injection

News, Facts & more. Information for our customers.

March 2004

09

ENGEL

Production centre for injection units extended – delivery times shortened

>> All injection units from Engel now have one thing in common: they are manufactured at Engel's new "competence centre for injection units" at St. Valentin. With the new 7,000 m² extension at St. Valentin – we reported on this briefly in the last issue of "injection" – yet another module has been added to Engel's restructured manufacturing base. Costing around EUR 2.5 million, this new, ultra-modern flow production facility for Engel's "small" injection units ranging from 80 to 1,800 (international size rating) delivers not only to the parent factory at Schwertberg but also to the production facilities in Canada and Korea.

Engel's production line for injection units for large-capacity machines, which has already been in service at St. Valentin for the past three years, served as the benchmark for the new one. Once the production of plasticizing units (cylinders and screws) has been integrated into the facility – this will be one of the next steps – the "competence centre for injection units" will be complete.

A continual flow of up to 3,000 injection units per year

When planning the new injection unit production facility, Engel gave top priority to a synergetic concentration and co-ordination of production know-how and a reduction in logistic times. The resultant production layout is based on the so-called flow production principle. "Flow production" means that material flow and capacity are co-ordinated at every stage of the production process. In other words, each component is installed immediately it has been manufactured – without any intermediate storage. Even the finished injection units for final machine assembly at Schwertberg are delivered there on a daily basis for immediate installation.

The new flow production facility manufactures 2,200 injection units for small and medium-sized machines every year. Provision has already been made for an increase in capacity to 3,000 units p.a. in the event of an increase in demand. Added to this capacity are the injection units from the other flow production line for Engel's large-capacity machines, these currently numbering approximately 500 p.a.

Fast flow times plus consistently high quality

The steady, uninterrupted flow of parts during the manufacturing and assembling process has a considerable stabilizing effect on the process parameters, and this in turn makes for a consistently high quality of product. The work of the production personnel has likewise been restructured to this end: individual teams are responsible for "their" injection unit from start to finish, from the production of the individual components and the respective quality assurance tests through to the final performance test carried out on the finished unit. This broadening of each employee's scope of responsibility has at the same time given him a much greater incentive.

And what are the immediate advantages for Engel's customers? – Engel's investment in new production installations and the reorganization of the production layout mean an enormous benefit for the customer. The flow time has been reduced considerably: a standard injection unit is ready to install within ten working days of receipt of order.

This is in line with our general objective of steadily reducing the flow times for machine assembly. By applying the flow production principle to the assembling of machines at our Schwertberg facility, we shall in future be able to deliver a standard machine within four to six weeks, depending on size and equipment. That is virtually half the time required hitherto. Thus even a spontaneous decision to purchase a machine can become "productive reality" in next to no time.

Following completion of a further stage – the integration and simultaneous expansion of the production of plasticizing units at the St. Valentin facility (these were hitherto manufactured at Engel's Steyr factory) – all components of the injection unit will be manufactured in one single location (see brief report on page 8). The facility at St. Valentin will then be able to supply injection units to the assembly line in Schwertberg virtually "just in time". This will be the case some time during the summer of this year and we shall of course be reporting on it in detail when the time comes. <<

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Dear Customers,

Wherever possible, Engel is consistently implementing its flow production concept as part of its restructuring and further development programme. Our new injection unit production facility at St. Valentin – see report in this issue of "injection" – is just one example. One of this concept's main objectives is to shorten "door-to-door times" for machine assembly without forfeiting the high quality of product to which our customers are accustomed. In short, we want our customers to have new machines and processing technologies at their disposal within the shortest possible time so that they in turn can convert their ideas into innovative products as quickly as possible.

Closely bound up with this concept is our vision of the "four-week machine", modularly configured to meet the customer's specific requirements. Once the new flow production facility at our parent factory in Schwertberg goes into service this summer, we shall have taken a further important step towards realizing this vision. It will enable us to meet the individual customer requirements in the case of 80 % of all tiebarless machines ordered – and in the shortest possible time, i.e. in four to six weeks. Complex, more labour-intensive "specials" will of course take longer.

Flow production is not our invention. It is modelled on the production methods used in the automotive industry, though naturally adapted to our own manufacturing requirements. The fundamental principle of our flow production concept is to reduce the door-to-door time of machine assembly to "real time", thus eliminating unproductive times completely. The supply flow is naturally synchronized with the production flow of the assembly line on a just-in-time basis.

We are also applying this philosophy to other areas of production. Work on the next expansion stage (8,800 m²) at our St. Valentin factory is in progress and by the summer of this year we shall be able to complement our competence centre for injection units by a production centre for plasticizing units – hitherto located at Engel Werkstofftechnik in Steyr. The same goes for a new production line for PET machines, likewise to be installed in this extension.

All these measures are aimed at strengthening and continually developing our partnership with our customers, for this partnership is the basis not only of our own success but that of our customers, too. And we must ensure that this continues to be the case in future, and unreservedly so.

Yours faithfully,

Heinz Leonhartsberger
General Manager Production

ENGEL MacPET – high-performance injection moulding of PET preforms

Minimized costs through maximized output – that is the declared aim of every manufacturer of PET preforms. With its "MacPET" range of machines, Engel now offers complete systems distinguished by their high quality and service-proved efficiency.

>> Engel's machine range has now been extended to include a completely new field of application: around the middle of last year, Engel took over the development and distribution of PET preform injection moulding machines from its longstanding co-operation partners SIG Corpoplast. These machines, which are marketed by Engel under the brand name of "ENGEL MacPET", produce PET preforms for the stretch blow moulding of PET bottles.

With over ten years' experience in PET preform production – gained in close partnership with SIG Corpoplast – Engel has now taken over the responsibility for the complete system technology, which is now marketed under the brand name of ENGEL MacPET. Just one of the advantages: the machines are compatible with all well-known makes of preform mould.

Service-proved a hundred times over

The nucleus of every MacPET high-performance preform injection moulding system is a toggle-clamp machine rated for fast-cycling applications. Equipped on the injection side with a special holding pressure unit (photo top right), the MacPET Series comprises five sizes of machine with clamping forces of up to 5,000 kN and specially tailored for use with moulds with 12, 16, 24, 32, 48, 64, 72 or 96 cavities.

Meanwhile – through Engel's longstanding collaboration with SIG Corpoplast – over a hundred machines of this type are giving reliable service in twenty countries in all parts of the world. A five-point double-toggle clamp operating in conjunction with an additional hydraulic accumulator ensures not only rapid opening and closing of the mould but also extreme rigidity of the clamping system and gentle treatment of the mould: lock-to-lock time, i.e. the mould opening and closing time including the removal of all parts, is a maximum of 2.8 seconds in the case of the 96-cavity mould. Economical operation of the machine is made possible by an energy-saving hydraulic system comprising servo-controlled variable delivery pumps for all screw movements. Specific energy consumption is reduced to a very minimum.

Gentle plasticizing – consistently high quality

The injection unit is of short, space-saving design and equipped as standard with a barrier screw (L/D ratio between 22:1 and 24:1 depending on screw diameter) which ensures gentle treatment of the melt despite its very high plasticizing capacity. If the melt is to be pigmented, screws are available with integrated mixing elements for optimum homogeneity. If a consistently low concentration of acetaldehyde across all the cavities of the mould is a specified quality requirement, a static mixing element is installed in the space in front of the screw (the standard concentration is max.

3 ppm, measured either in the preform or in the blow moulded bottle). Acetaldehyde results from the inevitable mechanical and thermal stress on the melt during the plasticizing process.

The economic efficiency of a PET preform production line depends not least on the demoulding system. In order to make the cycle times as short as possible, the preforms are cooled partially inside and partially outside the mould. The linear robots used in Engel's MacPET machines are thus equipped with special demoulding devices with integrated cooling systems. A rotating quadruple takeover device ensures that the preforms are post-cooled for the duration of four injection cycles prior to being stacked (photo centre right).

