

INJECT

Sumitomo (SHI) Demag Magazine 01/2011



**Wiehe: centre of excellence
for electric machines**

**Energy efficiency: how to
compare consumption**

**IntElect: competitive edges
through electric machines**

**K 2010: major success for the
Japanese / German team**



Dear Reader,

Yet again, the K 2010 international trade show in Düsseldorf has come as a surprise to us. Our first appearance as Sumitomo (SHI) Demag on the stage of international trade shows was intended to present to you our strategic orientation, our new products and our Japanese / German team, of course. Not only have our platform concept for electric machines, our new heavy-duty El-Exis SP machine and many solutions designed to raise your mundane production efficiency met with your interest, but also with approval and accolade. Many specific projects have been initiated and purchase orders received. Thank you very much for your positive feedback. We are very pleased indeed.

Our strategy is also confirmed by the fact that incoming orders have more than doubled in 2010 as compared to 2009. This fact and your support have encouraged us to continue on the course we have taken over these past two years. Through this INJECT sales bulletin, we are going to provide you with information on latest developments and innovations at regular intervals, to report of customer success with our injection moulding machines, and introduce to you new solutions devised by Sumitomo (SHI) Demag. We hope you will find this an interesting reading material which will inspire you for your upcoming challenges.

Invigorated by the feedback received at the K 2010, we see into the future optimistically: Sumitomo (SHI) Demag and our team are well prepared for 2011 and 2012. You can count on us.

Your

Dr. Tetsuya Okamura
CEO

Imprint

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Even closer to the customer

Sumitomo (SHI) Demag to consolidate its distribution and service networks

With the consolidation of its marketing organizations in Asia, Europe, North or South America, Sumitomo (SHI) Demag has some changes to announce as regards its branch offices or agencies in its distribution and service networks.

Showrann for Saudi-Arabia

Sumitomo (SHI) Demag will go through its international partner of Showrann Trading & Co. in Riyadh / Saudi-Arabia to cultivate the markets in the Near and Middle East, and more specifically on the Arabian Peninsula. Specifically, Showrann will offer turnkey production systems, i.e. injection molding machines including peripheral equipment and automation equipment, especially for the production of plastic packaging.

Mecman to cultivate Spain

In Spain, Sumitomo (SHI) Demag is now represented by Mecman Industrial, S.L., of Sentmenat / Barcelona. The agency agreement covers the distribution and servicing of injection moulding machines installed in Spain. As an owner-managed company with a workforce of more than 40, Mecman has comprehensive knowledge and expertise in the field of automation engineering, but also looks after peripheral equipment and the maintenance

and servicing of resources. Mecman offers all the services that were previously rendered by Sumitomo (SHI) Demag Plastics Machinery, S.L. which was closed down in July 2010. Several experienced employees of the subsidiary were taken over by Mecman.

New CEO in Russia

Dipl.-Ing. (graduate engineer) Alexander Votinov (43) has been the CEO of CJSC Sumitomo (SHI) Demag Plastics Machinery in Moscow since August 2010. He took over from Sergej Sorokin who has retired. Alexander Votinov has a background in mechanical engineering, and was last active in the sales force and management of the Moscow-based mouldmaker. CJSC Sumitomo (SHI) Demag has its headquarters in Moscow, and sales and service branch offices in all major economic regions such as St. Petersburg, Samara, Nishnny Novgorod or Ufa in Russia as well as in Minsk / Belarus, and is also active in the Ukraine.

North distribution centre now headquartered in Wiehe

In Germany, the North distribution centre has been moved from Hamm to the Wiehe location where all the overriding sales or servicing activities for North Germany, East Germany and Central Germany will be coordinated in future. "Most of our customers will stay with their local sales engineers and thus their usual contacts", points out Hans-Jörg Struth who is in charge of the North sales agency. "We are pooling all the resources required for customer satisfaction", adds André Schimpf, Service Manager North.

The South distribution centre has the same function for customers in Rhineland-Palatinate, in the Saarland, in Baden-Wuerttemberg, and in Bavaria.

To view the addresses and contacts of all agencies worldwide, visit www.sumitomo-shi-demag.eu.



(f.l.t.r.)
Hans-Jörg Struth
(Sales Manager for
Northern Germany),
Christian Renners
(General Manager
BU Sales, After Sales),
André Schimpf (Man-
ager Customer Care
Regions East & West)

“The entry of Sumitomo came as a stroke of luck to Wiehe.”

Frank Stengel, Works Manager, describes the role of the Wiehe location as a centre of excellence for electric machines



Frank Stengel is optimistic as regards the future of the Wiehe location after its new strategic orientation

The Wiehe location of Sumitomo (SHI) Demag celebrates its 40th anniversary. On May 1, 1970, the new Plastmaschinenwerk Wiehe had gone fully into production. In our interview, Frank Stengel, the Works Manager in Wiehe since 2006, looks back on the technological highlights of plastic mechanical engineering in the GDR, to the vicissitudes of the political Turnaround, to the entry of Mannesmann Demag Kunststofftechnik, and finally to the acquisition by Sumitomo. Stengel describes the new strategic orientation of the Wiehe location as a centre of excellence for all-electric injection moulding machines.

Desk: Mr. Stengel, plastic mechanical engineering in Wiehe looks back on a long tradition. What were the milestones in terms of development?

Frank Stengel: 40 years ago, the first injection moulding machines were built here at the suburb of the town of Wiehe in the newly built Plastmaschinenwerk. Injection moulding machines were built here in Wiehe as early as in 1950. The first machine was called SG 1, came with an electrohydraulic individual drive of the plasticizing piston, and the mould was closed by hand using a single toggle joint. Based on this technology, the publicly-owned com-

pany by the name of Volkseigener Betrieb (VEB) Plastmaschinenwerk Wiehe was established here.

Desk: When we think of injection moulding machines made in GDR, what comes to mind first is KuASY. When was that machine built in Wiehe?

Frank Stengel: The machines based on the SG1 were continuously improved, up to the first all-hydraulic machines. It was then in 1963 when the first electro-hydraulic automatic injection moulding machine by the name of KuASY was launched. And, by the way, KuASY is derived from the GDR nomenclature. “Ku” is for plastic (Kunststoff in German), “A” is Automatic, “S” is for injection moulding (Spritzgießen in German), and “Y” is for hydraulic. Then, three years later, the first injection moulding machine with screw plasticisation and double toggle joint came onto the market. Up to 200 machines of the KuASY 25 x 32 were built every year. The production facility in town became too small for that, and had to be relocated to the outskirts of the town where we are still producing today. In the 80s, we even used to manufacture up to 600 machines every year.

Desk: And then there was the Turnaround ...

