Inject the future: ENGEL at K 2013
New applications, efficiency records, world premieres
Page 8

All-electric, highly precise and tie-bar-less
ENGEL e-motion 30 TL extends smaller end of range
Page 13

Intelligent user interfaces of tomorrow
Multifunctional surfaces represent new opportunities for medical technology
Page 14

Free space fully exploited
Anton reduces unit costs thanks to tie-bar-less technology
Page 16

CC 300 – the new ENGEL control unit
At K 2013 ENGEL gives an insight into its new control concept
Page 11
A warm welcome to K 2013

With 25 machinery exhibits at K 2013 in Düsseldorf, we will be showcasing more applications than ever before at a trade fair: never before have we presented such a wealth of innovation. The system solutions, 12 of which will appear at our stand in hall 15, will demonstrate process integration, automation, strong performance, sustainability and process stability – qualities that add up to unbeatable efficiency that meets tomorrow’s needs today. Our slogan for K 2013 will be ‘Inject the future’.

Process integration is the key to greater efficiency – but it is also a sign of the increasing complexity of manufacturing processes. This presents new challenges for plastics processing firms such as yours, which is why we have been addressing the issue. At K 2013 we will be unveiling the CC 300, the new generation of control units and the logistical extension of the human/machine interface. From the very outset we have put the person at the centre, which has led to ideal, uncompromising functionality. The operation of even highly integrated and automated systems has become much simpler, safer and user-friendly as a result. We would like to cordially invite you to try the new control unit for yourself at our stand.

You’ll find we speak your language – not just when it comes to realising your needs and wishes, but also when we meet face to face this October in Düsseldorf. No other trade fair brings ENGEL and its global subsidiaries together in one place. Close customer relations are very important to us, which is why we are continually raising our world-wide profile while sharpening our focus on the sector. Our appearance at K 2013 will be characterised by originality as we place the spotlight on the benefits our innovations bring to various sectors.

The steady expansion of our production and sales sites around the globe calls for the kind of energy that comes naturally to us as a stable, family-run business; and we intend to stick to our path in the future. Our aim is to give you the decisive advantage that will set your company and your products apart from the competition, whether you do business in Europe, the USA, Asia or elsewhere.

Here’s to a successful K 2013!
Retrospective

Current Events

4  ENGEL worldwide. Around the corner. Fairs, events, projects

7  ENGEL increases its market shares New 950 million euro turnover record

8  Inject the future: ENGEL at K 2013 New applications, efficiency records, world premieres

11 CC 300 – the new ENGEL control unit At K 2013 ENGEL gives an insight into its new control concept

12 Maximum performance in a new dimension ENGEL e-speed for demanding packaging applications

13 All-electric, highly precise and tie-bar-less ENGEL e-motion 30 TL extends smaller end of range

14 Intelligent user interfaces of tomorrow Multifunctional surfaces represent new opportunities

16 Free space fully exploited Anton reduces unit costs thanks to tie-bar-less technology

18 Improved energy balance, optimised workflow Hadi-Plast invested in four ENGEL victory machines

20 “We discover new potential every day” Geberit ups efficiency and quality levels with ENGEL e-factory 2

22 Outstanding reproducibility levels included ENGEL supplies SPLAST with intelligent system solutions

23 The first machine was delivered by horse Kellipla thanks ENGEL for 55 years of cooperation
Process integration reduces cost per unit
Chinaplas in Guangzhou

Innovative system solutions for more efficient processes and a greater competitive advantage were the focus of the ENGEL trade fair booth at Chinaplas 2013 in May in Guangzhou. ENGEL was exhibiting four production cells at the fair to cover a wide range of applications from high-precision, electronics components, through thin-wall packaging and health care products made of liquid silicone through to multifunctional controls for cars. They clearly showed how process integration, automation, tie-bar-less technology, compact machines and energy efficient drive concepts help to substantially reduce unit costs. “Chinaplas is one of the most important times of the year for us”, says Christian Pum, CSO of ENGEL Holding. “ENGEL is seen as a very innovative and experienced system provider and technology leader in Asia, which is largely confirmed by the ever rising visitor numbers at our stand at the fair.”

Inauguration ceremony in Wurmburg
4th ENGEL location in Germany

Mid-April 2013, ENGEL inaugurated its new sales and service subsidiary in Wurmburg near Stuttgart with 130 customers and partners. “Our objective is to establish ourselves as an information and communication hub for our customers in South West Germany,” says Claus Wilde, Head of the new ENGEL Deutschland GmbH Technologie Forum Stuttgart. The 700 square metre Technology Centre is the largest of all ENGEL subsidiaries. It has space enough for seven automated production cells which change to reflect the comprehensive program of seminars and workshops. With the new location, right next to the A8 motorway, ENGEL has substantially shortened its travel time to customers in the Southwest. “Many plastics processors are moving away from standard machines to more complex and technologically sophisticated system solutions, which means even closer cooperation between plastics processing companies and systems suppliers,” says Wilde.

Besides Nuremberg, Hagen and Hanover, the ENGEL Deutschland Technologie Forum Stuttgart is the fourth ENGEL subsidiary in Germany. 22 staff for sales and application technology, training, service and energy consulting are in from the start. In the mid-term, ENGEL seeks to continue growing in Wurmburg. All told, ENGEL invested some 5 million euros in its new location.

“Customer proximity is becoming increasingly important as a success factor.”
Claus Wilde, Head of ENGEL Deutschland Technologie Forum Stuttgart

The Technology Centre offers space for seven production cells and the best options for networking.

On the industrial estate Dachstein in Wurmburg, ENGEL has found the perfect conditions for its fourth German location.
Key position in southeast Asia
New branch in Thailand

ENGEL AUSTRIA has raised its market profile in Thailand with the founding of a new sales and service branch on 1st April 2013. ENGEL Machinery (Thailand) Ltd., which is located in Bangkok, will also play a key role in terms of the company’s presence in southeast Asia: amongst others, sales and service in Indonesia and the Philippines will be overseen from Bangkok. Demand for ENGEL products continues to grow rapidly across the region.