Simple operation

The injection moulding machine, the demoulding robot and the peripherals share the same control panel. The robot control is integrated in the machine control system as standard anyway, a feature which not only facilitates operation but also keeps the necessary time for data exchange to a minimum and, by the same token, makes for very short cycle times. The machine control system is similarly compatible with the other component modules, such as the cooling system for the mould and the robot, the upstream drying and conveying system for the PET granules and the dry air curtain surrounding the mould, all of which are integrated into the system in keeping with the customer's need for a complete, fully equipped ENGEL MacPET preform production cell supplied on a turnkey basis.

A team of competent partners

In designing these complete production cells, Engel co-operates with partners who are competent suppliers in their own special fields. The MacPET team includes: gwk Gesellschaft Wärme Kältetechnik mbH in Kierspe/Germany (cooling systems), Eisbär Trockentechnik GmbH in Götzis/Austria (dry air curtain systems for moulds) and Motan GmbH in Isny/Germany (material drying and conveying systems). Each of these partners is also responsible for the after-sales servicing of their equipment (the person to contact is the respective service team project manager).

PET moulds are supplied by Engel's partners MHT Mold & Hotrunner Technology AG, Hochheim am Main/Germany, and SIG Moldtec GmbH & Co. KG, Essen/Germany. Both companies have acquired vast know-how through their many years' experience in this field. Moreover, the ENGEL MacPET system is compatible with all qualified makes of injection mould.

Setting new standards in high-performance preform production

Although ENGEL MacPET machines already work with the utmost efficiency, we have set ourselves an even more ambitious target: further developments will focus on increasing the ratio of the number of cavities to the size of machine. This quantum leap in high-performance preform production will be making its début at K 2004 in Düsseldorf.

In the meantime, Engel's MacPET team is entirely at the service of all customers requiring advice and assistance with forthcoming projects. Customers are also welcome to carry out trials on a demonstration machine at Engel's PET application technology centre at St. Valentin.

>> ENGEL MacPET: the ultimate standard in high-performance preform production – from a market leader in injection moulding technology.<<

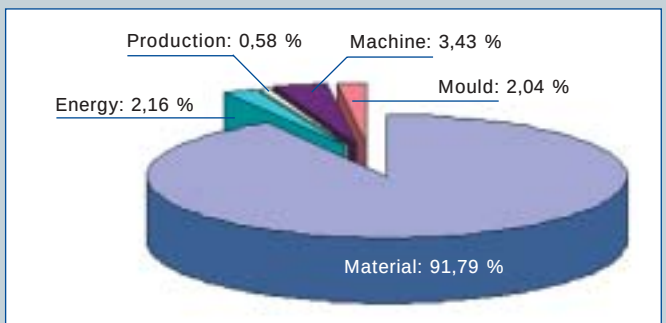
Specially developed for the injection moulding of PET, the holding pressure unit on the plasticizing unit is a special feature which distinguishes the ENGEL PET plasticizing system from all others. It permits metering of the melt for the next shot during the holding pressure and cooling phases. Prior to the next shot, the remaining melt in the holding pressure unit is completely discharged into the space in front of the screw, thus observing the first-in/first-out principle of injection and minimizing the duration of thermal stress on the melt.

The MacPET demoulding robot is equipped with a total of four cooled demoulding devices which are mounted on a rotating mechanism permitting post-cooling of the preforms for the duration of four injection cycles prior to their being stacked, without risk of damage, on the discharge conveyor. Stripper mechanisms with light beam monitoring systems ensure that all the preforms are removed from the mould and taken over by the robot.

Moulded part

Standard preform for 0.5 litre PET bottle – transparent – weight: 20.8 g – length: 98.4 mm – wall thickness: 2.45 mm – thread: PCO 28 – 72-cavity mould – cycle time: 9.11 s – annual requirement: 227,000,000 preforms

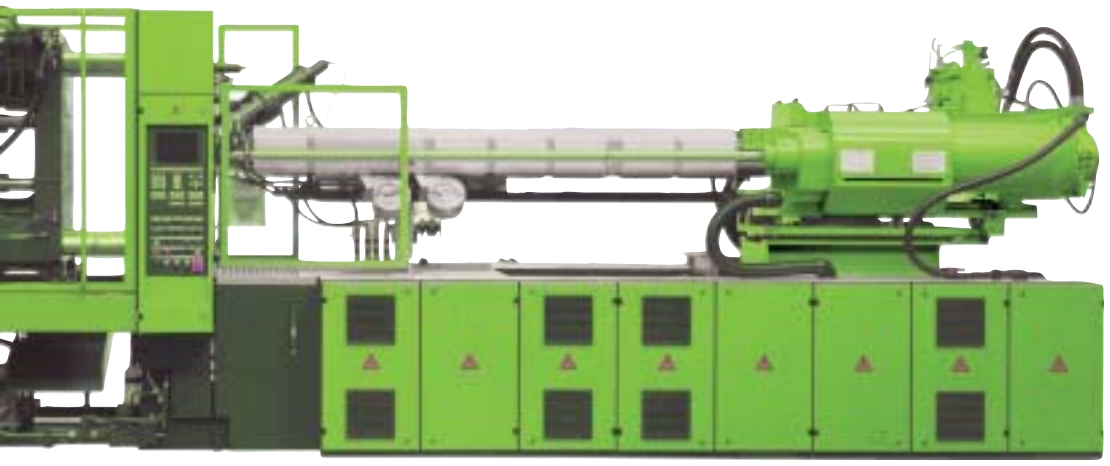
Manufacturing costs [EUR]	per year	per 1,000
Material costs PET:	4,957,680.00	21.84
Material costs masterbatch:	0.00	0.00
Overhead costs materials:	743,652.00	3.28
Total material costs:	5,701,332.00	25.12
Energy costs:	133,857.36	0.59
Labour costs, production:	26,594.26	0.12
Overhead costs, production:	9,307.99	0.04
Total production costs:	35,902.26	0.16
Set-up costs:	0.00	0.00
Machine costs:	213,214.92	0.94
Mould costs:	126,730.97	0.56
Manufacturing costs [EUR]:	5,950,449.18	26.21



Percentage breakdown of costs
(set-up costs have not been taken into account)

The services offered by the MacPET team include profitability calculations for customers' planned preform projects. High-performance software is available for this purpose. The example shows a breakdown of the costs of manufacturing a standard preform. This software analyses the expected production costs. It takes into account the capital investment costs of the machine and equipment as well as the costs of materials, production, maintenance and energy. These cost items are calculated with the aid of further available software packages which compute the exact cycle time and energy consumption of the entire system.

Further information on this calculation software is available from:
Karlheinz Moser, PET Division Manager, e-mail:
karlheinz.moser@engel.at

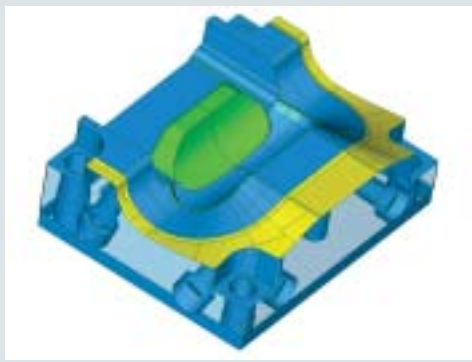


Trodat's handy Printy:

Two components – hard and soft – forming an inseparable whole

What can make a best-seller even more attractive? The second generation of Trodat's "Printy" stamp system has been an unqualified success since 1994. Since it leaves very little room for improvement, the only solution has been to streamline the basic system. The result? An ergonomically optimized self-inking rubber stamp featuring a "softtouch" surface, an integrated text view window and easy pad replacement at the touch of a button.