Frank Stengel: Yes, the management at the time reacted quickly, and soon found a strategic partner. Negotiations were held with

all the renowned manufacturers of injection moulding machines, from Arburg and Engel via Krauss Maffei to Klöckner-Ferromatik, and precisely Mannesmann Demag Kunststofftechnik. What was decisive was their intention to enter the small machine business. Moreover, Wiehe was quite well organised when you think

with all its know-how, and turned it into one of the most sophisticated engineering works in Europe. At the same time, we developed a new series, in a real teamwork effort focusing all our capacities.

The concept was developed at Schwaig, detail engineering and

Desk: The entry to all-electric machines?

Frank Stengel: Precisely. The El-Exis was turned into the IntElect which was launched with smaller clamping forces for the time being in 2003. Owing to its direct drives, the IntElect was well received in the market. It is now available in its fourth generation.



of how it was like in the GDR, had well trained personnel, and this finally convinced Mannesmann Demag. Acquisition occurred in 1990.

Desk: Please proceed, how did it go on ...

Frank Stengel: As early as at the beginning of 1990, we developed together with Demag engineers a KuASY series fitted with an NCIII control as used in the Demag machines, and presented it at the Leipziger Messe trade show. That was meant as a signal to the sector that we were going somewhere. Those were incredibly exciting times, the years from 1990 through 1993. Demag reorganised our whole company

production were deployed in Wiehe. The new Ergotech series with clamping forces of 250 and 1,000 kN was then presented at the K 1992. That was a real bombshell.

Desk: What was the feedback from the market?

Frank Stengel: Very positive indeed. In 1993, we built just under 500 Ergotech machines here at this facility, and we attracted many new customers. As early as in 1997, the Extra series was launched, again a great success. This one accounted for up to 40 percent of our overall sales volume. In 2000, we developed the El-Exis E based on the El-Exis S for the packaging sector.

Desk: In 2008, Sumitomo took the wheel. What consequences did this have for this location?

Frank Stengel: I have been right there, I have been the Works Manager here at Wiehe since 2006. And, I have to say, Sumitomo came as a real stroke of luck to Demag in general and to the Wiehe location in particular. The special thing about Sumitomo is the drive technology. Right at the time of acquisition, we began to develop the IntElect smart as a separate project in a joint effort with the Japanese engineers. These machines combine the high level of adaptability of the IntElect to customer requirements with the excellent Sumitomo



mo drives. Meanwhile, the Int-Elect smart has turned out to be the most successful model made in Wiehe.

Desk: What is the current product portfolio of Wiehe?

Frank Stengel: In addition to the IntElect smart with clamping forces between 500 and 4,500 kN, we continue to produce the Int-Elect performance with European drive technology and clamping forces in the range from 500 through 2,100 kN. The ratio between the smart and performance models is about three to one. This is supplemented by the all-electric Sumitomo models SE DUZ with clamping forces from 300 to 1,800 kN, the SE HDZ with clamping forces from 2,200 to 4,500 kN, and the high-speed variant of SE HSZ with clamping forces of 2,200 to 3,500 kN. Moreover, we produce the all-hydraulic Systec series with clamping forces in the range from 250 through 1,200 kN. However, this series is being further enhanced in Schwaig. Of course,

it's a great challenge to coordinate this variety of products. That is why Sumitomo has made major investments.

Desk: We note that there is a very large share of all-electric injection moulding machines

Frank Stengel: And that is correct. Nowadays, 50 percent of the machines built here in Wiehe are all-electric ones, and counting. That is why Sumitomo has decided to turn our location into a centre of excellence for all-electric machines intended for the European and American markets. This decision was taken in the spring of 2009, and was implemented with immediate effect.

Desk: How does it pay off?

Frank Stengel: Our traditional customers have responded positively and have welcomed the fact that the role of the Wiehe location has been strengthened like this. Firstly, in the crisis of 2009, it helped us to also build the Japanese machines. That is

why we did not have to lay off a single one of our currently 236 employees. This year, we are going to sell twice as many machines as compared to last year. At present, our degree of utilization is 90 percent, and our sales trend is satisfactory.

Desk: What does the year of the K 2010 mean to Wiehe?

Frank Stengel: We have reinforced our competence for all-electric machines. The product portfolio will be supplemented; the IntElect will be available in larger models with clamping forces up to 4,500 kN. We are extremely optimistic as regards our future, our people are fully motivated.

Desk: Mr. Stengel, thank you very much for this interview.

This interview was conducted by Marcus Reichl. INJECT would like to thank K-ZEITUNG for reproducing the updated interview.

Transparency through Euromap 60: energy efficiency examined carefully

New recommendation by machine builders to make energy consumption by injection moulding machines transparent and comparable for users

Energy efficiency is a much discussed issue in politics just every bit as in private life, and also when it comes to injection moulding, it should be subjected to sober reflection. Thus, the processing of thermoplastic materials requires a relatively high consumption of energy for purely physical reasons. Energy in the format of heat is required to transform the plastic material (usually pellets) from the solid phase to the molten phase.

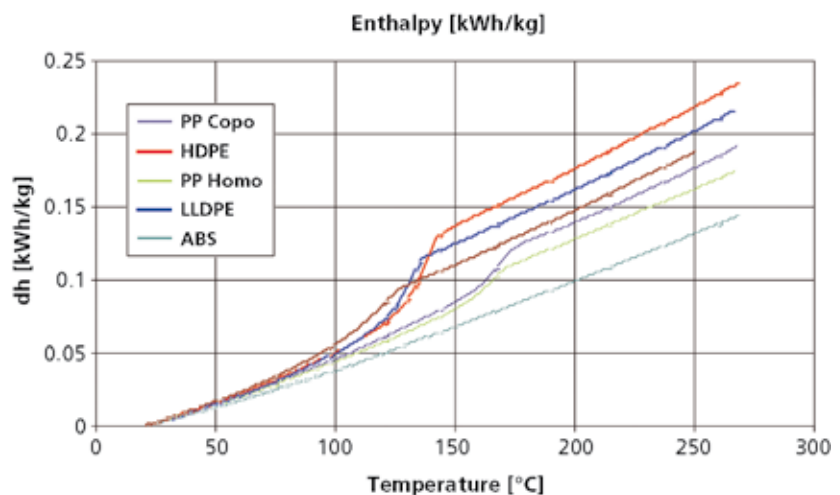
The amount of heat required will be a function of the type of material and the processing temperature. The required amount of heat and the related change of the volume of the material result in the enthalpy of the plastic material. This is usually approximately 0.12 to 0.22 kWh/kg (Fig.). At least this amount of energy must be introduced into the plastic material to process the latter in the injection moulding process. In addition to the introduction of this calorific energy, the injection moulding machine performs other tasks that also entail consumption of energy.

