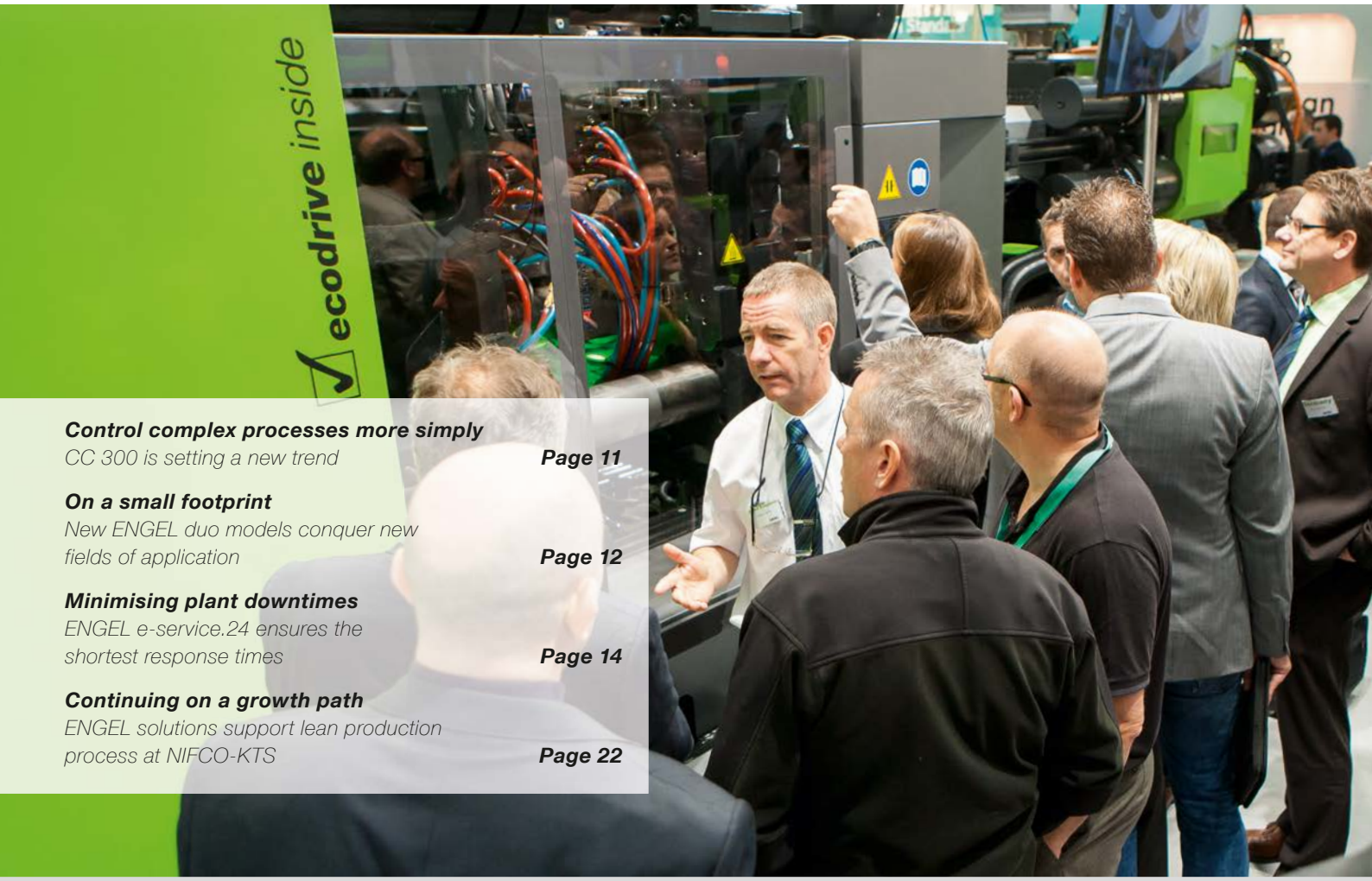
Injection

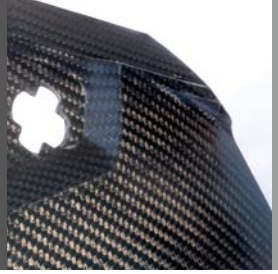
The magazine from ENGEL for the plastics industry.