In fact, ENGEL has had a sales office in Bangkok for three years; the staffing level of the office was recently expanded before it was absorbed by the new branch on 1st April 2013. Managing Director of ENGEL Machinery (Thailand) is Gilles Lefevre, who will take charge of a seven-strong team of sales and service personnel in the Thai capital. Market presence will also be enhanced in Indonesia with a representative office and two application and service technicians.

“The new structure will enable us to handle current growth, as well as the expansion we expect in the future, even more effectively. It will also allow us respond more flexibly to the rapidly developing markets in southeast Asia”, says Gilles Lefevre. ENGEL Machinery (Thailand) will benefit from the global production network of the ENGEL Group in the process. “Across the spectrum of injection moulding machines, we are able to guarantee our clients fast delivery times”, believes Lefevre.

“...”

Ready-to-use in one step
Packaging Days in Bangkok

How does a company combine maximum performance, quality and sustainability while minimising unit costs? – Visitors to Packaging Days found answers to this question at the beginning of June 2013 in Bangkok.

ENGEL Machinery (Thailand) and Frigel Asia Pacific were inviting clients to the event. In fact, the keys to success are new and high performance machines, innovative drive concepts and intelligent system solutions. ENGEL and Frigel Asia Pacific were setting out the theory and practice of new efficiency potential at Packaging Days.

The packaging industry is strongly consumer-driven. Unit costs and product quality are not the only concerns in the sector; companies are also under pressure to develop environmentally friendly packaging with ever greater functionality. This presents packaging manufacturers and their suppliers with special challenges that can only be resolved through research and development specific to the sector and close cooperation between all companies in the value chain. One example that ENGEL and Frigel were demonstrating live in Bangkok is the production of highly decorated margarine tubs using thin-wall technology. Thanks to a high level of process integration, ready-to-use food packaging was created in a single work step. With all system components perfectly coordinated, the result is maximum productivity and minimal energy consumption.

At Packaging Days, margarine tubs were produced using thin-wall technology and in-mould labelling.

“As far as the automobile industry is concerned, we are already one of the leading suppliers in the region. Packaging is a fast-growing area being driven by fresh momentum from Indonesia in particular.”

Gilles Lefevre, Managing Director of ENGEL Machinery (Thailand).
New dimensions in production efficiency
ENGEL at Feiplastic 2013 in São Paulo

Energy efficiency was the big issue for ENGEL at Feiplastic 2013, which took place in the Brazilian city of São Paulo in May. “Energy efficiency in manufacturing is a key competitive factor in Brazil”, emphasises Udo Löhken, Managing Director of ENGEL do Brasil Ltda. in São Paulo. The highlight of the exhibits on show at ENGEL’s stand this year was an ENGEL e-mac. Designed to meet the highest standards of precision in the production of technical parts and electronic components, ENGEL’s new all-electric injection moulding machine is setting new standards around the world. With acceleration of over 20 m/s², the injection axis of the ENGEL e-mac is the fastest when compared with competitor machines. The synchronous movements of the drive axes also reduce cycle times.

Minimal energy consumption values are not the exclusive preserve of all-electric injection molding machines, as the hydraulic ENGEL victory 200/80 tech injection molding machine fitted with energy-saving ecodrive option proved at Feiplastic. “Before any investment, we analyze the entire process with the customer”, says Löhken. From hydraulic through hybrid to all-electric injection moulding machines with options for specific industries, ENGEL ensures maximum effectiveness and the ideal price-performance ratio for every application.

“Numerous functions can be integrated into complete glazing systems made of plastic thus substantially reducing system costs. We see huge potential in this market sector.”

Udo Löhken, Managing Director of ENGEL do Brasil

Light, transparent, efficient
Glazing Symposium in Shanghai

During their joint Polycarbonate Automotive Glazing Symposium mid-March 2013 in Shanghai, ENGEL and Bayer MaterialScience once more underlined their global leadership in the field of automotive glazing with polycarbonates. 250 customers accepted the invitation to learn more about design trends, material innovations and economic production technologies and to network. The guests not only came from China; participants from Japan and Korea also travelled to the event.

Among them were mainly plastics processors and coating experts, tier suppliers and OEMs for international automobile brands. “Glazing made of transparent polycarbonate makes a decisive contribution towards supporting the lightweight construction trend and offers designers many degrees of freedom,” emphasises Gero Willmeroth, President Sales and Service, ENGEL Machinery Shanghai. “These benefits lead to increasing demand for innovative glazing solutions, which is reflected in turn in the excellent visitor figures.” ENGEL geared its dual platen, large-scale ENGEL duo machines, which are manufactured in Shanghai for the Asian market, to the production of large surface area, low residual stress, multiple-component glazing components at an early stage, and offers tailored equipment packages under the ENGEL glazemelt brand.

“Energy costs are much higher in Brazil than the other BRIC nations. The only way to be successful on this market is to invest continually in process efficiency.”

Udo Löhken, Managing Director of ENGEL do Brasil

Preview 2013

Drinktec, Munich/Germany, 16th – 20th September
Expo Plast, Bucharest/Romania, 18th – 21st September
MSV, Brno/Czech Republic, 7th – 11th October
K, Düsseldorf/Germany, 16th – 23rd October
ENGEL set a new record in the 2012/2013 financial year by achieving a global turnover of 950 million euros. This represents a 14% increase for the Group based in Schwertberg, Austria, in comparison to the previous year and an overall increase of 165% since 2009/2010.

“Our aim is to be the best at creating customer benefit,” stresses Dr Peter Neumann, CEO of ENGEL Holding: “Being near to our customers is the key to this. On one hand this means increasing our global production capacity and expanding our sales and service structures continuously, and on the other hand it means consistently aligning our products and technologies to the individual requirements of country-specific markets and target sectors. The very positive developments over the last few years confirm that we are definitely on the right track with this strategy, and we are keen to continue in our current direction.” ENGEL was able to increase its market shares all over the world, and its strong commitment levels in Asia played a major role here. Technologically, energy-optimised machine concepts, integrated and automated system solutions, and industry-specific developments are contributing to this growth more than anything else. About 50% of all automated manufacturing cells supplied by European injection moulding machine manufacturers are made by ENGEL, meaning ENGEL is now the world’s leading provider of automated injection moulding processes. The main driving force behind this focus on innovation is Germany. Automation is becoming more and more important throughout the world, however.