Among others, this is the movement of the moulds where the moulds weighing several tonnes in some cases and the clamping platens are moved and interlocked with enormous forces, or the acceleration of the screw during injection, including pressure build-up in the injection or

holding pressure phases. To meet this challenge of producing energy-efficient injection moulding machines, manufacturers use a wide variety of concepts. Thus, knowledge of the energy efficiency of a machine is a major decision criterion when it comes to purchasing a new injection moulding machine.

Euromap 60: objectives, creation, and content

To offer operators of injection moulding machines a comparable indication of the efficiency of a machine offered for purchase, Europe's Association for plastics and rubber machin-



Enthalpy of thermoplastic materials (source: SKZ Würzburg / Germany)

It is common practice to specify the specific energy consumption to give an indication of the energy efficiency of a machine. To this end, the energy consumption of the machine is related to the amount of plastic material processed. This results in an indication quoted in kWh/kg. This kind of indication might be compared to the mileage of a car, viz. fuel consumption in liters per 100 km, for example.

ery manufacturers (Euromap) has issued a Recommendation for the determination of the energy consumption of injection moulding machines. Based on this Recommendation, manufacturers of injection moulding machines are to determine the energy consumption of their machines under defined conditions, and to facilitate comparison of the energy consumption between different drive concepts and between machines made by different manufacturers. To this end, possible

framework conditions for a recommendation for standardised energy measurement on injection moulding machines for the processing of thermoplastic materials were discussed at length at four committee sessions in 2008 and 2009 one of which was held at Sumitomo (SHI) Demag in Schwaig / Germany. The result, viz. the “Euromap 60” Recommendation (which can be retrieved at www.euomap.org/files/euomap_60.pdf) makes it clear that straightforward classification of injection moulding machines is not readily available. There are just too many fields of application and too many machine frame sizes. Yet, three different test cycles were defined to meet the different requirements.

To simulate these varying requirements, the clamping side of the injection moulding machine is fitted with a defined block which will facilitate clamping force build-up in addition to the specified opening or clamping movements. The settings of the injection unit are also precisely defined for each of the three different cycles, and specified for each screw size.

A specified plastic material is plasticised according to these specifications, and injection moulded into the atmosphere through a special nozzle (to build up counter pressure). Owing to these precise specifications, the values thus determined will be reproducible, and will facilitate comparison between different drive concepts.

The three defined cycles (page 9) cover typical fields of application of injection moulding machines. For the user, it will be useful to choose that cycle as a reference which will come closest to his own requirements.

Validity of the results

The results of the energy consumption measurement according to Euromap 60 are used by manufacturers on a voluntary basis to give an indication of the energy efficiency of their products. Users will profit from the indications according to Euromap 60 as these will be a significant decision aid when it comes to selecting the right injection moulding machine for their products. To make proper use of the values determined through Euromap 60 it is necessary to know more of a background of Euromap 60 and to properly interpret the data specified by the manufacturer.

According to Euromap 60, the indications for a machine made by Sumitomo (SHI) Demag may be as follows:

Machine:
IntElect smart 450-2200

Screw diameter:
60 mm

Euromap cycle: II

Specific consumption:
0.315 kWh/kg

Average power input:
13.2 kW

Cycle time: 21.6 secs
cos φ : 0.99

To properly interpret this figure, some underlying data are required as bold and partly shortened information regarding energy consumption according to Euromap are unhelpful. Knowledge of the drive technology used, the screw diameter, screw geometry or optional energy-saving devices such as barrel insulation or energy-saving drives

is mandatory to make proper use of these indications.

If the framework conditions are clear, the consumption indication according to Euromap may be useful in selecting the appropriate injection moulding machine although it does not provide an indication of the actual energy requirement of a specific application. Similar to the “Euromix formula” for cars, the energy consumption of injection moulding machines is merely measured under standardised conditions.

These conditions do try to simulate real conditions of production, but cannot simulate all applications optimally, for obvious reasons. Also in future, the user will have to conduct tests on the respective machine to obtain a precise indication of the actual energy requirement and real efficiency of the injection moulding machine in producing a specific injection moulded part.

By tradition, Sumitomo (SHI) Demag offers machine technology of high energy efficiency, and will continue to sensitise users for this critical issue. Euromap 60 provides relevant reference values for this purpose. Sumitomo (SHI) Demag will determine these values for its machines on an ongoing basis, and make them available to interested parties.

Euromap 60: www.euomap.org/files/euomap_60.pdf

Author

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Cycle I for high-speed parts

Typical high-speed items such as bottles, buckets or closures provide the settings for heavy duty machines such as they are examined in Cycle I. Here, the dosing stroke is relatively small, the injection, holding pressure or cooling times are very short, and pressures are relatively high. With the specifications of Cycle I, machines especially designed for short cycles such as the EI-Exis S will display their advantages. In addition to energy consumption also the cycle time for Cycle I is a critical indication of efficiency.



Cycle II for engineering component

With Cycle II, settings are simulated for typical engineering components. With connectors and electrical components, housings or pods, mechanical components or functioning parts, this group covers the by far largest share of all injection moulding applications. Here, typical cycle times are between approx. 20 seconds and 40 seconds.



Cycle III for thick-walled components

Cycle III simulates the specific requirements of thick-walled components such as lenses, optical systems, fittings or fixtures or certain consumer goods. Here, the cycle time and stroke are clearly higher as compared to Cycles I or II. With the required longer holding pressure or cooling times, typical cycle times are in excess of 40 seconds.



NC5 to facilitate automation

Robot technology and peripherals, QA or PPS systems are easily integrated in the control system of Sumitomo (SHI) Demag machines



The SDR three-axis robot is fully integrated in the NC5 control

With the expansion of its NC5 control to an integrative control centre, Sumitomo (SHI) Demag offers operators of injection moulding machines more flexibility in terms of control and the integration of peripherals of any type. This is based on the many interfaces of the NC5 control that serve as a host to integrate useful functionalities and the most varied partner systems. Thus, among others, robots for injection moulded part handling, production planning and scheduling systems (PPS) or master computer systems, peripherals or systems for process control or quality assurance can be easily integrated.

VNC integration of partner systems

The control interfaces of many peripherals or partner systems are integrated into the NC5 control of the injection moulding machines via Virtual Network Computing (VNC) and can be controlled there just like the control system itself. Recently, Sumitomo (SHI) Demag has developed respective solutions in a joint effort with Wittmann Kunststoffgeräte, Sepro Robotique, Wemo, T.I.G. Technische Informationssysteme, ONI Wärmestrafo or Priamus System Technologies. The implementation of further systems in a joint effort with part-

ner businesses is in the pipeline. The collection, processing or visualization of production or process data facilitate comprehensive control in each phase of production. Malfunctions in the production flow will be detected without delay, and can be eliminated before undesirable rejects are produced. This was demonstrated by Sumitomo (SHI) Demag at the exhibition stand at the K 2010 when all the other machines were hooked up to the system of T.I.G. Technische Informationssysteme GmbH.

