: plant concept applied successfully by OEM

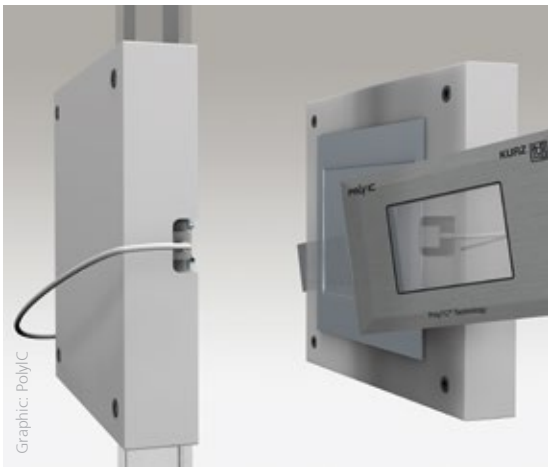
In addition, a standardised interface between the injection moulding machine and automation equipment ensures short commissioning times and a high level of flexibility. Faster commissioning and a reduction in equipment complexity are also helped by the fact that a single industrial robot performs all the handling tasks involving the component and functional label. Thanks to the suspended six-axis unit and the extremely compact automation enclosure, the footprint of the entire cell is very small.

While the PolyTC process is a world first, the modular concept realised for manufacturing the multi-touch displays is based on an existing setup at an OEM in the automotive industry: Volkswagen has been operating 13 IML/IMD plants at its site in Braunschweig for some time to manufacture components for the Golf VII. This concept has now been enhanced by the automated storage and handling of the sensor foils. "This way, we were able to customise the innovative IML/IMD technology from PolyIC in an enhanced form on the basis of a tried and tested cell concept. This is an important aspect for users who naturally value high levels of availability and flexibility," states Markus Hausmann to express his satisfaction. The PolyTC technology has great potential and provides maximum freedom of design for touch-sensitive operating panels which can also be realised very cost-effectively thanks to the plant concept devised by Sumitomo (SHI) Demag. ■



IML: Insertion of the PolyTC label on the injection side of the mould

IMD: Positioning of the decorative foil



Multi-touch displays are produced in a single manufacturing step

Serving the US Market with Moulding Solutions

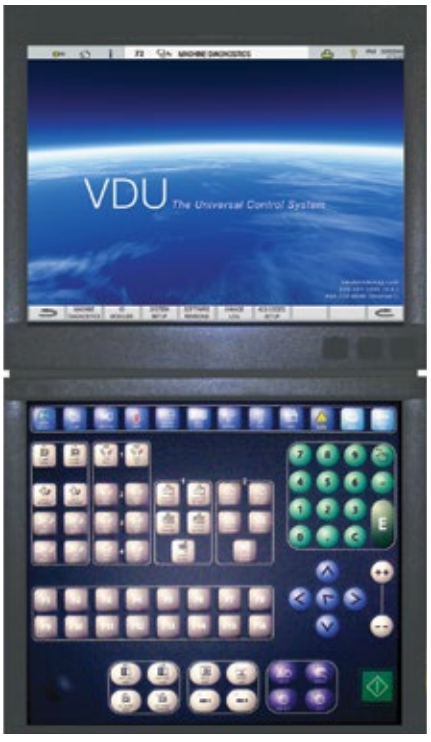
New machinery innovations and technology plus support for existing machinery

The new Technology Center has been opened for customer mould demonstrations and trials in Sumitomo (SHI) Demag's Strongsville, Ohio facility

John F. Martich III, Chief Operating Officer of Sumitomo (SHI) Demag's U.S. operations

The U.S. operations of Sumitomo (SHI) Demag works out of two primary locations: Norcross, Georgia, with 23 employees, and Strongsville, Ohio, with 59 employees. From these facilities, the company offers its customers a comprehensive range of injection moulding solutions spanning new machinery sales, field service, spare parts, training, mould trials and processing assistance, as well as specialised fleet management services such as retrofits, rebuilding and trade-in options. New machinery sales are handled by an inside technical sales team and four regional sales managers plus 33 manufacturer's representatives who are strategically located across the U.S. and Canada.

In April, the company held an open house for its new, 2,500m² technology centre in Strongsville. The opening which was attended by over 120 customers, featured moulding demonstrations on seven all-electric, hybrid and hydraulic machines with clamping forces from 56 to 652 U.S. tons. John F. Martich III, Chief Operating Officer, emphasised the opportunities that the centre offers: "We have equipped the technology centre with a wide range of types and sizes of machines and the associated innovations and technologies that make our products unique. We regard this site as an important facility for our customers. Whether they are moulding thick parts with long cycle times, micro-sized parts in difficult-to-process engineering resins, or ultra-high speed packaging and closure applications, our technology centre is now in place to help support them." In addition to customer mould trials and demonstrations, the centre will be used for hands-on training classes in machine operation, maintenance and process optimisation.