Germany the most important market
Approximately 20% of ENGEL’s global turnover is generated by its German branches, making Germany the most important country-specific market for the machine builder. Overall, 65% of the company’s turnover is generated by Europe, while the American and Asian markets are responsible for 17 and 18% of the total turnover respectively. In Asia, ENGEL generated a turnover of 145 million euros in 2012/2013 – which was also a new record. The largest share of this amount was produced in China, which is the world’s biggest market for injection moulding machines. Although the total sales volume actually decreased in China last year, there was never a break in the demand for European high technology. The markets in Southeast Asia are expanding at a particularly rapid rate, especially those in Thailand and Indonesia.

Continuous investments
ENGEL has been able to cope with the higher numbers of incoming orders across the world by continuously increasing its production capacity and adding to its sales structures. Altogether, the company invested more than 67 million euros in different sites in the 2012/2013 financial year. The lion’s share of this money remained in Austria and was used to expand the main factory in Schwertberg, enlarge and modernise its large-scale machine plant in St. Valentin, and introduce line assembly at its robot factory in Dietach. The biggest investments outside of Austria were the massive expansion of the two production plants in Asia. The production capacity at both the large-scale machine plant in Shanghai and the plant for small and medium-sized machines in Pyeongtaek City, South Korea, was doubled. ENGEL is the only western injection moulding machine manufacturer with two production plants in Asia. Since it was founded in 1945, ENGEL has been 100 percent family-owned. With Dr Peter Neumann as CEO and Dr Stefan Engleder as CTO, there are two family members in the management team with operative responsibility. This is now the fourth generation of the family that owns the company to be involved in its running, which is excellent for coupling tradition with innovation.

ENGEL invested 23 million euros in expanding its headquarters in Schwertberg in the 2012/2013 financial year, and further building work is expected to take place at the site.
Cost efficiency in high-volume lightweight construction

In cooperation with ZF-Friedrichshafen, ENGEL will reach a new milestone in automotive lightweight construction at K 2013. For the first time, composite brake pedals will be manufactured in a one-shot process on an ENGEL insert injection moulding machine with ecodrive and the ENGEL easix multiple axis industrial robot. This means previously unreached productivity, the lowest unit costs, accompanied by weight savings of approx. 30 percent compared with legacy steel pedals.

ENGEL v-duo – trade fair premiere and a record

For the first time, ENGEL is exhibiting its vertical large-scale machine at a trade fair. An ENGEL v-duo 700 will be producing lock covers for the KTM X-Bow sports car using the RTM method. It is the biggest vertical machine that ENGEL has ever exhibited at a fair, and it still surprises visitors with its compact design.
A new quality of soft touch
Combining three production processes in one, an ENGEL duo combi M injection moulding machine redefines the manufacturing process for soft touch components. Varysoft (Georg Kaufmann) and MuCell (Trexel) help to create dashboards for Hyundai Kia Automotive in a single step.

ENGEL medical
Three-component hollow bodies with inlays in a single step
Manufacturing drip chambers for blood transfusions, with an integrated filter, an ENGEL e-victory combi three-component injection moulding machine with integrated ENGEL easix sets a new record in process integration and efficiency. For the first time, hollow bodies with an inlay will take just one step.

High performance with maximum assurance
The highly-automated manufacturing cell for manufacturing needle holders for insulin pens demonstrates a process assurance that is hard to beat. The cores of the 96-cavity mould have a diameter of just 0.3 mm; despite this, a cycle time of approx. 5 seconds is achieved. To effectively counter core deformation, the electric injection unit on the ENGEL e-motion is equipped with a direct drive. This results in a particularly high injection dynamic.

ENGEL @ K 2013
The latest info at all times with microsite & app. Before and during the fair.
Curious about what the ENGEL stand holds in store for you? The exclusive microsite www.ENGEL-k-online.com gives you the latest facts.

- Information: Descriptions and trailers of the ENGEL fair exhibits
- Orientation: Clear-cut plan of the trade-fair stand and calendar for machine demonstrations at K 2013
- Overview: Directory of all ENGEL exhibits (including those at partner stands)
- Contact: Your direct line to ENGEL
- Download: Exhibit flyers, brochures, etc. available for downloading
- Latest: Current news about the K fair and ENGEL innovations

The most important facts to go. The ENGEL K app gives you immediate access to descriptions of all of ENGEL’s exhibits, trailers, demonstration times, and the stand plan at all times. Another benefit: once installed, the app works without a live connection to the internet.

Available free of charge on www.ENGEL-k-online.com for Android and iOS.

ENGEL packaging
The new ENGEL e-speed: Fast and powerful
The new ENGEL e-speed 650 injection moulding machine achieves injection speeds of up to 800 mm/s and still uses very little energy. With its new drive system and energy recovery solution, the hybrid machine with electrical clamping unit sets new standards in high-performance applications with high clamping force requirements. Thin-walled containers will be produced on a cavity stack mould in a total cycle time of under 4 seconds. (For more information on the new ENGEL e-speed, refer to page 12.)
Space-saving large-scale machine with excellent energy efficiency
An ENGEL e-duo injection moulding machine will demonstrate how the integration of ENGEL gasmelt and in-mould labelling allows highly-decorated, high-volume packaging parts to be manufactured with minimal resources, costs and energy. The latest addition to the ENGEL duo machine series, which has performed successfully over many years, combines the high precision and repeatability of electric machines with the space-saving double-platen technology of ENGEL's large-scale machines.