January | 2014



Inject the future

ENGEL
be the first.



Dr Peter Neumann
CEO ENGEL Holding

Man and machine

The performance of injection moulding machines has improved significantly over the last few decades – in terms of cycle time, energy consumption and service life. Efficiency has been rising every year too. One thing is often forgotten, however: the fact that the interface between injection moulding machines and the companies benefiting from them is still defined by man. The control unit of both the injection moulding machine and the rest of the manufacturing cell plays a very important role here – and not just because the main movements and sequences are optimised via the control unit, but primarily because the control unit enables the machine operator to regulate production efficiency, productivity, process stability and product quality extremely precisely.

The increasing complexity of processes means there are more and more demands on control units as well, and for us this means two things: On one hand, we have been paying special attention to the training of machine operators for several years. In order to extend the operators' knowledge we offer a comprehensive training programme including courses being conducted at our premises, customer premises or via electronic media. This programme was started several years ago and has continued to develop since. On the other hand, we have constantly enhanced our control unit to match the rising demands, so that it is easier and safer to use in spite of its wider range of functions.

Our new control unit, the CC 300, was without doubt one of the highlights of last year's K Fair. Customers want a control unit to be intuitive to operate, able to keep a process under control, and able to detect and correct deviations quickly and easily. This was therefore the main aim when the CC 300 was being developed: that it would detect errors quickly and respond reliably. It is safe to say that the result is the world's most modern control unit for injection moulding machines.

The new CC 300 is the control unit equivalent to the smartphone, with common touch and swiping movements familiar from the smartphone arena making it considerably more user-friendly and easier to operate. At the same time, e-move, which is the only central control element of its kind on the market, gives a feel for the machine and the processes back to the operator. Operating a machine with the CC 300 is therefore unique.

In our technology interview on page ten you will learn more about the new possibilities arising from the CC 300 control unit.

I hope you enjoy reading the latest version of Injection.

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News

Retrospective

Current Events

ENGEL

ENGEL worldwide. **around the corner.**

More spaces for customer acceptance tests
ENGEL invests again in Schwertberg

Just 18 months on from the southwards expansion, ENGEL has opened another new assembly hall at the northern end of its main base in Schwertberg. This increases the number of spaces for machines to be accepted by clients.
Designed for machines weighing up to 40 tons, the new assembly hall also addresses the trend towards larger injection moulding machines. ENGEL now produces machines with clamping force of up to 650 tons in Schwertberg. One of the biggest machines manufactured on the site is the new ENGEL e-speed high performance hybrid machine.
In the past two business years, ENGEL has invested some €50 million just to expand and modernise its Austrian plants in Schwertberg, St. Valentin and Dietach.

Process integration at its best
Swiss Plastics in Lucerne

Maximum precision and reliability levels combined with a tiny footprint: At the Swiss Plastics trade fair that took place in Lucerne at the end of January 2014, ENGEL demonstrated how even very sophisticated applications can be realised efficiently and economically using innovative injection moulding technology. For the first time ENGEL exhibited at the Swiss plastics fair.
At its stand ENGEL has produced drip chambers for blood transfusions with an integrated filter in just one work step using an ENGEL e-victory 160 combi three-component injection moulding machine with an integrated ENGEL easix multi-axis robot. Able to make multi-component hollow bodies with an insert part in a cycle time of just 14 seconds, the manufacturing cell achieves unprecedented productivity.

"We've been increasing our market share in Switzerland continuously. The huge interest we received from visitors at the fair also confirmed the high demands of the Swiss plastics industry for automation and process integration."
Felix Hüthmair, Managing Director at ENGEL (Schweiz)

Innovation strength rewarded
State awards from Upper and Lower Austria

ENGEL AUSTRIA won two innovation awards at the end of 2013. The company's new all-electric and tie-bar-less ENGEL e-motion 30 TL injection moulding machine enabled it to secure second place in the large enterprise category at the 2013 Upper Austrian State Innovation Prize ceremony, with the jury stressing that the new machine is steering the focus of the international electronics industry back to Europe. "Innovative force is the most important requirement for global success, not just for our own business, but also for our locations and the entire region," Dr Stefan Engleder, CTO of ENGEL Holding emphasises.
Shortly before this, ENGEL's large-scale machine plant in St. Valentin was also rewarded for its innovative capacity, with the ENGEL e-duo injection moulding machine receiving recognition and doing well at the 2013 Lower Austrian State Prize ceremony. "We're delighted that our innovative capacity is not just being recognised and appreciated by our customers, but by the whole region," says Joachim Metzmacher, ENGEL's factory manager in St. Valentin.