Integrated robots

The new series of integrated SDR robots with six models comes with all the mechanical, electrical or pneumatic interfaces for integration in the Systec and IntElect injection moulding machines. The mechanical system and actuator system of the SDR 11 through SDR 66 robot series are based on the robot series of the French manufacturer by the name of Sepro Robotique. The SDR robots are controlled by means of a "Visual 2" which

is integrated in the NC5 control and can be fully operated by the same. This integration will facilitate operability and increase the efficiency of the overall system.

The SDR handling devices supplement the known range of products by Sumitomo (SHI) Demag of three-axis robots. In addition, the DR7 and DR8 series developed in a joint effort with the Austrian Wittmann Kunststoffgeräte GmbH are available. Thus, Sumitomo (SHI) Demag offers its customers and system

partners a variety of products of factory-automated injection moulding installations. In addition to the DR or SDR robots, also linear robots of other manufacturers such as Wemo or Yushin Precision Equipment or six-axis robots such as those made by Kuka can be integrated in the NC5 control. That is to say, the plastic processor will be in a position to configure his machine made by Sumitomo (SHI) Demag in a very flexible manner even for complex automation jobs.



Control unit of the NC5 control made by Sumitomo (SHI) Demag, devised as an integrative control centre



Virtual Network Computing (VNC) will integrate robots made by Wemo into the NC5 control



Also the production planning system by T.I.G. can be integrated in the NC5 control

All-electric as a competitive edge

The IntElect in operation at the Fischer company in Sinsheim / Germany convinces by providing higher levels of process reliability, enhanced ergonomics, and lower energy consumption

When it comes to optimizing tools or processes, Werner Fischer is completely in his element. Whenever his full diary would so allow, the CEO of Fischer GmbH & Co. KG of Sinsheim / Germany would take his time, which in some instances may even be several hours, to observe and

toolmaking shop.” That is where they have enclosed all the noisy equipment with soundproofing housings.

Today’s Fischer GmbH & Co. KG was founded by Werner Fischer as a toolmaking company in Sinsheim in 1973.

was born, among others, from the conviction that tools as complex as we would build them would only be really good if you used them in manufacture yourself”, he explains his motivations. This was supplemented by the changed underlying conditions, adds Fischer. Although the



analyse processes. “After that, I come up with proposals for optimization”, says the skilled toolmaker with a smile. “Tenacity and patience, that’s what I was taught during my apprenticeship days by an experienced teacher”, adds the 61-year-old entrepreneur. But what is equally important is the appropriate environment, meaning the calm and quiet it requires. That may have made Werner Fischer to passionately advocate a low-noise working environment. “I would like to see our production workshop to be as low-noise as our

Toolmaking and injection moulding company

At the time he had to procure a special permit as he had not as yet passed his examination for a master’s certificate. Fischer preferred to attend master school in parallel to day-to-day business. At the beginning the young company produced cutting tools, but also the first injection moulds. After four years, Werner Fischer decided to set up his own manufacturing shop. “This decision

mouldings are by far more complex that they used to be some five or ten years ago, customers are even less willing than ever before to pay adequate prices. Rather, prices are going down while technical or qualitative requirements are going up, which is why I can foresee problems for the future.

Asked about the current situation, Werner Fischer tends to be slightly optimistic. “We are a sound company”, he points out. Although also his company endured losses in the 2009 crisis, it

should still be possible to cope with this after many successful years. "Theoretically speaking, we should have laid people off", he says reflectively, but quickly adds that this would have the last resort only, and the conceivably poorest solution.

In the end, there would be nothing more difficult than to find well trained and committed people when things will go better again. Fischer also made little use of short-time work only. Rather, he used the time to improve operational processes or to optimise toolings. "Bucking the trend, we have invested a lot of money, not least because we

30 trainees in five trades. In 2008, the volume of sales was 33 million Euros, and the company processed 3,600 tonnes of engineering plastics, mainly into small mouldings. This means approximately one million mouldings every day when the company is at full work, part of which is delivered direct to the OEM, but predominantly to their Tier 1.

The medium-sized company is certified to ISO 9001:2000 and ISO/TS 16949, and its customers include many renowned companies from the fields of automotive engineering, mechanical engineering, electrical or electronic engineering, and optical

of 3,500 kN or higher are fitted with an electrical screw drive. This is because parallel dosing will not only reduce the cycle time, but also improve the quality of the melt as there is less load on the material because of the reduced rotational speeds.

The portfolio of the company includes all the process chain from development and tool design to toolmaking, production of plastic components or completion and assembly of assembly groups. In the process, experts selectively search for ways to optimise these processes, for example by simulating or analyzing the feasibility of the



wanted to be prepared for the upcoming economic recovery", amplifies the entrepreneur.

Experienced expert for engineering components

Currently, the Fischer company has a workforce of 200, 50 of which are involved in toolmaking, eight in the design department, 122 in production and installation, plus ten in sales and administration. The training quota of the company is above average. After all, the company trains

engineering. The moulding shop works three shifts, toolmaking one and a half.

Currently, Fischer operates 65 injection moulding machines with clamping forces from 500 to 10,000 kN. More than 80 % of the machines were made by today's Sumitomo (SHI) Demag Plastics Machinery GmbH, nine machines are from the all-electric IntElect series. All machines are fitted with unloading devices made by Getecha or Geiger respectively. Moreover, all hydraulic machines with clamping forces

production of plastic components by means of Moldflow. The portfolio also includes the installation of PU seals (dispensing) or the fitting of mouldings with very small and delicate contacts, for example. Of course, the Kraichgau based company will also print on or weld the components it manufactures upon request.

Within this range of components, the focus is on connector systems. Currently, the range available from Fischer includes 5,000 different mouldings with

weights ranging from as little as 0.2 g to as much as 1.5 kg. "It's easy to fill straightforward components with a uniform wall thickness all the way through. Rather, it's more of a challenge when you have a moulding with wall thicknesses from 1.2 to 0.2 mm and when the material is a glass-fiber reinforced plastic on top of that", says Fischer.