ENGEL teletronics
The new ENGEL e-motion 30 TL: All-electric, highly accurate and tie-bar-less
Combining the benefits of ENGEL tie-bar-less technology and all-electric drive technology, the ENGEL e-motion 30 TL responds to the needs of the electronics industry in the low clamping force area. The new, smallest, tie-bar-less ENGEL e-motion with an injection pressure of 3200 bar achieves an injection speed of 800 mm/s in the manufacturing of 60x board-to-board plug connectors in a 16-cavity mould. (For more information on the new ENGEL e-motion 30 TL, refer to page 13.)

From punched part to 4-pin connector with a rotary table machine
All-electric machines are not always required for maximum precision, as will be proven by a vertical ENGEL insert rotary table machine used to manufacture complex, three-dimensional connectors. Preassembled punched parts are overmoulded. An ENGEL viper 20 fully exploits the strengths of the latest generation of ENGEL linear robots.

Stable CFK lightweight construction for the highest design requirements
Teamed with an ENGEL viper 12, the all-electric ENGEL e-mac fulfils all of the consumer electronics industry’s wishes at the same time. In a single step, it creates housing shells for portable electronic devices that combine innovative CFK lightweight design with outdoor robustness, minimal wall thicknesses and high-gloss appearance. The methods used here are the ENGEL organomelt and variotherm technologies as well as a PVD coating plant that is integrated inline with the production cell.

ENGEL technical moulding
Intelligent solutions with a perspective
High optical quality, or an economic manufacturing process? – ENGEL’s multi-layer technology brings both of these requirements together in the manufacturing of premium, optical, moulded parts.

Pre-moulds are created on an ENGEL e-motion and then overmoulded with more layers of the same material. This compensates for sink marks and considerably reduces the cooling and cycle times.

LIM processing on the dot
Fully-automated, rework-free, waste-free and avoiding burrs – an ENGEL e-victory combi impressively demonstrates that ENGEL system solutions not only fully meet these requirements, but also handle LIM multi-component processes safely and efficiently. This is the first time that iQ weight control has been deployed in LSR processing. The new ENGEL software compensates for fluctuations in the melt volume online.

ENGEL automation
New dimensions in linear handling
Maximum stability, dynamism, ease of use and lightweight construction are qualities common to ENGEL viper robots of all sizes. An innovative design that utilises laser-welded steel sections has kept the dead weight of the robots low, enabling the load-bearing capacity to be raised. In a world premiere, the new ENGEL viper 120 will be seen in action at a trade fair for the first time. With a nominal load-bearing capacity of 120 kg, a removal stroke of 3000 mm and a reach of 3550 mm, this is the biggest linear robot in the competitive field.
ENGEL's new generation of control units is set to be unveiled at K 2013. The CC 300 will make the use of injection moulding machines and integrated system solutions even safer, even user-friendlier and even more efficient. ENGEL will be offering all visitors the chance to view the new operating unit for the first time and try it out at its stand in hall 15 of the trade fair, which takes place in Düsseldorf from 16th to 23rd October.

With the development of the new CC 300 injection moulding machine control unit, ENGEL has redefined the interface between man and machine. Man is the focus and has determined the design – without compromises for sure. The result is the optimal arrangement of operating elements and functions. ENGEL had three priorities when developing the unit, which allowed it to achieve this:

1. A focus on customer-oriented functions
2. Optimised ergonomics
3. Realisation using the latest technologies

Customised functions
The new operating unit allows injection moulding machines and manufacturing cells to be controlled according to tasks such as mould changing, or according to functions such as injecting. The information displayed concentrates on the essential without having to leave out the details at the next level if necessary.

The new central operating element, which provides millimetre-precise accuracy and speed-sensitive control for movements, is called e-move. The clearly defined functions increase safety levels when sensitive movements are made and significantly reduce the risk of operation errors. Simply pressing the intelligent operation button is enough to start the machine and to initiate various movement sequences. Gerhard Dimmler, Head of Product Research and Development at ENGEL AUSTRIA, says: “With e-move we are able to fulfil our customers’ wish of making it easier to control injection moulding processes without reducing efficiency or safety levels. It has taken ‘one-button-control’ for injection moulding machines from being a vision to being reality.”

The complete integration of ENGEL viper linear robots and ENGEL easix multi-axis robots, which ENGEL will continue to use with all the products in its new generation of control units, also contributes to this. The entire manufacturing cell can be controlled and monitored centrally from the injection moulding machine’s control panel. The CC 300 therefore offers efficiency-optimised interaction between the injection moulding machine and automation, reduces cycle times, and by doing this plays a crucial role in maximising competitiveness.

Individualised ergonomics
Seeing, feeling and adapting are key factors as far as ergonomic improvements are concerned. The new 21" full HD display, for example, is easier to read and also offers simpler and user-friendlier navigation. The information and layout of the different screen pages can be adapted to suit the user’s individual needs, and haptically shaped operation elements can be assigned different functions. The control panel automatically switches to the position which is best ergonomically for the individual operator when they log on.

Latest technologies – robust and fast
Thanks to capacitive touch technologies, the new machine control unit can be operated as easily as a smartphone and is also just as quick to respond. Safety glass gives it a surface which remains robust and insensitive to dirt even in unfavourable environments. The increasing degree of process integration and automation is constantly presenting plastics processors with new challenges. Acquiring ENGEL’s new CC 300 control unit will ensure that they are as well equipped as possible for the future and able to program, activate and monitor complex processes easily with outstanding precision and safety levels.
ENGEL e-speed for demanding packaging applications

Maximun performance in a new dimension

ENGEL combines the best of two worlds in the new ENGEL e-speed 650 injection moulding machine. The new high-speed machine uses the tried-and-tested technology of the all-electric ENGEL e-motion and ENGEL e-cap high-performance series and also boasts the performance of the ENGEL speed series, meaning it unites outstanding injection speeds with maximum energy efficiency.