"Austria has been and always will be the source of our innovations."
Dr Stefan Engleder, CTO, ENGEL Holding

Tie-bar-less technology impresses with coinjection
MSV in Brno

Coinjection technology frees the way for lowest unit costs and new material properties. At International Engineering Fair MSV in October 2013 in Brno/Czech Republic, ENGEL demonstrated how to leverage additional efficiency potentials thanks to a combination of coinjection and tie-bar-less technology. A tie-bar-less ENGEL victory 330H/200V/120 combi injection moulding machine equipped with an integrated ENGEL viper 6 linear robot has produced fan blades in sandwich design live at the ENGEL trade fair booth. The sample parts clearly showed the high precision of the tie-bar-less ENGEL victory injection moulding machine.

Top marks for ENGEL apprentices
Federal Economic Chamber competition

The best in 2013: Georg Hannl, Raphael Fischer and Stefan Undesser (left to right) received the highly coveted apprentice awards.

ENGEL's apprentices are among the best in Upper Austria, and thanks to one first place and two second places at the 2013 apprentice competition run by the state's Federal Economic Chamber (WKOÖ), the company's second-year apprentices upheld this reputation in style. Raphael Fischer proved to be the best design engineer apprentice in Upper Austria, while Stefan Undesser (design engineer) and Georg Hannl (machining technician) secured the two second places.

845 apprentices from 153 companies in Upper Austria participated in the competition, which was judged by a jury of expert professionals. ENGEL was represented by 39 trainees and was very pleased with the results, above-average overall. To Josef Wahlmüller, ENGEL's training manager, this latest success is confirmation of ENGEL's high commitment. "Our apprentices are our future," he says.

"The professional in-house training makes a crucial contribution to securing qualified specialists."

Josef Wahlmüller, ENGEL's training manager

Initiative for young professionals
Pupils visit Molder's Corner

Tamer Gonzalez from ENGEL Deutschland guided the 22 pupils from the Gummersbach Realschule around the subsidiary's premises.

In-house technical training is not just a priority at ENGEL's headquarters in Austria. As ENGEL's first subsidiary, ENGEL Deutschland trains plastic and rubber process engineers at its Hagen premises, and is also dedicated to supporting the next generation of specialists. The site invited year eight and year nine pupils from the Realschule Steinberg in Gummersbach to visit ENGEL's Molder's Corner with its customer Eaton Industries. It was the first time that ENGEL combined

its annual user get-together with a pupil event – and it was a great success. Rolf Saß, ENGEL Deutschland's managing director, says: "The whole industry has been affected by the shortage of professional specialists, and as a result, the pupil initiative also went down very well with our customers and those who came to Molder's Corner."

The young visitors were most impressed by the injection moulding machines and robots at the technical centre, which were constantly producing little presents the pupils could keep. One pupil said, "The machine's unbelievable precision was very interesting. We learnt a lot about plastics during the visit. We were also surprised at how bright and clean the work areas were. We had no idea they would be like that in the industry."

"We all have a responsibility to get young people interested in plastics technology at an early stage."

Rolf Saß, ENGEL Deutschland's managing director

ENGEL attracts the crowds
Open House at ENGEL in Kaplice

"We didn't expect this many visitors to be interested," said a delighted Peter Jungwirth and Gerhard Lumetsberger, Managing Directors of ENGEL strojírenská spol. s.r.o. in Kaplice, remarking on the crowds that turned up to the company's open day. In fact, more than 1,200 visitors accepted the invitation to take a look behind the scenes at one of the most modern factories in Southern Bohemia. Many guests also took the opportunity to find out about current job vacancies at ENGEL, after all, the site is still growing.