Proud history and large machine population

While the company's primary focus is new machinery sales and support, providing fleet management solutions for a large machine population also plays an important role for the U.S. operations. This is due to the fact that, through a series of acquisitions, there are more than 22,000 Sumitomo, Demag, Van Dorn and Newbury injection moulding machines in operation in North America.

The history of these combined companies begins with the Van Dorn Iron Works Company which produced its first injection moulding machine in 1945. Following a change of name to Van Dorn Co. in 1964, the company was taken over by Crown Cork and Seal Co. in 1993 which sold the plastics division to Mannesmann AG. Mannesmann continued to operate

The VDU® retrofit control helps customers decrease downtime and optimise the performance of their legacy Van Dorn machinery

the company as its U.S. subsidiary Van Dorn Demag Corporation, and in 1995 it acquired the vertical machine manufacturer, Newbury. In 2002, Demag Ergotech in Schwaig, Germany, and Van Dorn Demag in Ohio merged their activities and operated as Demag Plastics Group. Following the acquisition of Demag Plastics Group by Sumitomo Heavy Industries Ltd. of Japan in 2008, Van Dorn Demag became an important pillar of the global Sumitomo (SHI) Demag family.

Additionally, Sumitomo Heavy Industries began selling moulding machines in the U.S. in 1980, initially to Japanese transplant companies, and then gradually expanding its market with U.S. moulders. In the 1990s, Sumitomo expanded its U.S. customer base with its high-speed SGM series of accumulator-assisted machines for thin-wall applications and SD series for optical media storage devices such as CDs. At the end of the 1990s, with the introduction of the all-electric SES machine series, the company was well positioned for the 2000 to 2010 decade during which approximately 40% of the U.S. market for small-to-medium-sized machines switched over to all-electric drive technology.

Today, the majority of Sumitomo (SHI) Demag's U.S. new machinery business is in the medical, automotive, electrical components, closures and consumer products markets. The company is also actively working to expand its business in the thin-wall packaging market.

To demonstrate the company's rebuilding capabilities during the opening event, a fully rebuilt 1999 Van Dorn 700 HP machine was shown next to a 1997 700 HP in the condition it was received from the customer.

Fleet management solutions

"Our fleet management solutions have been developed to help moulders protect and build the value of their moulding operations," said Martich. "For their existing fleet, these solutions help improve reliability, minimise downtime, optimise precision and machine performance, improve energy efficiency, and extend the useful life of the machines."

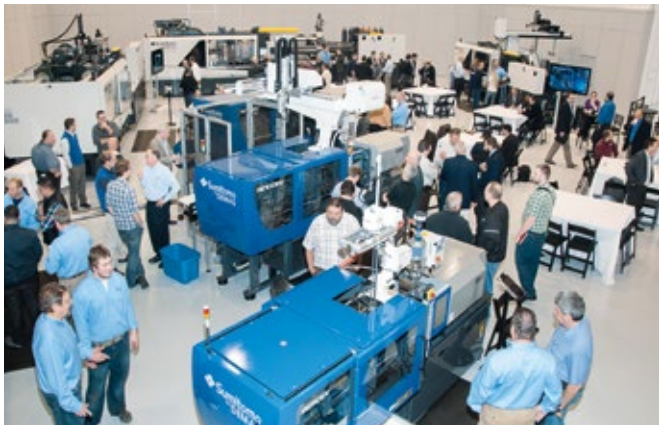
Retrofit solutions such as the company's VDU® controller, are available for older models while a new screw/barrel combination can expand capabilities on a late or recent model machine.

Partial-to-complete rebuilding is another service offering. The company demonstrated this offering during the open house by positioning two 700 ton machines next to each other on the plant floor: one waiting to be rebuilt and the other completed and ready to be shipped back to the customer. An extensive parts inventory is maintained to support the broad range of machines, and parts use is continuously monitored to ensure availability when needed.

The company also has a unique program that allows customers to trade in their existing moulding machines – even machines made by competitors – in exchange for credits towards the purchase of a new machine.

"Achieving high customer satisfaction requires flexibility – meeting their needs. We focus on helping customers improve their production efficiency – both with new machinery and with products and services that help ensure the operational efficiency of their existing fleet," Martich said. ■

During the opening, technical sales specialists were available at each machine to provide information to visitors



The Technology Center in Strongsville during the opening event in April 2013

Less Noise in the Production Area

Injection moulding machines from Sumitomo (SHI) Demag already generate relatively low levels of noise in their standard versions. The sound pressure level can be reduced even further through specific measures in order to keep the working environment as quiet as possible.