Boris Linke, who works in the project management and sales department, adds: "When it comes to quality in injection moulding, for us there is no maneuver for compromise. Especially in terms of connector systems, we would have 100 interfaces when a 100-

for in-house production. "Some 99 % of the tools used by us have been manufactured in-house", says Werner Fischer, and he adds that even bought-in tools will be tested at their "in-house test stand", and will usually be optimised by their tool-making shop. What is a problem is when optimised tools are then removed by customers for their own production.

Similar to the quality requirements made by customers, the time and costs spent at Fischer's company before and after serial production are very high. Thus, all new tools would have to pass an elaborate type approval test.

any other department, will be identical in construction and will have the same type of control. Also the fact that practically all of the tools are fitted with intrinsic pressure sensors is owed to pragmatical considerations as Fischer does not use the sensors for injection moulding, but rather for purposes of control: the system would query the various moulding cavities and if the mould internal pressure specified previously is not reached the unloading robot will receive a respective signal to separate the respective moulding or mouldings. "In my view, internal pressure measurement will be the only way in future to reliably pro-



duce high quality", says Fischer confidently. In this connection, he refers to practical circumstances: It is especially with small parts produced in millions of pieces that one single reject might result in the full shipment being returned.

pole multipoint connector must be assembled."

Also, reproducibility is critical because of the high safety and quality requirements made on the components, such as air bag connectors. So, unsurprisingly, Fischer has invested a lot into quality assurance. To even better analyze and further enhance operations and processes, one employee was sent for training in Six Sigma in 2006.

The Fischer toolmaking department almost exclusively works

duce high quality", says Fischer confidently. In this connection, he refers to practical circumstances: It is especially with small parts produced in millions of pieces that one single reject might result in the full shipment being returned.

All the more important it is to use control systems as optimal as possible. Moreover, it is easier and faster to balance the moulding tools through internal pressure measurement. With a view to quality control, Boris Linke adds that Fischer, upon customer

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request, would sort the parts by cavity, pack, supply and deliver the parts fully automatic.

Altogether, the company strongly relies on comprehensive control systems. For example, numerous cameras by Visicontrol inspect the parts or assembly groups in the automatic assembly or testing units many of which have been developed and manufactured in-house. Be it dimensions, variants, the completeness of individual parts or assembly groups, or whether the right part has been provided. There is no other way of handling such huge numbers of pieces. "Of course, we try to avoid errors in the first

working conditions and a comfortable working climate. Indeed, the company's offices and production shops promote a comfortable and cheerful atmosphere.

Continuous control

At the time, Werner Fischer did not anticipate that his curiosity would get him a real "saver" with numerous extras. In addition to the low noise level of the IntElect, two more aspects suggested the purchase of an all-electric machine from Sumitomo (SHI) Demag. Firstly, at the time they needed a clamping force of 1,500 kN which the competitor

to train his operators accordingly. It thus happened to be that an IntElect 150/520-610 of the first generation was installed at the Sinsheim facility in late 2004. "Once the machine had been installed here, we subjected it to comprehensive testing, of course", Fischer recalls.

"Sure, the machine had some teething troubles in the beginning, just like any new system of such complex nature would", he adds with a smile. "But, together with Demag, we soon got over those", he goes on. And Herbert Gegenheimer, sales engineer for Sumitomo (SHI) Demag, still adds that the trustful cooperation built



place", says Robin Kemter who is in charge of Six Sigma. Foresight and curiosity were merely two of the driving forces that made Werner Fischer start the "all-electric injection moulding machine" project in 2004. On the one hand, he was convinced that energy costs would go through the ceiling even then, on the other hand he was interested in that technology. Plus, another major reason was the low noise level of all-electric machines. On this, Boris Linke adds that his boss has always paid much attention to ergonomic

of Sumitomo (SHI) Demag who had also been shortlisted could not offer. Plus, almost even more important, the continuity of the control architecture maintained by Demag. "There is hardly anything worse than having a whole bunch of different control systems involved in your production", Fischer, a pragmatist, puts it in a nutshell.

There were times when his machine operators had to cope with seven different control systems on the machines. So, it was also very costly and time-consuming

up over a number of years has also contributed to this success. "We want to get to know new technologies and processes as early as possible", explains Robin Kemter.

The reason is obvious. The sooner you gain firsthand experience, just like here with a new generation machine, the more confident operators will be in using these machines. This is an understandable and important aspect when faced with high quality requirements. Plus, the use of modern, powerful machinery adds to

the motivation of your people. In this regard, the willingness to innovate and to invest of the entrepreneur is exemplary, adds Kemter.

Convincing precision

The production features of the new machine came as a surprise to the Fischer team. Even the first results suggested the extraordinary repeatability and positioning accuracy of the all-electric injection moulding machine. But none of those involved knew at the time how precise this machine would really be. It is not out of the usual, comments Linke, that manufacturers would praise their new products to the skies.

But, the positive experience gained with the IntElect came totally unexpectedly, even at that time, five years ago. Consequently, in early 2005, it was suggested to compare the production data of the new machine with those of a hydraulic machine of similar frame size. An Ergotech Extra 150-430 with a DFE control that had been procured not even one year earlier was selected for that purpose. At the time, the result was that the average input power of the IntElect was lower than that of the hydraulic machine by approximately 40 %. But, the benefits of the all-electric injection moulding machine were also obvious in

normal operation. The machine's precision and process reliability were undisputed. Also, it was soon found out that also the amount of maintenance required was clearly lower as compared to the hydraulic machines. Thus, Werner Fischer procured another eight electric machines within a short period of time.

Mid-2009, Fischer decided to do another test on the same two machines, but with much more comprehensive measurements this time. "We wanted to obtain a statistically supported pool of data", Robin Kemter explains the motivation behind this exercise. Here, an eight-cavity moulding tool for a 15-pole connector housing of PBT-GF20 (weight of the moulding: 4.8 g; cycle time: 16 seconds) was used. This mould was fitted with two hot runner sub-distributors and four hot runner nozzles, and each cavity had 2.5 sliding cores. Just like virtually all moulding tools at Fischer, this one, too, was fitted with sensors to collect the mould internal pressure in the cavities.

For the field test, the tool was first clamped onto the hydraulic Ergotech Extra and then on the all-electric IntElect, and operated with identical parameters. Energy measurement was begun after approximately 30 shots, and production data were logged for the next 50 shots. Energy measurement was performed by the

local utility of EnBW. The mouldings were marked and deposited separately with a view to accurately measure and weight them later on. To anticipate the upshot: Not only were the results from the first test confirmed, but they were clearly surpassed this time. "At similar cycle time, similar peripherals and identical unloading system, the all-electric machine is more stable in operation as opposed to a hydraulic one", points out Werner Fischer.

40 % less energy

At the same time, the IntElect requires approximately 40 % less energy, which results in an annual saving of more than 3,000 Euros for each electric machine based on three shifts and 250 working days. Something not taken into consideration here is the reduced energy requirement of the centralised cooling system as generally fewer components have to be cooled.