Quality of the highest calibre
Korea National Quality Award

The Korea National Quality Award is one of Korea's most prestigious business awards and one of the most important quality distinctions in the world. At the end of November 2013 ENGEL MACHINERY KOREA won this presidential quality award in the field of production innovation. Furthermore, ENGEL is the first foreign company ever receiving this award in the 39 years of its history. The award was handed over by the Korean Prime Minister Jung Hong-Won and the winners have been honored by the Korean President Park Geun-Hye. The Korea National Quality Award has been introduced by the Korean government to improve quality standards in Korea. It is based on the Malcom Baldrige National Award (USA), the European Quality Award and the Deming Prize (Japan) which underlines the international importance. "This award is a great honour for us and also

Robert Bodingbauer, ENGEL MACHINERY KOREA's president (centre), accepted the award together with plant manager Lee Byoung-Hong (left) and manager Park Dong-Chul (right).

an important confirmation of the fact that we're on the right track with our global quality management system", says Robert Bodingbauer, ENGEL MACHINERY KOREA's president. "Our plant in Pyeongtaek City abides by the same strict quality standards used at our main factory in Austria, and this award highlights the fact that this company motto is being adhered to consistently all over the world." The outstanding commitment of ENGEL KOREA's management and employees to implement ENGEL's global systems has been the main factor to receive this prize.

ENGEL has been producing injection moulding machines in the small and medium clamping force segment in Korea since 2001. The decentralised production guarantees short delivery times for customers in Asia and also ensures that machines are adapted to the specific requirements of the local markets. In spring 2013, ENGEL doubled its capacities in Korea. Robert Bodingbauer states: "The demand for quality products and innovative technologies will secure the success of ENGEL in Asia in the future."

A new quality of soft touch
Varysoft Day

Visitors to trade fairs often express the wish for more time to appreciate some exhibits – and that's exactly what ENGEL gave its automotive industry clients with the Varysoft Day at the start of December 2013. The

Preview 2014

ENGEL med.con, York/USA, 8th March

JEC Europe, Paris/France, 11th-13th March

Expo Plasticos, Guadalajara/Mexico, 25th-28th March

Kunststoffe im Automobilbau, Mannheim/Germany, 2nd-3rd April

ENGEL med.con, Corona/USA, 8th April

Chinaplas, Shanghai/China, 23rd-26th April

Mouldplas, Batalha/Portugal, 7th-10th May

ENGEL med.con, Shanghai/China, 22nd Mai

Plastpol, Kielce/Poland, 27th-30th Mai

highlight of the event held in Schwertberg and St. Valentin and organised by ENGEL, Georg Kaufmann Formenbau and other partners was the manufacturing cell used to produce soft touch components under the Varysoft process. The cell was one of the most visited items on show at the K 2013. Many of the 60-plus attendees were international automobile producers and reputable supplier firms.
Compared to other technologies, Varysoft offers even greater softness while allowing undercuts in the component design. "We think the first series applications will come about in around three years", predicts Michael Fischer, Sales Manager (Technologies) at ENGEL AUSTRIA. "At the Varysoft Day event we showed we are not far away from production maturity."

"The ENGEL Varysoft Day is an event with a particularly focused audience. This underlines the importance of innovative soft touch technologies to the interior design of the future."

Michael Fischer, Sales Manager (Technologies) at ENGEL AUSTRIA

Intelligent solutions minimise unit costs

Interplastica in Moscow

At Interplastica at the end of January 2014 in Moscow, Russia, ENGEL demonstrated how innovative injection moulding technology and intelligent options can substantially improve the overall efficiency of manufacturing cells. A tie-bar-less ENGEL victory tech injection moulding machine with an ENGEL viper 6 robot has produced geometrically complex technical parts. This system solution represented the state of the art in injection moulding, featuring an integrated ENGEL viper 6 robot, an ENGEL flomo temperature control water distributor, integrated oil maintenance and the ENGEL e-service.24 service package. The ENGEL victory tech injection moulding machine and all of its optional equipment will remain in Russia after the fair, and will be available for customer trials and training at the new ENGEL Training Centre in Nizhny Novgorod.