Two aspects were focused on in particular during the development of this addition to the ENGEL speed series, which is a proven high-performance toggle clamp series of machines. They were the introduction of higher clamping forces at the top end of the series and a new drive concept which guarantees excellent energy efficiency levels even at high speed. The result is a 650-tonne hybrid machine with an electric clamping unit and a completely new drive solution. As power peaks are traditionally not achieved economically when high clamping forces are combined with short cycle times, a flywheel acts as an electric reserve in the new ENGEL e-speed. It stores the braking energy from the platen movements and transfers this energy back to the motor as and when it is required for processes such as the reacceleration of the clamping movements. This ensures that the power requirements of the drive motor are covered. When the storage capacity is reached, the excess energy from the generator is fed back into the network and not converted into heat by the braking resistance – which is what usually happens with older machines. The ENGEL e-speed 650 is therefore able to run with a relatively low and above all constant connected load. Power peaks are reliably avoided. Ejection movements are also executed electronically on standard models. A hydraulic variation is available as an option.

On the injection unit side, the ENGEL inline injection unit, which has particularly high injection dynamics and an electric plasticising drive, is used, which enables injection speeds of up to 800 mm per second to be reached. Screw diameters 80 and 90 are available with the ENGEL e-speed 650 at the outset.

Thin-wall injection moulding with ultra-short cycle times

As is the case with all ENGEL’s toggle clamp machines, the toggle clamp on the e-speed 650 is encapsulated, which ensures that oil consumption levels are well below average. Thanks to this special design principle, the machine achieves extremely short dry cycle times. The integrated controlled spindle cooling system also helps to shorten cycle times, which can be less than four seconds when thin-walled items like containers and lids are being manufactured for purposes such as food packaging. The ENGEL e-speed 650 has been specially equipped with an extensive range of options (including cooling water and pneumatic options among other things) to enable it to meet demanding packaging requirements. In addition, its particularly long opening stroke allows it to work with large stack moulds without any problems.

Another development aspect was also heavily focused on when the new hybrid machine was being designed. To make it easier to access the mould area, the safety gate was constructed in two parts. In the case of minor manual interventions, the machine operator is able to access the mould area quickly and easily with just one hand, and only has to open the safety gate completely when the mould needs to be changed.
ENGEL e-motion 30 TL extends smaller end of range

All-electric, highly precise and tie-bar-less

In time for K 2013, ENGEL has expanded its range of all-electric ENGEL e-motion injection moulding machines to include a tie-bar-less 30-ton version. The new ENGEL e-motion 30 TL combines maximum precision and energy efficiency with low machine weight and a compact design, thereby setting a new global standard in the manufacture of precision optical parts and electronic components.

ENGEL has been constructing tie-bar-less, all-electric injection moulding machines for the small clamping force field for more than 12 years. The machine concept has now taken a major step forward with the expansion of the series. The experience of selling more than 60,000 tie-bar-less machines in the ENGEL victory and ENGEL e-victory series and the findings of extensive analyses have led to optimisation of the mechanical properties of the machine components along with a reduction in the weight of the new machine.

The most striking innovation is that the ENGEL e-motion 30 TL has a new kind of ‘intelligent’ frame concept in place of the double machine frame. This guarantees very high platen parallelism together with an even distribution of clamping force across the entire mould fixing platen. The sealed three-point toggle lever with maintenance-free crank mechanism works with a servomotor to facilitate very short dry cycles of well under one second.

The servoelectric ejector and mould height adjustment are integrated into the moving mould fixing platen. As with all ENGEL e-motion machines, the main movements are servoelectric; this makes it possible to synchronise parallel movements.

As far as injection is concerned, the ENGEL e-motion 30 TL is equipped with the established in-line injection unit 50, which now delivers an injection speed of 800 mm/s. Three barrel diameters are available as standard: D15, D18 and D20.

For optical lenses and electronic components

With no tie-bars in the way, mould fixing platens can be used to the hilt. Tie-bar-less technology also makes mould changes easier and speeds up automation as direct parts handling is possible from the side.

Promising high precision, efficiency and flexibility, the ENGEL e-motion 30 TL is ideal for manufacturing high quality optical components and electronic parts such as connectors for mobile devices. At the same time, the high performance level of the new tie-bar-less machine offers advantages to producers of other components requiring a low clamping force.

For optical lenses and electronic components

With a length of just three metres, the new all-electric tie-bar-less machine offers a highly compact design that saves valuable floor space in the production hall. Moreover, thanks to tie-bar-less technology, it is possible in many applications to use a smaller machine than mould size would normally dictate.
What exactly are multifunctional surfaces?

**Michael Fischer:** The term multifunctional surface stands for a totally new engineering composite. Injection moulding technology and mechatronics can be combined to give plastic surfaces functionality and electronic intelligence. This is made possible by capacitive sensors which utilise the principle of electrical capacity, the reciprocation between two spatial points (as in the electric force field between two electrodes). The electric flux lines within an electric field may be changed by introducing a conductive object (such as a fingertip). The capacitive sensors pick up these changes and respond with a voltage variation that can be used to initiate a particular function.

What benefits does this mean for medical technology?

**Christoph Lhota:** Operator controls on electrical medical equipment pose a risk in all environments, including sterile areas such as operating theatres. Germs and dirt particles adhere easily to the connection points of switches, buttons and control knobs on a front panel, and prove difficult to remove. To produce a continuously sealed and even interface, a membrane keyboard is often used. However, such keyboards tend to be less than robust in practice and therefore constitute an additional risk factor. With multifunctional surface technology, the operating elements are hidden behind a continuous, flat and durably resistant surface. This makes it easier to fulfil strict hygiene requirements than with legacy technologies – and at a far lower manufacturing cost.

Which reference applications exist?

**Michael Fischer:** ENGEL presented its first close-to-production application at its Symposium last year. Centre consoles for cars with a multifunctional interface were manufactured using an ENGEL duo 350 injection moulding machine with reversing plate and combination mould. A capacitive, three-dimensional pre-formed film was placed into the mould, overmoulded with PC/ABS using the ENGEL clearmelt method and then finally flooded with polyurethane, not only protecting the surface but also providing a premium appearance. A highly-integrated and automated production cell made one thing very clear at the symposium: multifunctional surface technology does not just ensure the perfect preconditions for developing ideal user interfaces, but also achieves previously unknown production efficiency.
What makes the manufacturing process so efficient?