"Moreover, we also noted enhanced process stability", comments Robin Kemter regarding these results. As opposed to the hydraulic machine, the electric machine is significantly more consistent and has higher positioning accuracy in terms of both, cycle time and other machine parameters such as dosing time. Thus, the reproducibility of the IntElect would considerably contribute to securing and main-

Ergotech Extra 150-430		IntElect 150/520-610	
Ø Average power requirement	11.42 kW	Ø Average power requirement	7.21 kW
Consumption / hr.	11.42 kWh	Consumption / hr.	7.21 kWh
Costs	0.12 €/kWh	Costs	0.12 €/kWh
Operating costs	1.3704 €/h	Operating costs	0.8652 €/h
250 days, one shift	2740.80 €	250 days, one shift	1730.40 €
250 days, three shifts	8222.40 €	250 days, three shifts	5191.20 €

taining the high level of quality. The machine's precision was also obvious when the shot weight or critical dimensions of the component parts were examined. All in all, according to Kemter, the process capability in these tests was improved through the IntElect by approximately 0.9 (Cpk).

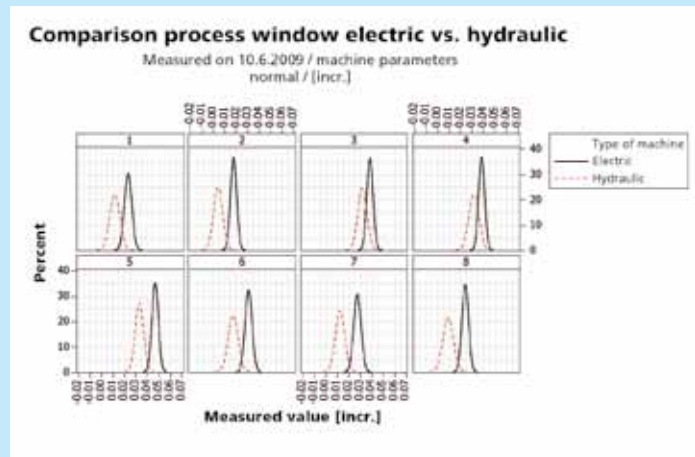
Noise cut by one half

As expected, also the noise measurements conducted yielded the results hoped for. On the operator side of the Ergotech, the measured value was 74 dB(A), whereas for the IntElect it was only 61 dB(A). Thus, the IntElect emits less than one half of the noise as compared to its hydraulic counterparts – a reduction by as little as 10 dB is perceived as only half the noise level. All in all, Werner Fischer is very satisfied with the test results.

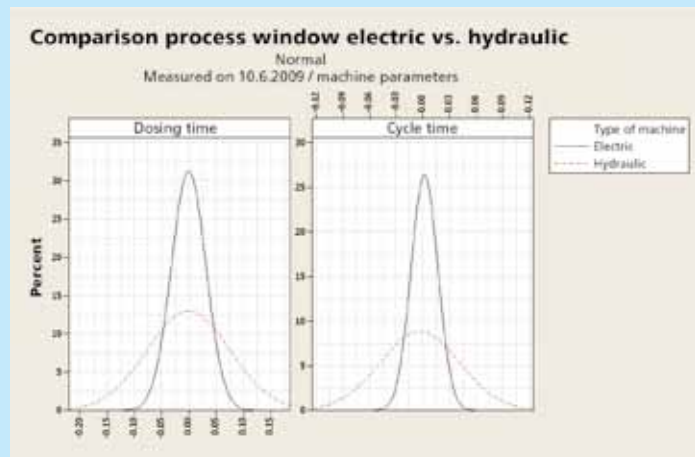
Apart from the investment costs, which are still higher, the IntElect has come up to expectations. "Lower consumption, higher process reliability, more reserves, significantly enhanced ergonomics – plus it does not require any oil, so it's clean, too", he enumerates some of the advantages.

Author

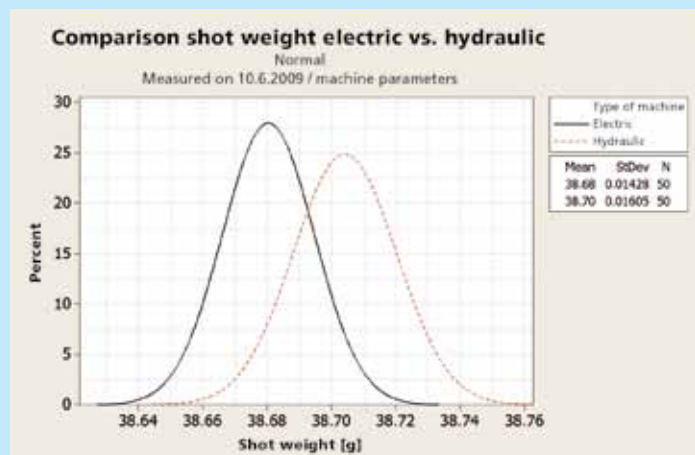
Dipl.-Ing. Thomas Schwachulla,
Freelance Specialised Journalist



Tightest tolerances: The electric machine especially convinces in terms of the dimensional stability of the mouldings



Precise control: The repeatability of the set parameters (screen shown dosing time and cycle time) is clearly better with the electric machine as opposed to the hydraulic one



Constant shot weight: With the all-electric machine, the variance of the shot weight is clearly less

More dynamics and efficiency for packaging and IML

High-speed injection moulding machine El-Exis SP has its premiere at K 2010

With the El-Exis SP, where SP is short for Speed Performance, Sumitomo (SHI) Demag has introduced the new series of this high-speed and high-performance machine. The new El-Exis SP continues the story of success of the El-Exis machines.

The unique drive philosophy of the El-Exis, which was first presented at K 1998, endures to last until today. The fact that this concept with more than 1,000 high-performance machines has convinced customers all over the world is taken as a confirmation of its hybrid technology concept by Sumitomo (SHI) Demag.

Now, all machine components have been improved such that the new El-Exis SP offers increased dynamics for mould movement, injection and ejection. All this increases the efficiency of high-speed production such as of closures, thin-walled plastic packagings or similar containers. The intention is to successively expand the El-Exis SP series and to cover a clamping force range from 1,500 kN through 7,500 kN with nine frame sizes.

The successful concept of the El-Exis, which has been pursued since 1998, has been maintained, but virtually all components were basically re-engineered. The focus was put on optimizing the whole drive system in terms of terminal velocity, acceleration

and precision, but also in enhancing the rigidity of the platen. The El-Exis SP comes with an electric drive for the dosing movement, an electro-hydraulic drive for mould opening, and a hydraulic accumulator for the injection movement. All secondary movements of the El-Exis SP are controlled hydraulically via servo valve technology.