ENGEL worldwide. **People.**

ENGEL Appoints New Chief Sales Officer

Dr Christoph Steger has been appointed as the new CSO of the ENGEL Holding. He has followed Christian Pum, who decided to resign from his position to accept new challenges in a different industry.
Christian Pum joined ENGEL in 1991 and has been CSO since 2006. During his time as CSO, Mr Pum contributed significantly to the worldwide success of ENGEL. "We thank Mr Pum for his great achievements and his commitment", highlights CEO Dr Peter Neumann. "We regret to inform you of his departure, but of course we respect his decision and wish him good luck and all the best in his new challenges."
Dr Christoph Steger joined ENGEL 2012 and had since lead the Business Unit packaging with great success. Under the leadership of Christoph Steger, ENGEL packaging has experienced a continuous substantial growth. Together with Dr Peter Neumann, third-generation-member of the ENGEL family holding, now the fourth generation in management with Dr Christoph Steger and Dr Stefan Engleder (CTO) bears operational responsibility.

Dr Christoph Steger

New managing directors for ENGEL in Scandinavia and Mexico

On 1st November 2013, Jens-Thor Hansen joined ENGEL as its new managing director for Denmark, Sweden and Norway. Having previously been the managing director at a plastics-processing company specialising in clean room production, he has gained extensive experience in this area over the last six years. Prior to this role, he was the project and sales manager at a medical technology company and focused on raw materials. Mr Hansen has replaced Ralf Godbey, who left the ENGEL Group at the end of 2013.
ENGEL Mexico also has a new managing director since the beginning of November, with Hector Moreno taking over from Peter Auinger. Mr Moreno is an engineer and has many years of sales experience in the Mexican market. Before joining ENGEL he has been in charge of another European machine builder's Mexican sales for 18 years. Mr Auinger will continue to work for ENGEL and will be taking up a new challenge in Asia.

Jens-Thor Hansen

Hector Moreno

K 2013
huge success for ENGEL AUSTRIA

The K 2013 exceeds ENGEL AUSTRIA's expectations. Spotlighting the topics of system integration and automation, ENGEL's total of 25 machine exhibits focused on the future buzz topics of the global injection moulding industry. Above all, visitors were excited about the new ENGEL CC 300 control unit generation, which takes the overall efficiency of the system to another dimension.

"At the K 2013, we experienced a very positive attitude towards investments", says Dr Peter Neumann, CEO of the ENGEL Group after concluding a successful week at the fair. "Our forecasts were more than fulfilled."
The ENGEL booth in Hall 15 was well visited throughout. Many trade fair visitors took this opportunity to try out the new control unit generation at first hand. They experienced a completley new control solution that at first glance, still looked familiar. (Find out more about the CC 300 on Page 10)

Development live: Solutions close to the customer, for lightweight composites

Amongst others, the automotive exhibits attracted a particularly large number of visitors to the ENGEL trade fair booth. Focusing on lightweight design technologies, ENGEL gave trade fair visitors a sneak preview of current research projects. For example, ENGEL, in collaboration with partner ZF-Friedrichshafen, has established another milestone in the form of the first one-shot process for the production of composite brake pedals in Düsseldorf. This is a milestone because of

two reasons. Firstly, the production cell displayed at the fair, which is nearly production-ready, achieved previously unknown productivity figures. Secondly, the geometrically and load-optimised component proves, that fibre composite materials can already replace steel in safety-relevant areas.

The ENGEL medical business unit also presented a world premiere by making drip chambers for blood transfusions with unprecedented efficiency. Each chamber consists of two halves made from different materials. These halves are injection moulded, joined to the filter and sealed together with a third plastic component by means of overmoulding in just one step.

A 15 mm optical lens in 60 seconds: This was another record set by ENGEL at the K 2013. The company's multi-layer technology, which involves the pre-moulded part cooling outside the mould, enables cycle times to be cut by about 50% compared to current multi-layer methods and by as much as 85% compared to single-layer methods.