>> While the specified requirements sounded perfectly simple and logical, their implementation demanded the closest conceivable co-operation between the product developers at Trodat and the mould makers at Engel. The basic component of the new grip cap was to be moulded in SAN and provided with a locking and click-out mechanism, an integrated text view window and a large-area coating of TPE. The purpose of the TPE layer was not only to lend the "Printy" greater "feel appeal" but also to serve as the resilient click-out button for pad replacement.



The Austrian firm of Trodat, the world's leading manufacturer of rubber stamp systems, has during the past 30 years sold over 100 million "Printy" units world-wide. The third generation of this best-seller now features a new "soft touch" design and a quick-action mechanism for easy changing of the ink pad. It was introduced at "Paperworld 2003" in Frankfurt/Main and is available in five sizes.

The actual injection moulding task thus consisted in moulding the basic component in SAN and then coating it on one side with TPE. This was basically realizable with a multi-cavity mould working in conjunction with an external rotary table. In order to meet the requirements of mass production, it was decided that 6+6 cavities would be the very minimum for all five sizes of product. The moulds were to be used on tiebarless machines of the type ENGEL VICTORY 650H/200W/200 or 250 Combi.

The injection mould (photo above) might at first glance appear to be quite conventional and straightforward. Closer scrutiny, however, reveals a complex system of hydraulically and mechanically actuated splits necessitated by the many undercuts.

The basic component is moulded in SAN in a "standing" position in Station 1 (top half of mould). As the mould opens, hydraulically actuated splits in the stationary half of the mould retract from the side openings for the click-out buttons. The mould is then rotated through an angle of 180° and the TPE is injected. The demoulding operation is performed by the combined action of hydraulically actuated splits on the stationary mould half and a total of 24 splits on the moving mould half, these being actuated mechanically by means of two stage ejectors and local split followers. The actual ejection operation is performed by flat ejectors assisted by compressed air blown through the cores.

In addition to the mechanical complexity of the mould, Engel's design engineers had to take into account the differences in mould temperature requirements for SAN and TPE. For cooling the TPE in Station 2, a temperature difference of 50° between the stationary and moving mould halves is necessary. In order to ensure the necessary degree of precision, the cavities of the moving mould half are located in floating, self-centring mountings. Cavity temperatures are monitored individually and continuously.

>> The results of this project partnership between Engel and Trodat are certainly impressive: production units for two-component parts of enhanced quality and cycle times of between 25 and 28 seconds. <<

Šibo d.o.o.: the new building has space for 32 machines in its production line for industrial components and space for 23 machines in its line for tube caps (left-hand photo). With its current total of 35 machines, Šibo still has growth potential for 20 machines. “And if we grow any more, we’ll simply build an extension,” says Boštjan Šifrar with a smile. The latest addition is an ENGEL E-MOTION 440/100 with two ENGEL ERC robots which was just being installed as we visited Šibo (centre photo). Šibo plans to exploit the potential of this new machine with a view to broadening its scope in the field of precision parts. “What our machine operators appreciate about the Engel machines, besides their precision and reliability,” says Šifrar, “is the language of the control system – it’s Slovenian!”

Slovenian perfection

Slovenia is one of the ten countries joining the EU on 1st May 2004, bringing the number of member states to an impressive twenty-five. Although Slovenia is a small country measuring just over 20,000 km² and having a population of just under 2 million, it would be wrong to judge its economic potential simply by its size. During the communist era, Slovenia made a disproportionately large contribution to the Yugoslavian economy. And how are things now after the collapse of communism and the gaining of independence? Three of Engel’s customers exemplify Slovenian entrepreneurship in the field of injection moulding.

Engel’s customers in Slovenia benefit from a competent on-the-spot service

Engel has been represented in Slovenia by the firm of Lesnik d.o.o., Kranj, since 1993. The founder and present managing director, Vojko Rogelj, an academically qualified engineer with years of mould making experience, ideally meets Engel’s prerequisites for a competent customer service. Besides selling new machines, Lesnik also takes care of the servicing of Engel machines and robots and the sale and delivery of replacement parts.

During the last 20 years, Engel has delivered around 240 new machines to Slovenia. The number of Engel machines currently in operation in Slovenia may easily be double this figure, for many Slovenian processors still purchase used injection moulding machines from all over Europe.

Šibo: broad-based, large-scale production of tube caps and industrial components

>> A state-of-the-art factory that had only just gone into operation – this was the status quo when we visited Šibo d.o.o. in Škofia Loka in mid-January 2004. The factory has two amply sized injection moulding shops arranged around a central “energy building” equipped with all water and raw material supply systems. Located at one end is the office wing and at the other the engineering wing comprising the maintenance department, the quality testing laboratory and recreation rooms for the employees.

Immediately adjacent is a high-rise warehouse with a covered drive-in area for lorries. The entire complex has a useful area of 4,350 m² and stands in grounds measuring a total of 12,000 m². Production is divided into two areas: one injection moulding shop produces industrial parts, such as components for fire alarm systems and electric razors, while the other produces tube caps of all shapes and sizes.

Šibo’s mould making department is still located in the company’s old building. When the injection moulding shop moved out, it then had a whole 1,200 m² at its disposal, enough for further growth and for a development and mould testing centre.

Competence in mould design and construction has contributed much to Šibo’s success. Established in 1967 as a small private firm within the scope permissible in Yugoslavia at that time, Šibo began as a contract injection moulding firm and then set up its own mould making facility in 1976. Following the political events of 1989, Boštjan Šifrar, the son of the company’s founder and the present managing director, combined the two private firms into a limited-liability company – Šibo d.o.o. – and henceforth focussed the company’s business on export.

Industrial components for users all over western Europe account for a good half of the company’s sales. “But our production of tube caps is also growing at a rate which is way above average,” says Boštjan Šifrar, clearly delighted with this development. “Meanwhile we are supplying our own range of products to all important tube manufacturers in as many as 30 countries, mainly in western and eastern Europe. By offering both quality and flexibility, we are even scoring points as far away as Africa and Central and South America.” Last year alone, Šibo secured new business in six countries.

Several factors account for Šibo’s dynamic growth. First and foremost there is the highly motivated workforce which meanwhile numbers a good 100 employees. Added to this is the extreme flexibility of the production and mould making departments, making even small batches worthwhile. And, thirdly, there is the flexibility of Šibo’s warehousing and dispatch facilities. The high-rise warehouse now has enough space for a good 1,000 Euro pallets packed tight with a broad selection of standard products as well as additional space for almost 300 pallets of raw material.

“For us at Šibo, modern production also means using state-of-the-art machines,” says Šifrar. “Our very good experience with Engel injection moulding machines has naturally influenced our choice of Engel as our main supplier.” 25 Engel machines out of a total of 35, none of them manufactured before 1997, are a concrete expression of this future-oriented partnership.

Gorenje d.d.: a perfect example of Slovenian big industry

Established in 1953 as a state enterprise in former Yugoslavia, Gorenje d.d. has been a joint stock company since 1997 and is today one of the seven largest manufacturers of white goods in Europe. In 2002, Gorenje’s sales world-wide reached EUR 805 million, 8.8% up on the previous year. Contributing to this success were 8,610 employees in the 44 companies of the group (15 in Slovenia and 29 abroad). With sales totalling EUR 681 million – of which exports accounted for 93% - white goods constituted the bulk of Gorenje’s production.

In 2002, Gorenje manufactured 2.7 million units, both for its own brand and for other large European suppliers: 1.15 million refrigerators and freezers, 980,000 cookers, ovens and hobs, and 650,000 washing machines and

Gorenje d.d.: Joze Goropevšek (on right) and Bojan Orešnik have long since been used to the reliable service given by Engel machines. Two Gasmelt-equipped machines, for example, non-stop are producing handles for household appliances. Support from Engel and its Slovenian agent (see panel) also works perfectly – from training seminars through to the supply of replacement parts. Orešnik says: “In particular we appreciate the competent on-the-spot support we receive from the experts at Lesnik. Whenever we’re in a fix, they’re here in next to no time.”