More dynamics for injection

On the El-Exis SP, an amply dimensioned hydraulic system provides for best productivity while at the same time the machine runs smoothly. Very fast servo valves with an optimised valve characteristic, new and more dynamic controller systems in the control, reduced weights, higher pressures of up to 2,100 bar in the B barrel and enhanced acceleration for higher dynamics during injection will guarantee more output, better moulding quality, and more availability.

The El-Exis SP also offers more dynamics in terms of the deceleration of the injection cycle such that overpacking of the mouldings will be prevented through a zero overlap valve. Sumitomo (SHI) Demag also managed to clearly increase the efficiency of the plasticising unit.

Higher screw circumferential speeds provide for high plasticating and homogenization capac-

ities. Plastic processors will profit from increased filling dynamics, improved product quality and not least a major contribution to reducing the cycle time.

Faster mould movement

The electro-hydraulic component of the El-Exis SP that drives the five-point toggle joint is a combination of a servo motor and a hydrostatic transmission to translate the motor rotation into a hydraulic linear motion. Improvements on the control behaviour of the motor plus an optimised design of the hydraulic system and valves now provide the El-Exis SP with higher dynamics of the clamping unit with faster traversing speeds and higher positioning accuracy.

Especially in continuous operation and volume production, a highly precise mould stopping position is required such as to guarantee smooth transfer of mouldings to the unloading robot and accurate positioning of the label in in-mould labeling (IML).

Just like the electric IntElect machines, the El-Exis SP also comes with the active mould protection system „activeQ“ which will actively stop the clamping movement when there is an unusually high traversing force. The new models of the El-Exis SP series with clamping forces starting at

3,000 kN come with an increased opening stroke and a more spacious mould installation space even in their standard configuration such that buckets or cartridges can be easily injection-moulded from moulds with deep cores, for example.

The new El-Exis SP offers an especially high ejector speed. The El-Exis SP 250 merely requires 130 milliseconds for a forward and backward stroke of 5 mm. Moreover, the ejector force can be optionally increased such as to facilitate the forced demoulding of multi-cavity moulds.

More productivity through shorter cycles

The new feature of “activeAdjust” of the El-Exis SP provides the user with the option of accelerating each machine motion separately as a function of the process and moulding with a view to optimizing the cycle time.

The mould opening motion, ejector motion and switchover to holding pressure can be accelerated or decelerated respectively by means of slide controls in the control. All in all, this will result

in shorter dry running times and enhanced productivity.

Just like the all-electric IntElect or the hydraulic Systec machines, the El-Exis SP comes with the standardised NC5 control. Numerous high-speed specific features will support the increase in efficiency and dynamics.

Sumitomo (SHI) Demag is convinced that the new high-speed El-Exis SP is an attractive investment with a reasonable cost-benefit ratio and excellent amortization schedule.

72 screw caps in merely 2.5 seconds

At K 2010, an El-Exis SP 300-2500 with a clamping force of 3,000 kN was seen to produce screw caps from HDPE. The 72-cavity hot runner mould for the 28 mm closure of 1.6 g with a tamperproof strip for non-sparkling mineral water was made by KTW Germany GmbH. That machine had a high-per-

formance barrier screw with a diameter of 70 mm and a L/D ratio of 25:1. Owing to its hybrid drive technology, the fact that all motions were optimised through “activeAdjust” and the new NC5 machine control, it reached cycle times of as little as below 2.5 seconds.

The 100 % quality control of all screw caps and proof of the reproducibility were provided by an

IMDvista quality inspection system made by IMD. The whole production system was fully integrated into the NC5 control through integration of the peripheral components.

Owing to optimised dynamics, short cycle times and the resulting high output, the El-Exis SP provided for low unit costs, high efficiency and outstanding economic viability.



Major interest in Cluster Meetings

More than 250 experts came to get firsthand information on micro injection moulding and decoration through IMD or IML at two specialist forums at Sumitomo (SHI) Demag

More than 140 participants came to attend the Cluster Meeting titled "Micro injection moulding – short and precise" held at the Centre of Excellence for electric injection moulding machines in Wiehe. Well-known speakers from Kunststoff-Zentrum Leipzig, from Jenoptik Polymer Systems,

tions. A tour of the factory gave participants the opportunity to look behind the scenes of the production of all-electric injection moulding machines by Sumitomo (SHI) Demag.

In cooperation with Cluster Neue Werkstoffe (CNW) and Kunst-

Switzerland or Druckerei Verstraete printing shop from Belgium.

An impressive live demonstration of the IMD and IML technologies on injection moulding machines complemented this Cluster Meeting. Among others, participants were privileged to see the exhibit



Stamm AG, M.A.I. GmbH and Sumitomo (SHI) Demag provided detailed information on aspects of micro injection moulding. The focus was on the flexible production of micro mouldings and their handling from the point of view of production and of the user as well as distinctions of micro injection moulding such as the production of optical components. In its showroom in Wiehe, Sumitomo (SHI) Demag presented two current exhibits with applications for micro injection moulding. An IntElect 50-45 produced planetary carriers (shot weight 1.48 g, 4-cavity mould) for medical engineering purposes, and an IntElect 150-680 made camera bodies (shot weight 30.95 g, single-cavity) for electronic applica-

stoffs-Netzwerk Franken e.V. (KNF), another Cluster Meeting titled "Process chains and applications in IMD and IML" was held at Sumitomo (SHI) Demag in September. On that occasion, the host's CEO, Dr. Tetsuya Okamura, welcomed 120 professionals and executives from different sectors to the Schwaig location. Courses of lectures were devised to provide detailed knowledge on surface decoration in injection moulding through integrated processes such as in-mould decoration (IMD) or in-mould labeling (IML). Diverse practical examples from the fields of automotive engineering, consumer goods or consumer electronics accompanied the papers presented by HBW Gubesch GmbH, KEBO AG from

of K 2010 beforehand, with the IMD-Multi-K process for the manufacture of a two-component ashtray faceplate with a wood and metallic décor on a Systec multi 210 injection moulding machine. At an informal get-together in a relaxed atmosphere, professionals had plenty of time for discussions, which was intensively used by the specialists from Southern Germany to engrass the impressions gained at the meeting. In addition to this Cluster Meeting, and in cooperation with Hasco Hasenclever GmbH & Co. KG, Sumitomo (SHI) Demag hosted two forums titled "Technology – short and precise" in early June in Wiehe and "Innovation and technology" in mid-September in Schwaig respectively.