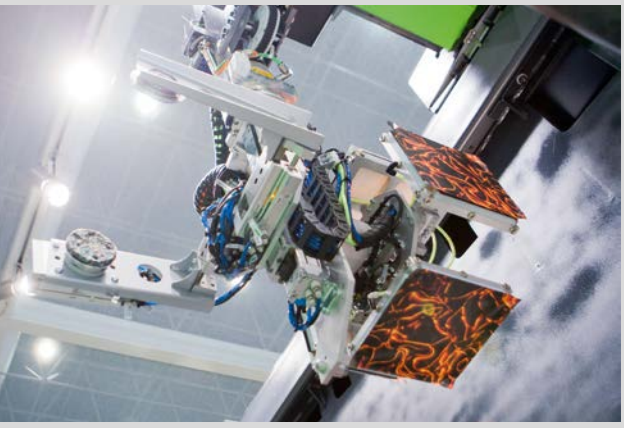
One highlight of the teletronics exhibition area was the new small, all-electric and tie-bar-less ENGEL e-motion 30 TL injection moulding machine, which was presented to an international audience for the first time at the K 2013. ENGEL packaging also showcased a new machine: the ENGEL e-speed 650, which combines excellent injection speeds with maximum energy efficiency. With injection speeds of up to 800 mm/s, the new 650-tonne machine with an electric clamping unit and a hydraulic injection unit has raised the bar in the field of high-performance applications that require high clamping forces.

Service included: ENGEL makes maintenance costs calculable

The exhibits displayed at ENGEL's stand all had one thing in common: they all demonstrated that process integration and automation can provide companies with an edge over their competition. ENGEL also takes this one step further. After all, training and service are fixed components of the company's system philosophy.

Under the ENGEL plus banner, the machine manufacturer showcased its service products and services at the K 2013 in a separate exhibition area. Two items that were particularly popular were the new maintenance packages ENGEL protect and ENGEL protect+, which save plastics-processing companies repair costs and thus increase the availability of machines and systems significantly. As a result, maintenance costs for injection moulding machines and turnkey solutions can be calculated from the very beginning.

“Our aim is to lead the field globally when it comes to creating customer benefit,” says Peter Neumann. The visitors at the K 2013 experienced at first hand that ENGEL keeps its promises.



Dr Gerhard Dimmler, Senior Vice President Product Research and Development (left), and Hannes Fritz, Head of Control Technology and Software Development at ENGEL AUSTRIA (right)

Control complex processes **more simply and reliably**

Process integration and automation are crucial to increasing efficiency in injection moulding production. At the same time, however, they are making manufacturing processes more and more complex, which places new demands on the interface between man and machine. ENGEL has embraced this challenge and presented its new generation of control units, the CC 300, at the K 2013.

Mr Dimmler, what was the response like to the new ENGEL control unit among visitors at the trade fair?
Gerhard Dimmler: The response was extremely positive and far exceeded our expectations. Although we received plenty of suggestions from customers as early as the development stage, we were very keen to find out if the new concept would impress the general market as well. The answer is very clearly yes. I really believe that we've set a new trend for the whole industry.

Mr Fritz, what impressed customers straight away?
Hannes Fritz: What visitors saw at our stand was an operating concept that was new and yet familiar to them at once. Devices that we take for granted in our daily lives, like smartphones, acted as role models when the interface was being developed. At the same time, by introducing the central control element, e-move, we've given the operator back a feel for the machine, which we had taken away to start with when we first included touch functions. It's precisely this combination that impressed our customers.

What exactly has changed compared to the current control unit?
Gerhard Dimmler: Our aim was to develop a control unit that would allow operators to control even complex processes even more simply, conveniently and safely.

We had three priorities when developing the new unit: to optimise the ergonomics, to focus on customer-oriented functions, and to use the latest technologies to create the unit. The new 21" full HD display's appearance alone is a success, being easier to read and also offering simpler and user-friendlier navigation. Like its predecessor, the CC 300 can be tilted forward and its height can be adjusted. What is new, however, is the fact that this happens automatically when an operator logs on, because the ideal ergonomic position is stored in the user profile along with other details. In cooperation with usability experts, we developed a new clear structure, derived from typical application scenarios for the whole panel. The feedback from test users indicates that this structure has been able to significantly simplify intuitive operation of injection moulding machines further.