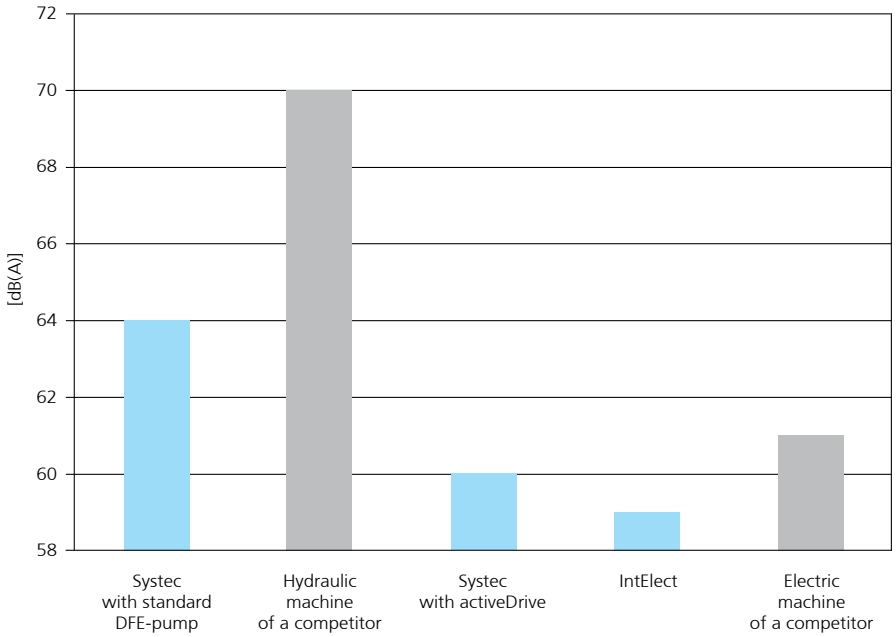
The fact that injection moulding machines generate noise during the operation is unavoidable. The employees working in injection moulding production are subjected to the noise from the machines for long periods of time. People's noise perception varies greatly and the reaction to persistent noise changes from one person to the next.

A sound pressure level as low as 65dB (A) may result in a lack of concentration and have a negative impact on the cardiovascular system. In order to avoid affecting employees' health, the noise generated during the course of the manufacturing process should therefore be reduced as much as possible. A low noise level not exceeding 60dB (A) makes the working environment more attractive and improves employee efficiency – they make fewer mistakes and work more accurately. This in turn improves the quality of the end product. Sound is propagated through the air in the form of acoustic waves. The sound volume is stated as the sound pressure level in decibel (dB). The rule of thumb is that an increase in the sound pressure level by 6 to 10dB (A) is perceived as a doubling of the sound volume. The sound pressure level regarding injection moulding machines is determined according to DIN EN 201:2009 Appendix K as to obtain comparable measured values.

The noise emission of hydraulic injection moulding machines can reach more than 70dB (A). All-electric machines, on the other hand, generate much lower noise levels during operation. The sound pressure level produced by the IntElect series from Sumitomo (SHI) Demag Plastics Machinery GmbH, for instance, is only 59dB (A). However, hydraulic injection moulding machines can also make for a relatively quiet production environment, provided that the machine manufacturer already pursues the goal of keeping the noise level as low as possible during the development phase. The Systec series hydraulic injection moulding machines from Sumitomo (SHI) Demag, for instance, are equipped with electrically adjustable DFEE-type variable capacity pumps and high-efficiency drive motors. Consequently, the noise level during the operation of a Systec 210 with a clamping force of 2,100kN and a bar width of 560mm reaches only 64dB (A). This means a relatively low level – even in the standard version which is well below the average industry level of approx. 68dB (A).

The hydraulic machines from Sumitomo (SHI) Demag generate even less noise when the activeDrive concept is used. This will reduce the sound pressure level produced by a Systec 210 (2,100kN clamping force, 560 mm bar width) down to just 60dB (A).

The innovative activeDrive concept from Sumitomo (SHI) Demag contains a frequency-controlled high-performance motor and a hydraulic pump. The dynamic power adaptation to all cycle-dependent requirements ensures optimum efficiency because only the actually required power is made available in each cycle sequence. This results in significant energy savings of between 30 and 60% and a noticeable, roughly halved, noise reduction. ■



The hydraulic injection moulding machines of the Systec series from Sumitomo (SHI) Demag have built-in noise reduction as standard. Thus the noise emitted during the operation of a Systec 210 (2,100kN clamping force and 560mm bar width) with standard equipment will not exceed 64dB (A). The sound pressure level produced by the machine can be reduced further to approx. 60dB (A) through use of the activeDrive concept.

Graphics: Sumitomo (SHI) Demag