Kovinoplastika Janez Povše s.p.: the new production facility operates ten injection moulding machines, all of them from Engel, with clamping forces ranging from 350 to 1,100 kN. Fifteen employees produce parts for kitchen appliances and hand tools. Some parts are joined together to form complete sub-assemblies using ultrasonic welding (centre photo), a technology in which Kovinoplastika Povše is *the* specialist in Slovenia. The company processes all common engineering plastics from ABS and POM through to glass strand reinforced PA and, more recently, PEEK. Right-hand photo: Janez Povše (left) is always pleased to see Vojko Rogelj of Lesnik. He appreciates him as a highly competent consultant. One of the current matters under discussion is Kovinoplastika Povše's plan to produce components for medical equipment.

tumble dryers. Gorenje is a global player with companies in 60 countries all over the world.

The plastics processing facility at Velenje employs 240 people, 99 of whom work in the injection moulding shop. Thirty injection moulding machines process over 400 tonnes of thermoplastic material every month, primarily polyolefins, PS and ABS, but also some PA, SAN and PC.

"We mould all the important visible parts ourselves so as to ensure the highest quality of product," explains Joze Goropevšek, who manages not only the injection moulding shop but also the extrusion and thermoforming departments. "Those parts that are less critical – that's almost half of the moulded parts contained in a household appliance – are outsourced from qualified suppliers." Bojan Orešnik, responsible for the technology used in the injection moulding shop, adds: "We still have to cope with an enormous diversity of parts. With the 30 machines currently in service, ten product changes – and that means ten mould changes – are required during every shift." If we consider that Gorenje's refrigerator/freezer department alone produces 5,500 units per day, we can perhaps gain a rough idea of the enormous quantities the plastics processing facility has to handle. Gorenje's demands on the reliability and precision of the machines are correspondingly exacting.

When Gorenje commenced systematic renewal of its injection moulding machines in the mid-1990s, Engel was of course on the short list of choices. Gorenje had been using Engel machines for a good 25 years and its experiences with them had always been very positive: "A 100 tonne machine of this generation," says Bojan Orešnik, pointing to the only blue Engel in a whole row of green ones, "still gives non-stop service – Engel machines are simply indestructible."

The first two new Engel machines, supplied on a trial basis in 1997, were both equipped with quick-action mould mounting mechanisms, as changeover from one mould to another had to be as fast as possible. An advantage in this regard was the tiebarless design permitting side access to the clamping unit, for at that time the machines were installed in a building which afforded only limited headroom.

All of the 22 new Engel machines meanwhile in service at Gorenje are equipped with quick-action mould mounting mechanisms and linear robots or handling devices. Their technologies include Gasmelt and Combimelt, primarily for the moulding of handles. Insert technology is used for providing hardened panes of glass (shelves) with plastic surrounds. This same technique will in future also be used for edging wooden machine tops measuring 60 cm x 60 cm. The machine, an ENGEL CLASSIC 2050/500 with an insert-placing and parts-removal robot, is at present being "run in".

"By renewing all our machines we also aimed to increase productivity," says Joze Goropevšek. The 50 % target has been more than achieved with the Engel machines: "While in the past we needed around 100 machine hours to process one tonne of material, we needed only 38 hours in 2003. For this reason alone we are confident that, with Engel as our partner, we shall be able to cope with all future challenges just as successfully."

Gorenje has concentrated all its facilities – production, warehousing and R&D – in Velenje. The grounds have a total area of 350,000 m², of which 195,000 m² are covered with buildings.
The company now operates 30 injection moulding machines, including 23 Engel machines ranging from 900 to 7,500 kN, all of them equipped with robots. The oldest machine, built in 1978 (photo above right), is still working as reliably as ever. Systematic and documented maintenance of all machines and moulds ensures that the machines run to 98% of their capacity at all times. 80% of the moulds are produced in Gorenje's own mould making department, which employs almost 200 people.

Kovinoplastika Povše: industrial parts of the highest quality

Anyone crossing the threshold of the new factory of Kovinoplastika Janez Povše s.p. will certainly think he ought to swap his outdoor shoes for a pair of indoor slippers, for his immediate impression is that of a "clean room" – meticulousness, neatness and accuracy wherever he looks. Although Kovinoplastika produces "only" industrial parts in engineering plastics, it does so with the utmost dedication to precision, care and quality.

The history of this privately owned company is yet another example of the diligence, courage, perseverance and competence that characterize Slovenian entrepreneurship. Janez Povše, a trained toolmaker and mechanical engineer, started out on the road to self-employment back in 1976. In his garage at his home in Šmartno ob Paki, not far from his employer Gorenje, Povše began producing plant bowls and flowerpots using a home-made thermoforming machine and his own moulds. Shortly after, in 1977, he managed to persuade the import authorities to grant him an import licence for his first used injection moulding machine. By 1983 he was fully self-employed as a contract moulder of high-quality components for household appliances. Further used machines – including Engel machines – followed one after the other from 1987 onwards. "In 1995 I bought my first new Engel machine," says Povše, "as I had come to appreciate Engel as a brand which is particularly reliable and keeps its value." Seven machines were meanwhile bursting the seams of his much too small workshop (110 m²) and so, in 2001, it was time to move into newly built, much brighter premises with almost six times the previous floor space.

And the future? Janez Povše has long since set his sights on new challenges, in the medical equipment field, for example. Know-how is available and it goes without saying that the company already has ISO 9001 certification. More and more customers are using Povše's own mould development service rather than providing their own moulds. Povše is already considering investing in a two-component machine – "and before the end of the year we shall be moving into the new extension with a good 400 m² for the new development facility and new offices." Indeed an impressive rise from a small business to a system partner offering everything the customer needs. <<

Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible Engel flexible

New arrivals at ETG: three ENGEL ELAST 2,700/250 V. ETG particularly appreciates the process transparency of Engel machines and their fully integrated control concept for the machine and the automation peripherals, many of the latter being manufactured in ETG's own workshops. A further advantage lies in the extremely fast machine movements which ensure high productivity while maintaining a high degree of moulded-part precision.

In the new "Thermoplastics Department", for example, ETG has linked together two tiebarless machines – an ENGEL VICTORY 200/60 Power (left) and an ENGEL VICTORY 330/110 Power – via an ENGEL ERC 53/1-E linear robot to form a self-contained production cell. With this arrangement, multi-component parts (e.g. rigid/flexible composites) can be injection moulded relatively easily.

"It's not just the mixture that counts, ..."

"…. you need the right machine as well." This was Günter Appel's reply when asked why he had chosen Engel machines. Initially interested only in rubber machines, he has meanwhile come to appreciate the tiebarless machines for thermoplastics and LSR, too.

Just a small selection from ETG's range of parts for the automotive industry: expansion bellows, bushes, sound isolators, caps, functional parts and components in EPDM, TPE, TPU and LSR.

>> In 2000, the South German firm of ETG Elastomertechnik Gedern GmbH faced a difficult decision. Should it, or should it not, venture into the unknown? This supplier of rubber parts to the automotive industry was planning to renew its entire injection moulding facility. "Although we had no previous experience with Engel machines, we nevertheless decided on Engel as our future supplier. Günter Appel, who manages the company together with his brother Jürgen, can today look back on this brave decision with a confident smile.

Peter Schulz of SI Industrievertretung, Remseck, the agent for Engel's elastomer machines in South Germany, had a great many convincing arguments: Engel offers a complete range of machines for all injection moulding technologies, from rubber through LSR to thermoplastic; all standard machines can be modified and/or extended with a modular system designed to meet every specific requirement; even customized automation systems, with machine-integrated controls, are of Engel's own manufacture – plus a host of other advantages, and not least Engel's comprehensive after-sales service.