Michael Fischer: Starting with capacitive films and plastic granulate, ready-to-install functional components are created in a single step. Compared with manufacturing a legacy control unit, where in many cases more than 100 small parts need to be individually produced and assembled, multifunctional surface technology reduces the manufacturing costs for the centre console in the car by at least 30%. Since no assembly is required, productivity is also increased sharply.

Christoph Lhota: Another advantage is the huge scope for freedom of design which the technology offers. Because sensor positions can be freely chosen within generous limits thanks to flexible print production, and because the films can be shaped almost arbitrarily, product designers can place even more emphasis on usability and ergonomics without increasing unit costs.

When can we expect the first applications?

Michael Fischer: Initial projects are already moving into the implementation phase in the automotive industry. In cooperation with our partners, including plastic electronic in Linz/Austria, we are working on enhancing the lessons learned in the automotive industry for medical technology. Functional tests were successfully carried out for the automotive industry in the temperature range of -40°C to +85°C.

What potential do you see for medical technology?

Christoph Lhota: The potential is huge. Principally, multifunctional surface technology is suitable for any electrical medical technology device that needs to be manufactured in large numbers, for example, blood sugar measuring devices, insulin and infusion pumps, or respiratory therapy systems.
Free space fully exploited

Anton Kft., which is based in Zalaegerszeg, Hungary, can now place four injection units at once on an ENGEL victory injection moulding machine with a clamping force of just 400 tonnes, while at the same time combining multi-component injection moulding with insert technology. Thanks to tie-bar-less technology, the plastics processor has been able to cut down its production costs and also reduce the amount of floor space its manufacturing cells take up. This high efficiency levels impressed the jury of the ENGEL HL Awards 2012. Anton won the bronze HL Award.

Highly complex multi-component parts are one of Anton’s specialities. As it makes its own moulds, the company, which was founded in 1990, is able to offer a complete range of services, from the design stage to the process development stage to mass production. “We have always focused on multi-component technology and are now one of Hungary’s leading providers in this area,” stresses László Kendli, the production manager at Anton. “Our international customers in particular appreciate the fact that we are able to provide them with a mould construction service and injection moulding from the same place.” Bosch is one of the company’s biggest customers. Anton has worked with the global technology giant for more than ten years and, among other things, makes power tool casings for it, such as the casings for the jigsaws in the PST series. As products aimed at DIY enthusiasts which are faced with tough competition in home improvement stores on a daily basis, the tools have to be both highly functional and attractive in appearance. The casing therefore plays a key role. Different colours and materials are combined using a very economical, integrated process. After all, the price of an item also has a significant effect on how competitive it will be when it appears on the shelves.

Four injection units positioned compactly

The jigsaw casings are produced using four-component injection moulding and insert technology, and the mould is accordingly large. It measures, 1250 mm x 910 mm x 900 mm and weighs, 3000 kg. Although the required clamping force is only 350 tonnes, plans for injection moulding machines with a clamping force of over 600 tonnes were initially drawn up. ENGEL, however, tried using a 400-tonne machine for the production process, and was rewarded with the order for the injection moulding system involved here. The key to achieving this? As the clamping units on the ENGEL victory injection moulding machines don’t have tie bars, mould fixing platens can use all the space right up to the edge of the machines. This means that large moulds fit on relatively small machines. András Borszéki, the sales manager at ENGEL Hungaria, says: “It’s no longer the mould dimensions which dictate the size of the injection moulding machine, but the clamping force that’s actually required.”

Another advantage of the barrier-free clamping unit is the fact that the four injection units can be positioned compactly. Two are vertical, one is horizontal, and one is placed in a piggyback position.
The ENGEL victory 1050H/330W/200V/400 combi injection moulding machine produces a left half and a right half of a casing per cycle in a 2+2-cavity rotary table mould. An ENGEL viper 20 robot inserts a metal sleeve into each cavity at the beginning, which is later used to attach the saw blade at the assembly stage. Once the mould has closed, the basic forms are injected in the lower half of the mould. These are green polypropylene and contain 30 % glass fibres. The mould then opens and transfers the pre-moulded parts to the top half, where core pull technology is used to add the three other components: the red Bosch logo, which is also polypropylene reinforced with glass fibres, and TPE S in black and grey on the handles. After a total cycle time of 36.8 seconds, the ENGEL viper 20 robot removes the two halves of the casing while putting a new set of inserts in place.

“Quality is the most important thing, and our customers’ requirements have become considerably more demanding in the last few years,” stresses Anton’s quality manager, Norbert Farkas. “The surface quality is just as important as the dimensional accuracy of the parts.” While high-quality surfaces are mainly achieved through optimising the mould, the precision of the injection moulding machine and the way parts are handled are what count when it comes to attaining dimensional accuracy. Norbert Farkas adds: “By investing in a new manufacturing cell, we’ve been able to reduce our proportion of rejects to less than 5 %. With our old systems, this figure was 12 to 16 %, This improvement is primarily down to the way the new system handles parts.”

Positioning accuracy reduces cycle times

The trademark of the ENGEL viper generation is maximum stability combined with outstanding dynamics. New software features such as vibration control, which reduces the natural oscillation of the robots and increases tracking and positioning accuracy in doing so, are responsible for this. Zoltán Vincze, Anton’s technical manager, says: “The viper 20 does remain stable while working for a long period of time, without us having to readjust it. This is not the case with other linear robots.” András Borszéki adds, “The ENGEL viper robots also offer new ways to optimise the interaction between injection moulding machines and robots to make systems more efficient.” As the robots’ control unit is completely integrated in the CC 200 control unit of ENGEL injection moulding machines, a robot can access the machine’s parameters directly and start the insertion and removal process before the mould has fully opened. From his calculations, Arnold Farkas, Anton’s production team manager, is able to say: “This cuts our cycle times by about 3 %. If a large number of units is being produced, this alone will have an effect on the unit cost.”
"Our company has always stood for precision products that are subject to numerous internal and external tests", emphasises Ralf Dirks, the managing director of Hadi-Plast GmbH. "The new ENGEL injection moulding machines not only allow us to maintain the standard without any effort, but to actually extend it." Hadi-Plast’s customers come from a variety of branches, including automotive, fitting and device construction, medical technology and furniture manufacturing. The required profile is similar for all of them: maximum precision and just-in-time delivery.