Hannes Fritz: Something else that's new: The injection moulding machines and production cells can be controlled from either component (e.g. injection unit) or task view (e.g. mould change). In component view, all the available menus, such as the clamping side, the injection side and the robot are arranged in a carousel, which means users can switch back and forth very quickly. To enable a particular task to be completed efficiently, in task view the operator is only provided with the pages needed to carry out this specific task. There are, for example, prepared screens for maintenance, mould changing, process optimization and error searching. More related functions are available on the next level that can be accessed any time they are needed.

Complete robot integration was already a central part of ENGEL's control philosophy in the CC 200. What's the CC 300 like in this regard?

Hannes Fritz: We have fully integrated all ENGEL viper linear and ENGEL easix multi-axis robots into the CC 300 as well, so an entire production cell can now be controlled and monitored centrally from both the injection moulding machine's control panel and the robot. The machine and robot access the same database here, which contributes significantly to the general efficiency of the system, because the movement sequences are coordinated with each other perfectly.

How difficult will it be for users to get used to the new operating philosophy?

Hannes Fritz: It was important to us that users would recognise the interface of the previous version. He should be able to get used to the new environment spontaneously. We have used the same general setting principle. The CC 300 is not a radical innovation, but an evolutionary update, and many of the new features are the result of customer suggestions. The larger screen means that several functions can now be displayed on one page, for example, which provides the user with a better overview of the whole process. As on a smartphone, users can switch from one screen page to another by moving their finger in a horizontal motion across the screen. As was the case with the CC 200, however, this can also be done by tapping on the screen, which allows users to change over to the new options gradually.

And what exactly is e-move?

Gerhard Dimmler: The e-move is a central control element, a kind of twist-and-push knob that has made the vision of one-touch operation for injection moulding machines a reality. One simple press is enough to start the machine and to initiate a movement sequence. Like the gas pedal of a car, e-move enables all machine and robot movements to be controlled in a speed-sensitive manner by being rotated. This allows an even higher degree of precision to be achieved at various points in the start-up phase, such as when the screw or the ejector is being coupled, or the robot is being positioned. The deflection and the respective speed are displayed directly above the control element, which reduces the risk of operation errors significantly.

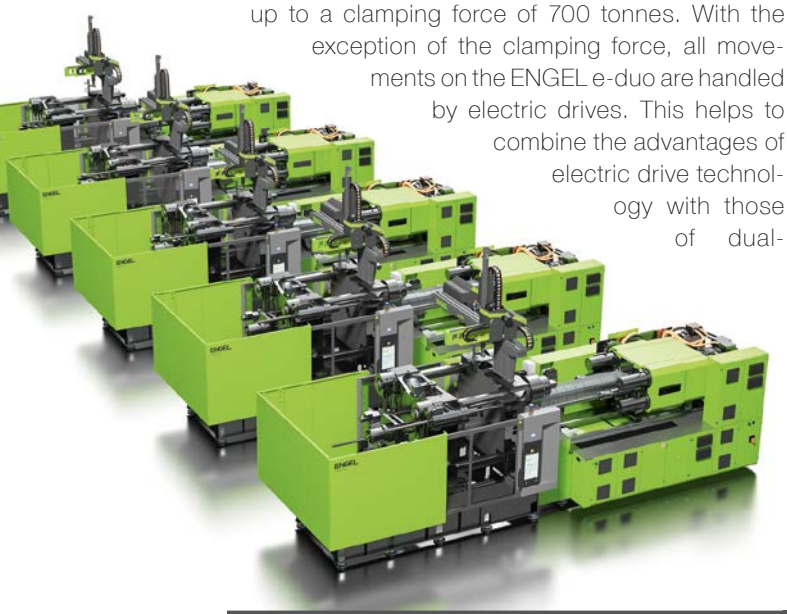
When will the first machines and turnkey solutions with the new control unit be delivered?

Gerhard Dimmler: We'll be starting to launch the new unit onto the market in April 2014 and will be introducing it to all our machine sizes, series and production plants one by one. Of course the huge success at the K show has now put us under pressure to speed up this process, but our focus is still very much on the stability of the new solution.