To cut a long story short: the first two ENGEL ELAST machines were delivered to ETG in 2000. Meanwhile the company operates eight rubber injection moulding machines with clamping forces ranging from 400 to 6,000 kN, two of them horizontal, the other four vertical. A further fully automatic ENGEL ELAST 4500/400 H produces moulded rubber parts for the sanitary and building industry at ETG's associate company, Appel GmbH, in Lauda-Königshofen.

"If we were faced with the same decision today," says Günter Appel, "it goes without saying that we would still choose Engel. We are indebted to Engel's competence both in rubber and thermoplastics processing for our standardized and extremely reliable machine concept – and this in turn strengthens us in our own core competencies."

Recipes for success

Two years ago, ETG ventured even further into the unknown. "We decided to complement our existing production of rubber cable conduits with machines for the injection moulding of thermoplastics. And there was no need to search for a new supplier, as Engel is a specialist in both fields," says Günter Appel, clearly satisfied with their decision. The need to go into the processing of thermoplastics – TPE (thermoplastic elastomer) currently tops the list in terms of quantity – was the logical outcome of ETG's longstanding collaboration with automobile manufacturers in the development field. "Naturally, today's high-performance thermoplastics cannot replace moulded rubber parts in every case," says Appel, "but they often represent clever and economical alternatives and make new material combinations possible." Although rubber parts still account for the larger share in ETG's production, the proportion of thermoplastic parts is growing steadily. Meanwhile the facility at Gedern is processing thermoplastics on five tiebarless Engel machines ranging from 600 to 2,000 kN. Another machine with a clamping force of 1,100 kN has been specially configured for the injection moulding of LSR. A further two ENGEL VICTORY machines and two linear robots (ERC 23/1-E) have already been ordered and will shortly commence service in ETG's mass production lines.

It is precisely this combination of rubber and thermoplastics processing know-how which has made ETG a much sought-after supplier to the automotive industry. Added to this is the synergy between ETG's various departments – moulded-part design and development, injection mould design and construction – which makes for enormous flexibility, especially when it comes to providing the customer with "real" working samples.

Another recipe for success is the ETG know-how which goes into the actual rubber mixtures, which are produced at Appel GmbH in Lauda-Königshofen. Established in 1956 as a rubber goods factory, Appel GmbH today produces a wide diversity of extruded seals and profiles and injection moulded parts for the sanitary and building industries. In 1993, Günter and Jürgen Appel took over ETG GmbH, which had likewise been founded in 1956, and developed it to the status which it enjoys today. Meanwhile ETG and Appel together employ a good 220 people. <<

injection

Publisher
ENGEL AUSTRIA GmbH,
Ludwig-Engel-Straße 1,
A-4311 Schwertberg
www.engel.info

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Layout
Konsens Public Relations
GmbH & Co. KG,
D-64823 Groß-Umstadt
www.konsens-pr.de

Printed by
Kärntner Druckerei,
A-9010 Klagenfurt

injection is the customer newspaper from ENGEL.

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On the proverbial cutting edge of technology

>> What could represent Swiss quality and precision more aptly than the famous Original Swiss Army Knife or a Swiss watch? In *its* turn, the firm of Victorinox in Ibach-Schwyz in Central Switzerland, which is quite literally "forging" ahead with its Original Swiss Army Knife, has for the past several years been putting its trust in the quality and precision of Engel injection moulding machines. Victorinox operates tiebarless Engel machines of three different types – standard machines with hydraulic drives, two ENGEL INSERT 500V/90 machines with vertical clamping and injection units and, more recently, an all-electric ENGEL E-MOTION 80/55.

As the traditional Swiss Army Knife has in recent years gradually developed into a multi-purpose tool, so too have the quantity and sizes of its component parts undergone drastic changes. Microparts and precision components have to be complemented by a whole diversity of handle designs, and this is the challenge to which Engel machines, capably supported by Engel Switzerland, rise superbly. <<

The latest addition to the machines at Victorinox: an ENGEL E-MOTION 80/55.

... OPTIMELT?

OPTIMELT is an innovative Engel technology for the injection-compression moulding of optical components. Even thick-section lenses designed for the most exacting optical applications can be reliably and economically manufactured with OPTIMELT.

>> Engel is breaking new ground in the field of high-quality optical parts: in collaboration with Leica Projektion GmbH Zett Geräte, Braunschweig, Germany, the OPTIMELT Technology Group has developed a new injection-compression moulding system featuring a specially adapted injection-compression module for use both on tiebarless and on toggle clamp machines.

Its nucleus is a sensitive hydraulic pressure pad with a low oil requirement (see illustration). Exact sequence control is effected by a precision stroke measuring system and a pressure sensor working in conjunction with a closed-loop control valve. The injection-compression mould, like the one for plano-convex lenses in PMMA illustrated below, is mounted on the base plate of the injection-compression module which is provided with integrated mould attachment holes.

Injection-compression module for lenses of the highest quality

The compression cores in the mould are connected to the compression core in the pressure pad. Prior to injection, the compression cores move forward by approx. 2 mm, creating a gap which permits fast and complete filling of the mould without jetting. The mould is also pre-set to the required clamping force in order to obviate the usual deformation of the clamping unit and/or breathing of the mould during compression.

The melt continues to enter the mould until the compression core, which is subjected to a defined constant counterpressure in the pressure pad, returns to a predetermined position. This exactly reproducible positioning of the compression core (measured by the integrated stroke measuring system) ensures that the same volume of melt is always available in the mould cavity for the compression process. In other words, the melt is not metered by the control system of the injection unit, for this could easily give rise to excessive fluctuations from one shot to the next, as the shut-off action of the non-return valve is not exactly reproducible. With this “intelligent shot weight control”, on the other hand, the gate is shut off mechanically as well, with the result that, during each moulding cycle, exactly the same volume of melt is metered into the mould cavity.

In order to ensure the greatest possible isotropy (i.e. parts having the same optical properties irrespective of direction), particular attention must be paid to the control of the temperature in the mould. Optimum results are achievable with a process-adapted, variothermal mould cooling system (see illustration below for further explanation).

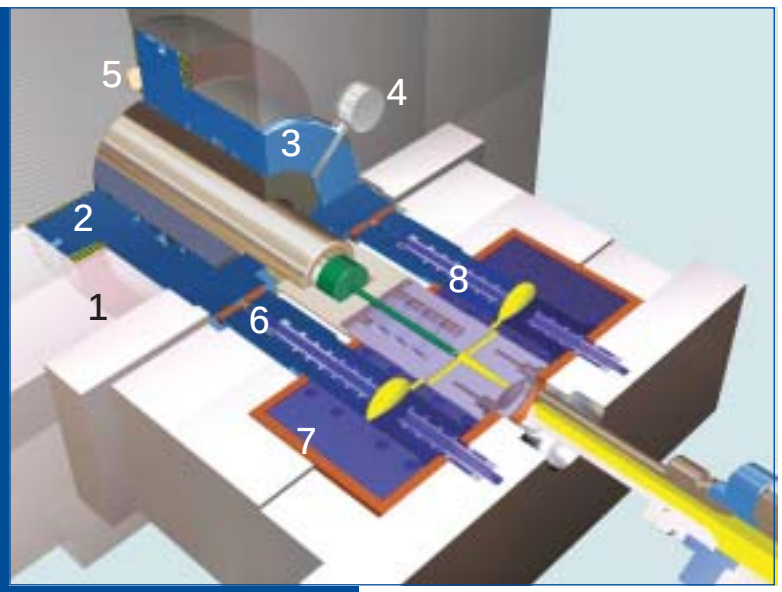
Even microstructured surfaces can be moulded with the utmost precision

High-quality optical components can nowadays be rendered non-reflective in several ways, not least through the use of microstructured surfaces. As is so often the case, it was nature which inspired this development: the non-reflecting, facetted structure of the cornea of a moth’s eye serves as an excellent camouflage.