One of the biggest challenges that Ralf Dirks and his 25 staff face daily is zero error production, which is being increasingly demanded in the automotive industry, as..."
well as the continually increasing energy costs. "To be able to maintain our competitiveness in the long-term, we need to compensate for rising costs with the help of innovative processing technologies", says Dirks. Four ENGEL victory injection moulding machines with clamping forces of 50, 80, 120 and 180 tonnes – each equipped with ecodrive and sprue pickers – were commissioned in the course of 2012; two further machines – with 28 and 50 tonnes clamping force – were ordered in May 2013.

Smaller machines thanks to tie-bar-less technology

"Because we need to manufacture with a large number of high-volume moulds, due to design considerations, we benefit greatly from the tie-bar-less technology of our new injection moulding machines", says plant manager Friedhelm Dirks. "In many cases we can deploy machines with lower clamping force." For example, we now use a 4-cavity mould with particularly long core pulls to manufacture connecting parts on the ENGEL victory 330/80 tech with 80 tonnes clamping force. Previously we needed a 150 tonne machine purely because of the mould’s dimensions. "Thanks to tie-bar-less technology we can reduce the clamping force for this application by nearly 50 percent. What this means for us is less floor space needed, less energy consumption and also lower investment outlay in new projects", says Friedhelm Dirks.

Job sizes vary at Hadi-Plast between 1000 and 50 million. Only one third of the products are long runners; the other moulds only produce between six and 48 hours. This makes tooling times an important efficiency factor. "On average, free access to the mould area saves us half an hour", says Ralf Dirks. "All told, we have thus been able to accelerate our complete order processing and optimise our workflows."

Energy savings of up to 55 percent

All ENGEL victory injection moulding machines at Hadi-Plast are equipped with the ecodrive energy-saving option. "The injection moulding machines are self optimising and regulating in terms of energy consumption to match the specific part", says Thomas Rottkamp, who is responsible for production planning. "That means that we never require 100 percent performance from the machines, but only what we really need to produce a component. This considerably reduces the energy consumption compared with conventional, hydraulic injection moulding machines without energy saving options while at the same time helping to achieve a far lower noise level in the production shop."

"Depending on the machine type and the application, ecodrive reduces the energy consumption of ENGEL hydraulic injection moulding machines by at least 30 percent", says Christoph Hölscher, a sales engineer with ENGEL Deutschland. The key to this is, among other things, avoiding energy loss. While the machine is idle, during cooling phases for example, the servo-pumps switch off and no energy is consumed. "It is unusual for people in production to be happy about things that aren’t moving", says Friedhelm Dirks with a twinkle in his eye. To create an overview, Hadi-Plast performed numerous comparative measurements. "On average, the consumption values for our products are between 43 and 55 percent lower with ecodrive than what we need with hydraulic machines without servo-hydraulics", says Ralf Dirks. "This means that we can operate twice as many machines with the same power consumption. In future, we will only invest in energy-optimised machines. For us, energy efficiency also means securing our future."
With networked machines and transparent processes, the fourth industrial revolution is providing a further boost in efficiency and quality for plastic processing companies. Manufacturing execution systems (MES) are forming the interface between production and management levels more and more frequently. Geberit’s Pottenbrunn branch has opted for ENGEL e-factory 2 and has so far been exploiting more optimisation potential than ever before.

“Our aim was to be able to set up our systems more quickly and continuously improve our production processes by making them more transparent,” says Michael Höchtl, a process engineer for Geberit Produktions GmbH & Co. KG based in Lower Austria, when stating the most important reasons behind the company’s decision to start using ENGEL e-factory 2 in 2012. With the launch of Release 2, ENGEL has added more functions to its MES solution for the injection moulding industry. As a test customer, Geberit’s branch in Pottenbrunn has been one of the first to use the new version.

Geberit, whose headquarters are in Rapperswil-Jona in Switzerland, is Europe’s leading manufacturer and supplier of sanitary parts and systems. The group employs approximately 6100 staff across the globe, and 350 of these work in Pottenbrunn, where 39 injection moulding machines with clamping forces ranging from 40 to 600 tonnes enable the site to make a very wide selection of products. It manufactures just about everything from small and delicate internal components for bathroom fittings to lengths of pipe with diameters of 250mm for building drainage systems.

Centralised data management reduces set-up times

As screw threads and connection sizes vary from country to country, the site works on a total of 1300 different moulded products. This means frequent mould changes and that there is a huge number of data sets. Michael Höchtl says: “Before we started using e-factory, we had a separate diskette for every one of the 1300 items. The person setting up the machine had to find the right diskette first of all and then print out a hard copy.” In addition to being time-consuming, this meant there was a high risk of error, because there was sometimes more than one set of set-up data for one item. “e-factory has put an end to this vicious circle,” Höchtl continues. Michael Höchtl and his team began introducing e-factory in March 2012, and the site has been using the MES solution productively since November. 28 injection moulding machines are now connected to e-factory 2 and 1100 data sets have been added, while older machines and moulds which are only used very rarely have been purposely left out for the time being.

“The central management of part data sets alone has resulted in higher productivity levels within a very short space of time,” explains Michael Höchtl. The data module of the ENGEL MES solution allows part data sets to be managed centrally and then transferred to the injection moulding machines online. There is only one active data set for each mould, and any changes to a data set are recorded in its history. “The fact that we can now process and edit the data sets while sitting at a desk is a great advantage to us,” says Höchtl. “It means that we’re no longer wasting productive machine time.”

Process optimisation performance indicators

Geberit uses a second module of the ENGEL MES solution for continuous process optimisation. e-factory Monitor sends meaningful performance indicators and status information such as production progress data, production stop causes and machine alarms directly to the office of those responsible for production. They are able to counteract any deviations from plans immediately, and in many cases before rejects are produced. Michael Höchtl says: “Our previous PDA system simply told us whether a machine was producing or not. With e-factory we’re now informed of the reason for a production stop as well. We analyse the error causes and gain important information for optimising our processes from that.”