K 2010: High production efficiency convinces trade show visitors

Sumitomo (SHI) Demag team enjoys positive feedback to El-Exis SP and improvements in mechanical, drive or process engineering

The K 2010 trade show has been a major success for Sumitomo (SHI) Demag. The machines, technologies and services on display were received positively above average by customers and trade visitors from all over the globe.

Positive feedback was also received in relation to the product platform with new or modified series of machines presented to international professional circles at the Düsseldorf event for the first time. The Systec and El-Exis SP injection moulding machines with hydraulic or hybrid drives are still designed and built on the Demag platform.

For all electric machines of the IntElect and SE series, Sumitomo (SHI) Demag will create a common platform through further development of the existing Japanese machine platform in the long run. Both product platforms are characterized by high levels of production efficiency, which is reflected in a number of mechanical, control or drive enhancements resulting in increased dynamics, precision, and energy efficiency.

Six exhibits at its own stand, and three more at the stands of partnering companies at the K Show are impressive evidence of the objective of Sumitomo (SHI) Demag. Feedback from international customers and trade visitors was equally positive. "Our incoming orders at this trade

show have even surpassed the high level of the K 2007 by 20 percent", says Christian Renners, General Manager Business Unit Sales & After Sales. "This large number of purchase orders clearly reflects the trend towards all-electric machines. More than 40 Percent of the purchase orders received at the trade show were placed for all-electric machines."

Even though customers from Europe would still place fewer orders for electric machines as compared to machines with hydraulic or hybrid drives as opposed to customers from North America or Asia, Sumitomo (SHI) Demag still noted a clear trend towards electric machines.

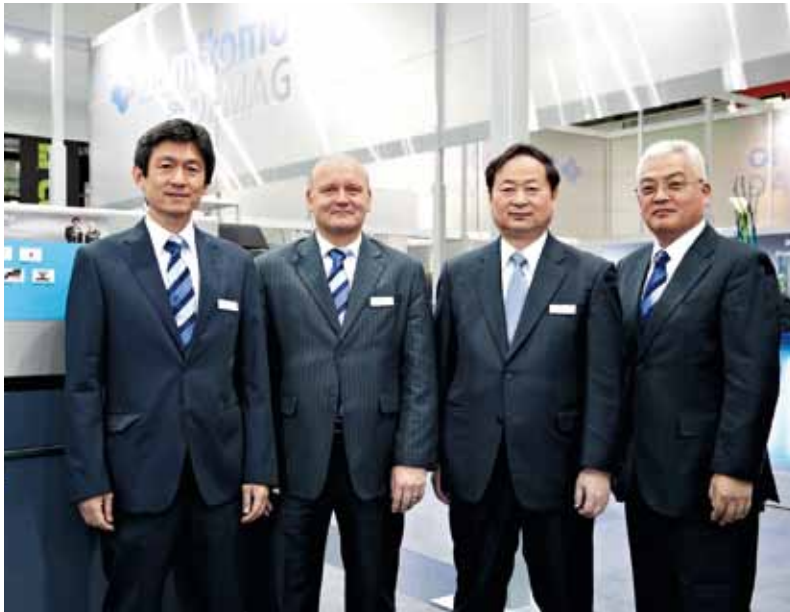
"More than 40 percent of visitors to our stand were not as yet customers", Christian Renners is happy to note, "this is rather un-

usual for an international trade show like this one." Visitors showed strong interest in all of the product range of the German / Japanese mechanical engineering company. The electric IntElect Smart developed since the merger of the two mechanical engineering companies and the hybrid high-speed El-Exis SP met with interest just like the well established hydraulic all-rounder Systec, including the models with clamping forces of more than 10,000 kN.

Also the latest process innovations and technologies by Sumitomo (SHI) Demag made a market, among them especially systems such as the sealable back-flow lock „activeLock“ designed to significantly raise the precision and repeatability in the production of engineering components through its patented mechanism.



Erwin Fischer (2.f.l.), Production Manager for Fischer GmbH & Co. KG of Sinsheim / Germany, takes over the first IntElect 450 from Frank Stengel, Works Manager of the Wiehe production facility, Eric Haase, Product Manager for IntElect, and Dr. Tetsuya Okamura, CEO (f.l.t.r.). At the trade show, the largest IntElect ever was seen producing connector housings with a 16-cavity mould made by Fischer



High-ranking visitors from the parent company Sumitomo Heavy Industries, Ltd. (SHI) from Japan: (f.l.) Dr. Tetsuya Okamura, CEO, and Shaun Dean, COO, of Sumitomo (SHI) Demag to welcome the President and CEO, Yoshinobu Nakamura, and Executive Vice President, Yuji Takaishi, of SHI



The sealable back-flow lock "active Lock" enhances precision and repeatability in the production of engineering components

Since the K Show, demand for systems designed to save energy has escalated, especially in the format of retrofits for existing machines.

The offer of Sumitomo (SHI) Demag in the field of automation was impressive in so far as many peripherals such as three-axis unloading devices are available in the standard range. Here again, there is huge demand for retrofitting packages. Christian Renners: "For plastics processing companies, Sumitomo (SHI) Demag is a partner who is stable in the long run, and who can help raise productivity through its products."

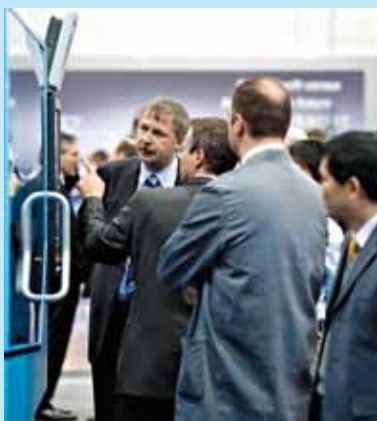
Dr. Tetsuya Okamura, CEO, takes the fact that incoming orders have more than doubled as compared to 2009 as a confirmation of the strategy chosen by Sumitomo (SHI) Demag: "In the light of the positive signals emanating from the K Show, we look into the future very confidently. We are well prepared for 2011 and 2012."



A production study demonstrated fast colour change in the use of liquid dyes instead of master batch



Christian Renners, General Manager Business Unit Sales & After Sales (l.), and Andreas Schramm, Head of Research and Development, (r.) talking to international specialized journalists at a press conference held by Sumitomo (SHI) Demag





Systec – the multifunctional machine

“With the Systec, I can remain cool even when dealing with challenging components.”

Michael Lehner, CEO, HBW-Gubesch

Passenger faceplates are fitted to 300 Skoda Superbs every working day. A 35% cost saving is achieved through the IMD PRO manufacturing process developed by HBW-Gubesch on a Systec machine.

www.sumitomo-shi-demag.eu
www.hbw-gubesch.de

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