Using the new injection-compression module, such microscopic surface structures (< 1 µm) can also be moulded with excellent reproducibility. A valuable supportive factor is the variothermal mould cooling system which heats the cavity wall during injection to a temperature between the glass transition temperature and the melting point of the polymer.

While the use of injection-compression moulding for the production of microstructured surfaces is still in its infancy, its application potential is enormous. <<

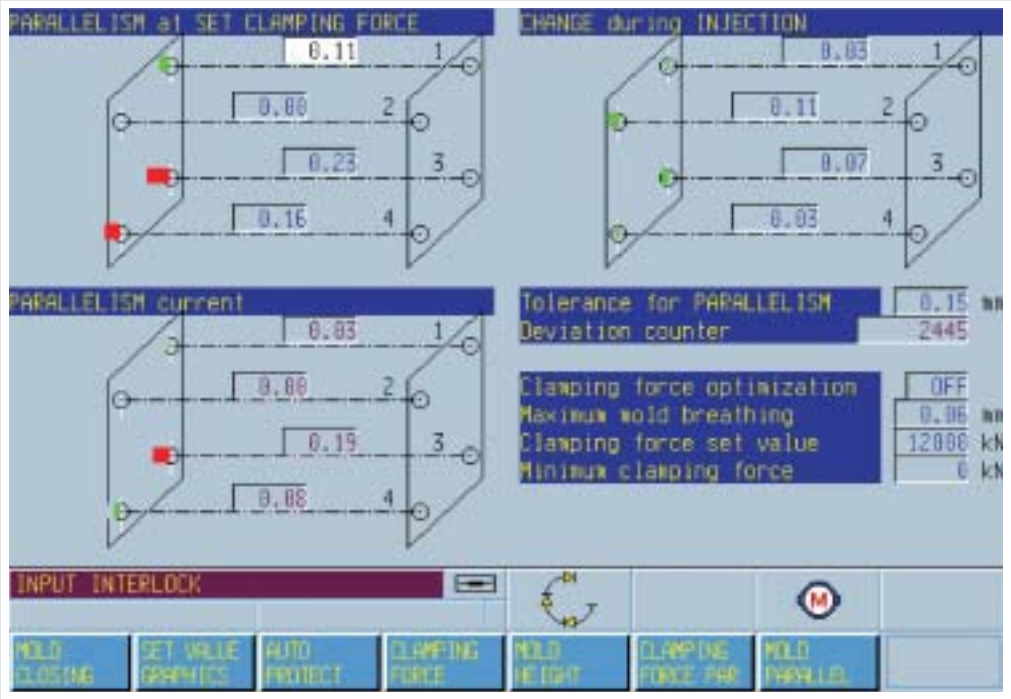
Volumetric mould filling processes are mostly used for the injection-compression moulding of small and thick-section optical components. Very low mould filling speeds are necessary in order to avoid jetting, but this in turn can result in an excessive cooling of the melt while it is still being injected. This can be remedied by the so-called variothermal mould cooling system. This dynamic heating-cooling system rapidly heats the mould during injection of the melt and then cools it intensively in order to obtain as fast and economical a setting time as possible.



Engel’s new injection-compression module (1) – complete with variothermal mould cooling system – comprises the following components: hydraulic pressure pad (2), compression ring (3), stroke measuring system (4), pressure sensor (5), compression core (6), ceramic insulator (7) and core temperature control system (8).

Broader scope
for the ENGEL DUO:

On-line monitoring of mould parallelism



The new software for monitoring mould parallelism affords users of ENGEL DUO injection moulding machines a much broader scope of possibilities: continuous, exact measurement (to within 5/100 mm) and evaluation of mould parallelism not only ensure highly reliable processing but can also considerably prolong the working lives of both the mould and the machine.

Any discussion or conjecture as to whether a mould always closes with the desired degree of parallelism is now a thing of the past, at least for the ENGEL DUO: the new software for measuring mould parallelism permits a completely objective appraisal.

>> With its new software for monitoring mould parallelism on machines of the ENGEL DUO Series, Engel now affords the injection moulder a much broader scope of possibilities for routine machine applications. Designed for use on these large-capacity, two-platen machines, this new software recognizes any deviation from parallelism of the two halves of the mould during every moulding cycle and indicates it quantitatively with a resolution of 5/100 mm.

Mould and process monitoring rolled into one

The new software is the first ever objective means of checking mould precision directly on the machine. Once the new or, in particular, used mould has been mounted on the machine, any deviations from the reference parallelism can be measured and clearly indicated in “black and white”. The software also identifies any irregularities in the load acting on the mould during the injection cycle. These might result, for example, from an asymmetrical arrangement of the mould cavities. The software also optimizes the clamping force, in turn prolonging the working lives of both the mould and the machine. The technical prerequisites for the retrofitment of this software package are satisfied by all DUO machines built from 2000 onwards.

The necessary data for the monitoring function are derived from the exact positions of the four tiebars at any one moment, both during application of the clamping force on the mould and during any time the mould may be partially opened to permit breathing during injection. Position measurement is performed by high-resolution stroke transducers in the four hydraulic pressure pads on the stationary platen. On the ENGEL DUO, these pressure pads generate the clamping force, which is transmitted to the mould by way of the tiebars. The machine’s control system retrieves the position data via a CAN bus every 6 ms. Platen parallelism is then checked by comparing, at the required clamping force, the measured values with stored reference values which were obtained at factory with an exactly parallel test block. Any deviation from this zero (reference) position is displayed numerically and visually on the VDU of the machine control system. The actual values obtained when the mould is closed may then serve as reference (“zero”) values for ascertaining possible quantitative changes during injection.

This new software package virtually converts the injection moulding machine into a “measuring machine”, providing an objective means of ascertaining, for example, whether reject parts are the result of faulty injection (overfeed) or the consequence of non-parallelism of the platens due to some inaccuracy in the machining of the mould. In the latter case, the rate of wear on both the mould and the machine would be excessive.

In this regard, the new mould parallelism monitoring software is also ideal for continuous process monitoring. The user defines a tolerance for setpoint deviation. When this tolerance is exceeded, a warning signal is given, or, in extreme cases, the injection moulding machine is shut down. <<

St. Valentin: Fourth extension phase to incorporate competence centre for plasticizing units

>> In the last issue of injection we reported briefly on the third extension to be built at Engel's St. Valentin production facility for large-capacity machines. This extension, which is now fully operative, houses Engel's competence centre of injection units (see page 1 of this issue), the extended component assembly department for large-capacity machines and a new hardening plant. Work already commenced on the next extension phase in December 2003: currently under construction are four further production buildings with a useful floor area of 8,800 m².

These additional buildings will accommodate Engel Werkstofftechnik (EWT), which was hitherto located at Steyr-Münichholz, as well as an assembly line for the MacPAC series of fast-cycling machines for the production of packagings (with clamping forces ranging from 1,000 to 6,500 kN) and the MacPET series of PET preform injection moulding machines rated for moulds with 12 to 96 cavities.

Engel Werkstofftechnik has made a name for itself as a production centre for plasticizing units and wear-resistant parts based on Engel "Marathon Technology" (see also injection No. 6, July 2002). So far, Engel is the only manufacturer to give a full guarantee on its carbide-coated Marathon screws against abrasion and corrosion, even for processing temperatures as high as 450 °C. And of the Marathon non-return valves introduced as long ago as 1996 there are meanwhile over 20,000 giving reliable service all over the world.

Following its move into the new extension, EWT will function as Engel's "competence centre for plasticizing units", manufacturing complete plasticizing units for all Engel machines and supplying ready-to-install units to the flow production facility in the competence centre for injection units. By locating both centres at St. Valentin, Engel has considerably improved its logistics, for distances – and hence times, too – are now much shorter.