It is however precisely this new dimension of transparency that caused Michael Höchtl to worry a little when Geberit first began to use e-factory. He was concerned

“We discover new potential every day”
about how the company’s employees would react to this permanent checking. As it quickly transpired, his worries were unfounded: “At our company, every employee is responsible for the quality levels achieved in their area, and the MES helps them to produce the quality levels required and even to increase them in the long term.”

Five employees in the injection moulding department are currently working with e-factory 2, and their aim is to exploit the potential of the system as completely as possible. Michael Höchtl says: “We discover new opportunities nearly every day. We weren’t aware of how great the potential really was until we actually started using it.”

The modular structure of the MES solution makes it very easy for plastics processors to embrace the digital age gradually. Doris Eder, the project manager for ENGEL e-factory at ENGEL in Schwertberg, says, “We analyse the individual needs of each customer and collaborate with them to work out which modules are going to help them most at which moment in time.”

Geberit have decided to implement two modules to begin with, for example. “There are lots of different factors which are helping us to increase the overall efficiency of our manufacturing thanks to e-factory,” Michael Höchtl says. “It is a continuous process. Simply implementing an MES doesn’t give you an advantage over your competitors any more. What’s crucial is how successful you are at exploiting the opportunities offered by the system.”
The automobile component and technical part manufacturer is among the first to use iQ weight control, ENGEL’s new software for online process control.

SPLAST, which is based in Jedlicze, Poland, has increased its injection moulding production capacity by acquiring three new system solutions from ENGEL. The relevant process parameters will be readjusted automatically.

SPLAST and ENGEL have worked together since 2005. Marek Sanocki, also an owner and the technical managing director at SPLAST, says: “We have dealt with the same contact at ENGEL since the beginning. ENGEL is not just a supplier to us, it is also an important development partner, and we particularly value its high levels of system solution competence, which encompass its injection moulding machines, as well as process technology, mould development, and automation”.

SPLAST is a complete injection moulding service provider, including product design, mould manufacturing, process development, serial production and assembling. Its customers include reputable international corporations and OEMs operating in the automobile, white good, household item, and electronic industries, and the main materials to be processed are technical plastics like glass fibre reinforced polyamide and POM. Tadeusz Sanocki, managing director and owner of SPLAST, stresses: “We are at home in challenging and innovative industries. The continuous monitoring of quality-relevant process parameters is an important competition factor to us. With iQ weight control, processes now monitor themselves and automatically readjust if necessary. This means that we have been able to reduce the risk of rejects drastically, because we are producing outstanding quality continuously.”

Relevant process parameters will be readjusted automatically.

The software, which was developed by ENGEL for injection moulding machines with electric injection units, analyses the pressure profile at screw positions in real time during the injection process and compares the measured values with a reference cycle online. Based on this, the system computes a new set of process parameters which allow changes in the melt volume and material viscosity – the two most important factors when it comes to the quality of moulded parts – to be detected immediately. If there are deviations from the set values, the relevant process parameters will be readjusted automatically. Changes in environmental conditions and raw materials are counterbalanced before a reject can be produced, and online monitoring also reduces the amount of work for the machine operator.

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iQ weight control detects changes in melting volume and material viscosity and automatically compensates for them in the same shot. The result is injection moulded parts which are always of outstanding quality.

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ENGEL supplied SPLAST in southeast Poland with a total of three injection moulding systems. They included a large-scale ENGEL duo 5550/900, an ENGEL victory 2050H/200V/80L/400 combi for three-component injection moulding, and an ENGEL e victory 440/120 injection moulding machine equipped with iQ weight control.

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A successful partnership spanning eight years: Mariusz Andrzejak and Piotr Nachilo of ENGEL POLSKA, Tadeusz Sanocki and Marek Sanocki, owners of SPLAST, Christian Pum, CSO of ENGEL AUSTRIA, Agnieszka Czubat, SPLAST’s Head of Process Technology, Maciej Socha, Maintenance Manager at SPLAST, and Herbert Hofmair, Head of Technical Moulding Sales at ENGEL AUSTRIA (from left to right).
The first machine was delivered by horse

Kellpla thanks ENGEL for 55 years of cooperation in an atmosphere of trust

With a big surprise up their sleeves, Kellpla from Venlo in the Netherlands visited its injection moulding machine supplier, ENGEL, in Schwertberg. To say thank you for 55 years of close cooperation in an atmosphere of trust, Kim Kelleners and Hay Kelleners, the owner and managing direction of Kellpla, handed over a sculpture by Dutch artist Fons Schobbers made of red Portuguese marble to ENGEL.

“When I saw the sculpture in Fons Schobbers’ workshop, I immediately knew that it belonged in the foyer of the ENGEL technology centre in Schwertberg”, said Hay Kelleners. “My father, the founder of our company, was the first to befriend the Schwarz family. I would like to express my thanks to ENGEL today by handing over this gift.”

“Kellpla is one of our longest-standing customers and oldest friends”, Georg Schwarz emphasised. “Our two family businesses have grown together down the years.” He can still clearly recall how the first injection moulding machine for Kellpla was transported for part of the journey on a horse-drawn cart back in 1958.

In the name of the entire owning family and the ENGEL workforce, Georg Schwarz said thank you to the Kelleners family. The foyer at the ENGEL technology centre has a new highlight. “I want to invite people to interact with my art”, emphasises Fons Schobbers, who made the trip to Schwertberg along with the Kelleners family.

“There is something new to discover from any angle.” After all, an injection moulding machine doesn’t immediately reveal its potential at first glance.”

The new highlight in the foyer at the ENGEL technology centre in Schwertberg. Kim Kelleners (4th from the right) and Hay Kelleners (3rd from the right) along with the artist, Fons Schobbers (3rd from the left) jointly handed over the sculpture. “Our family business are joined by a long-standing friendship”, said Georg Schwarz (right).