This fourth extension at St. Valentin is scheduled for completion by the end of June 2004. We shall keep you informed.<<

Josef Kornthaler is the new Works Manager at St. Valentin

>> Josef Kornthaler (54) took over the position of Works Manager of the St. Valentin production facility on 1st November 2003. He succeeded Heinz Leonhartsberger, who on 1st May of last year had been appointed to the management team of Engel Austria GmbH.

Prior to joining Engel, Josef Kornthaler held the post of Production Manager of the Eurostar Works of DaimlerChrysler in Graz/Austria. At Engel, Kornthaler's tasks and objectives will consist in the continued further development of the St. Valentin production facility with the focus on "lean production" and "high customer satisfaction".<<

Engel restructures its R&D

>> In service at Engel since last November is a new department – "Central Development Products and Technologies" – which reports directly to Engel Holding GmbH and, consequently, to the Technology Director. The Head of Central Development is Georg Steinbichler (49), who was formerly in charge of Technology Development at Schwertberg for many years. Answering directly to Georg Steinbichler are all the development departments and teams at Schwertberg, St. Valentin and Dietach. <<

Engel management teams now complete

The management team of Engel Austria GmbH:
Gotthard Mayringer, Georg Tinschert und Heinz Leonhartsberger

The management team of Engel Holding GmbH:
Hans Wobbe, Gotthard Mayringer und Peter Neumann

>> Oriented towards global demands, Engel's new management structure has become an operative reality just in time for Engel's new financial year 2004/2005, which begins on 1st April. As already reported, the management team of Engel Holding GmbH will co-ordinate the activities of the entire Engel Group, while the management team of Engel Austria GmbH will co-ordinate the business operations of all the Engel companies in Austria. Following a "return to the fold" and a "new addition", both management teams are now "complete". Since January of this year, Ing. Mag. Georg Tinschert (48) has been the new Sales Director and Spokesman of the Board of Management of Engel Austria GmbH – and with effect from the 1st April 2004, Dr.-Ing. Hans Wobbe (52) will be the new Technology and Production Director of Engel Holding GmbH.

Georg Tinschert is indeed no newcomer to Engel, and many customers will remember him from his previous employment with Engel, latterly as General Sales Manager until August 2000. A native of Linz, Georg Tinschert can draw on a good 15 years' Engel experience for his new position. Having graduated from the HTL Linz in electrical engineering and from the Vienna University of Economics and Business Administration in social science and economics, Tinschert joined Engel in 1985, initially as a sales engineer for the Arabian and Latin American markets. Further positions followed, including that of Sales Manager with Engel Machinery Inc. in York/PA, USA. In the "interval" until rejoining Engel, Georg Tinschert was on the Board of Management of Leobersdorfer Maschinenfabrik AG, Leobersdorf/Austria, where he had been Chairman of the Board since 2001.

Although **Hans Wobbe** is a complete newcomer to Engel, he is certainly not a newcomer to the plastics industry. Many will remember him in his capacity as Technology and Production Director with one of Engel's competitors before he established his own company, hw.tech GmbH & Co. KG, Herrsching/Germany. A native of Hamburg with a doctorate in mechanical engineering (TU Braunschweig), Hans Wobbe can look back on many years' management experience in the plastics machinery industry, both in the extrusion and in the injection moulding field, experience which will stand him in good stead in his new position.

Wobbe will be responsible for technology and production within the entire Engel Group. This "synchronization" of technology is one of the modules of a world-wide development and competence strategy aimed at maintaining Engel's status as a globally operating manufacturer of injection moulding machines. <<

Calendar

Please visit us at ...

- Mecanica 2004, 18.-22.05.2004 Sao Paulo, Brazil
- Plastpol 200, 25.-28.05.2004 Kielce, Poland
- Maschinenbaumesse 2004, 25.-28.05.2004, Nitra, Slovakia
- TIPF Thai International Plast, 26.-29.05.2004, Thailand
- Chinaplas 2004, 29.06.-03.07.2004 Shanghai, China
- Interplast 2004, 24.-28.08.2004 Joinville, Brazil
- MSV 2004, 20.-24.09.2004 Brno, Czech Republic
- K 2004, 20.-27.10.2004 Düsseldorf, Germany
- Plastic and Rubber 2004, 08.-12.12.2004, Istanbul, Turkey

North America Supplement

injection

News, Facts and more. Information for our customers.

March 2004

09

ENGEL

Technology builds profits – and success

Fabrik's 120,000 square foot facility in McHenry, IL houses 66 Engel injection molding machines.

19 vertical presses from 55 through 200 tons run in the third injection molding bay.

Since founding his company in 1980, Seth Wagner, President of Fabrik Molded Plastics, has maintained a close-knit circle of suppliers that are as dedicated to the pursuit of excellence as he is. Engel is one of these suppliers.

>> "Fabrik provides a technologically sound approach to plastics engineering, tooling design and construction, production injection molding and insert molding. We do this without compromising quality, always meeting or exceeding our customers' expectations for both quality and cost containment", says Seth Wagner.

Serving the automotive, appliance, electrical encapsulation and medical markets, Fabrik has a loyal base of satisfied customers dating back to the mid 1980's. Customer loyalty is earned through the reliability and responsiveness of Fabrik's dedicated employees from the front office to the shop floor.

An Engel customer since purchasing their first injection molding machines in 1984, Fabrik Molded Plastics is proof that technology is key to staying ahead in business. The 66 Engel injection molding machines which currently run in Fabrik's McHenry, Illinois facility are model year 1994 or newer. By typically replacing machines after 7-8 years, Fabrik is able to keep the latest in machine technology on their floor.

Fabrik's 120,000 square foot facility is TS 16949 certified, and includes a design and prototyping department, a 7,000 square foot tool room, pad printing department, assembly area and three bays of injection molding machines. All machines are equipped with Engel's quick mold-mounting system to allow for fast changeovers, and are predominantly equipped with Engel robots.

One of the reasons for the continued relationship between Fabrik and Engel is equipment standardization. "Standardization looks nice, but is practiced here for practical purposes" states Don Hardin, Fabrik's sales manager. "It makes training and maintenance so much easier, and it gives us better control over our processes and minimizes rejects." continues Seth Wagner. "Standardization makes us self-sufficient. We can buy one part that will fit a multitude of machines, and vice-versa. That reduces both training requirements and inventory costs."

A total of 47 horizontal presses, ranging from 40 to 660 US tons, are located in two of Fabrik's injection molding bays.

One huge benefit of standardizing with Engel machines is the controller which is common to all models and sizes. All machines are closed loop and can interface with QA equipment for gathering SPC data, or with auxiliaries. Machines purchased since 1997 are equipped with the CC100 control.

The full range of special process control software available on the CC100 controller is fully utilized at Fabrik.

By combining control technology with integrated automation, Fabrik is changing with the industry. The addition of automation allows the reduction of labor and overhead costs, which in turn allow the company to compete more successfully in today's market. One example of this is the upgrading of their insert molding capabilities with the addition of 6-axis articulating robots to their ENGEL INSERT machines. "Fabrik has gone through this transformation while still embracing the concepts and policies that have built this company", states Don Hardin.

Seth Wagner started out with one goal – seek qualified, dedicated employees and suppliers who could incorporate the latest advancements in machine and processing technologies that would allow for ongoing improvement and success. He has definitely achieved this goal. <<

Engel de Mexico: more than just a sales office

Engel was originally supported in Mexico by the representative agency BASF de Mexico. Though this relationship worked well in the early years, market requirements changed. With the growth of many large global corporations into the area, the market now required a full service facility: sales, service and spare parts support that only a direct Engel office could provide.

The Customer Service Department (CSD) at Engel de Mexico provide telephone support as well as technical service.

Engel de Mexico training facility is equipped with three machines for hands-on machine training, demonstrations and mold trials.

1996: Engel de Mexico is starting to grow into a full service facility

>> In September 1996, a subsidiary office was opened in Mexico City, Mexico. Jorge Guerrero, who had worked with the Engel product for more than 7 years through the representative agency BASF de Mexico, agreed to start-up the new organization. As General Manager, Jorge Guerrero and a secretary opened the facility, which consists of 150 square meters of office space and a 520 square meter warehouse.

In October 1996, the first service technician was hired and began his training at Engel's facility in Canada. By the following April, staff had expanded to include a second service technician and a spare parts coordinator. Today, Engel de Mexico employs a staff of twelve – including four service technicians – providing full service to our Mexican customers.

The full service provided not only includes sales (machine, automation and spare part) and technical service, it also means training. Engel de Mexico has a training classroom on site, with a capacity for 12 people, allowing for regularly scheduled courses to be held. With several machines and robots available on site, hands-on machine training is part of all courses. These machines are also available for demonstrations and trials or for quick delivery sales.

Since their inception, Engel de Mexico has sold approximately 220 machines and 30 robots into Mexico, working with Engel manufacturing facilities in Canada, the USA and Austria. They service a base of 730 Engel machines, and will soon expand their service area to include Central America and the Northern part of South America. Their location and resources allows Engel de Mexico to respond quickly to customers in these areas.

As you can see, now in operation for seven years, Engel de Mexico has grown into a full service Engel facility. <<

Engel machines in operation Engel machines in operation Engel machines in operation Engel machines in operation Engel machines

Mar-Lee: In-mold labeling cell consisting of high speed Engel 450 ton toggle machine and ERS (Speedy) servo robot.

Mar-Lee: The custom molding facility with Engel machines from 22 to 750 US tons.

Mar-Lee Companies has been a believer in Engel and a customer since 1995, when, realizing the benefits of Engel's 750 US ton wide platen toggle machine and stack mold technology, they were able to win a contract against several other firms.

>> Mar-Lee Companies is a multi-dimensional firm located in Leominster, Massachusetts. They have a 56,000 square foot custom injection molding facility with a total of 27 presses ranging in size from 22 to 750 tons, a high precision injection mold manufacturing facility, Tech Center offering turnkey molding solutions and a class 100,000 clean room, and a 10,000 square foot white room for the manufacture of medical products.

The growth and success of the company can be attributed to its president John Gravelle. He understands that in order for Mar-Lee to continue to succeed, increase profitability and compete in today's global economy, new technology must be incorporated – primarily automation.

Mar-Lee will add seven injection presses in the next year, and is currently undergoing a three million dollar makeover with the single purpose of automating their equipment.

To date Mar-Lee has installed three automated work cells, which have boosted the past year's sales by 18 percent and increased their profit margin significantly. In less than 6 months the savings in labor costs from these automated cells will have paid for the equipment. "This is Mar-Lee's vision of how you compete with China" Gravelle said. "We are automating everything we do."

One of the cells currently running produces a high dome baby wipe dispenser lid on a 660-ton high-speed machine equipped with two ERC robots. This cell runs a 14 second cycle, molding 8 parts per cycle on a 4+4 stack mold. The first ERC robot is an ERC 66/2-C, which consists of 2 – X, Y and Z servo axes mounted on one common Z-beam. Each X, Y, Z combination works independently of one another, removing parts from each half of the stack mold. The parts are handed off to a closing and condensing station to flex the living hinge and latch the lid. Spacing of parts is reduced for packaging, and the finished parts are handed off to an ERC 23/2-C robot for depositing into a box on a box-loading conveyor.

Mar-Lee also worked with Engel for its move into in-mold labeling technology. Two high-speed molding cells are each equipped with a high-speed ENGEL CLASSIC 450 toggle machine, an ERS (Speedy) robot and two ERC robots. These cells are used for Mar-Lee's new Solo baby wipe dispenser lid business. Running a 9 second cycle and producing 8 parts with each shot, Mar-Lee is able to provide their customer with a more colorfully designed part, at a competitive price. The automation of this cell allows for 8 hours of unattended production.

Mar-Lee have recently added video footage of these automated systems to their website at www.mar-leecompanies.com, promoting how their use of automation keeps them, and in relation their customers, competitive in today's global market. <<

Successful formulas for survival – and growth

Hague Quality Water International began business as a retail water conditioning dealership in Columbus, Ohio, taking advantage of a unique opportunity to build a sales organization and capitalize on into the rental market for both domestic and commercial water treatment equipment.

Hague: Brine cabinets and mineral tanks are molded on an ENGEL DUO 1250 with an ERC 84/1-C robot.

Hague: Three mold changes per week are performed on this 660 ton ENGEL TIEBARLESS machine, equipped with an ERC 74/1-C robot.

>> By the early 1970's, William R. Hague's company began manufacturing its own equipment – producing a product much better and more reliable than what he had sold previously. Within a few years Hague had a national sales organization distributing a full line of Hague Quality Water equipment.

When they began manufacturing their own water systems, the injection molded parts of their system were outsourced to the Orient. Hague's line of water treatment equipment begins with a single system "The WaterMax®", which is configured on an order-by order basis to treat each specific water conditions. In order for this manufacturing concept to work, Hague required just-in-time delivery of quality molded parts to enable the company to keep inventory levels stable.

When continuous poor quality and inconsistency of the outsourced parts became an issue, William Hague decided that he needed to make a change. In 1997 the decision was made to bring the molding of these parts in-house. With no knowledge of the injection molding process, he turned to Engel for assistance. A number of Hague's current employees were selected to start-up their plastics processing department. The chosen employees were sent to every training class offered by Engel – from basic machine function and maintenance, through processing and machine controls. These staff members became a fully knowledgeable and capable team.

The addition of the injection molding department created the need for more space, so in 1998 Hague doubled the size of their manufacturing facility to over 80,000 square feet. This space now houses eight Engel machines ranging in size from 40 to 1,250 US tons, all equipped with Engel robots.

To enable the company to keep inventory levels low, the Engel molding machines purchased by Hague include the quick mold change option. With 51 molds and an average of 10 mold changes per week, this option saves not only time but more importantly money. And another cost saving and quality measure employed by Hague is Engel automation. According to molding supervisor Mike McCoy, "No human involvement means no variation and no variation means consistently good parts. Also, the ability to run a lights-out operation pays off seven days a week because labor costs go to just about zero."

Keeping costs down and quality high are examples of Hague's commitment to maintain a world-class manufacturing operation and solidify its world-class position in the water business. Engel North America is proud to be an ongoing contributor to this American success story. <<

News in brief News in brief News in brief News in brief News in brief News in brief News in brief

Franz Strohmaier's "come back" at Engel North America

>> In January of 2004 Franz Strohmaier, long-standing Vice President Engineering at Engel North America, returned to "his company" in the capacity of Executive Vice President Operations & Engineering.

Franz Strohmaier is a 1970 graduate of the HTL Steyr with a bachelor degree in automotive design and combustion engines. As a native of Schwertberg, he soon was drawn into the injection molding world and joined Engel. From 1972 to 1976 he held positions from order engineering to the design of special machinery and the early stages of robotics. When Engel Canada was founded in 1975, he instantly knew his destiny. Moving to Canada early 1977, work in a startup company was plentiful and exciting. Being the only engineering person from the parent company, Franz had many bases to cover: drafting, design, service and trouble-shooting just to name a few.

Although originally planning to stay just 2 years, Franz did not return to Austria until 18 years later, when the position for a General Manager opened at Engel St. Valentine – a one time chance to bring 2 different cultures together and set the foundation for the future prosperity of this plant. Family reasons brought Franz Strohmaier back to Engel Canada at the end of 1996, into his previous position of VP Engineering. In September of 2000 he left the employment of Engel and joined BEKUM America Corporation (blow molding machinery) in Michigan as the Director of Engineering and later VP Manufacturing Operations. Affected by the injection molding virus, he now returned to Engel North America. <<