On a small footprint

High performance and a small footprint are the key attributes of the ENGEL duo dual platen, large-scale machine. ENGEL explores new fields of application with two models, the vertical ENGEL v-duo and the electrical ENGEL e-duo. All told, more than 50 large-scale, new-model machines have been installed since the market launch in the summer of 2012. Additionally, the ENGEL e-duo helped ENGEL take the Lower Austrian Innovation Award to St. Valentin at the end of 2013.

Thanks to the ENGEL e-duo injection moulding machine, which was developed at ENGEL's large-scale machine plant in St. Valentin, ENGEL has established yet another unique selling point. ENGEL is the only injection moulding machine manufacturer worldwide to offer electric machines with this kind of performance up to a clamping force of 700 tonnes. With the exception of the clamping force, all movements on the ENGEL e-duo are handled by electric drives. This helps to combine the advantages of electric drive technology with those of dual-platen, large-scale machines. The ENGEL e-duo stands for the ultimate in precision and repeatability, high injection performance and maximum energy efficiency, while at the same time having a comparatively small footprint. "According to Euromap 6, the 500-tonne version of the ENGEL e-duo achieves a cycle time of 2.6 seconds with a stroke of 600 mm; this makes it the fastest electric, dual-platen machine on the market", emphasises Bernhard Lettner, the Product Manager for the ENGEL duo model range. The ENGEL e-duo achieves injection speeds of up to 450 mm/s and supports parallel operation of the core-pulls, thanks to servohydraulics.



Electrical up to 700 tonnes

Besides the electric drives, other factors contribute towards the particularly low energy consumption. For example, the ENGEL e-duo uses ENGEL ecodrive servohydraulics for the clamping force and core-pulls; innovative linear guides reduce the friction upon opening and closing the mould, and the comparatively low weight of the mould fixing platen ensures low inertia. Compared with a conventional, hydraulic ENGEL duo injection moulding machine, an ENGEL e-duo of the same size requires up to 50 percent less energy. For each machine, this translates to annual energy savings of around 100,000 kWh. Substantially improved cleanliness in the mould area is another benefit.
Thanks to this innovative property profile, the ENGEL e-duo covers a wide spectrum of applications. It is deployed in the automotive industry, in both technical moulding and in the packaging industry, for example, to produce long thin trims or thin-walled components.

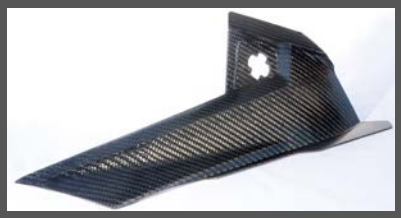
Working with gravity

The ENGEL v-duo was specifically designed for fibre composite applications and its small footprint is impressive. "Compared to conventional presses used for

The ENGEL e-duo stands for maximum performance, precision and energy efficiency on a particularly small footprint.

Trade fair premiere in Düsseldorf

The ENGEL v-duo celebrated its first trade fair showing with an HP-RTM application at the K 2013. A 700-tonne machine produced latch covers for the KTM X-Bow sports car. Thanks to automation – an ENGEL viper 20 robot was used here – the productivity achieved was excellent for an HP-RTM process.



At the K 2013, an ENGEL e-duo 700 injection moulding machine demonstrated how the integration of gas injection technology (ENGEL gasmelt) and in-mould labelling allows highly decorated, high volume packaging parts such as beverage crates and containers to be manufactured with minimal resources, costs and energy.

these applications, the ENGEL v-duo is 50 % shorter in height and about 60% lighter", says Bernhard Lettner. "This means less capital investment for the user". And the overhead for foundations is reduced, as existing shop floor structures can be used in many cases.
The new, vertical, large-scale machine, which is available with clamping forces of up to 3600 tonnes, offers a clear-cut approach to economical serial production for both thermoplastic and thermoset composites. Both in overmoulding of organic sheets and tapes, and for in-situ polymerisation and the high-pressure RTM process, it often makes sense to work with gravity. On top of this, the ENGEL v-duo clamping unit is freely accessible from all four sides, which facilitates manual intervention and automation. Using sliding tables, for example, insertion tasks can be carried out outside the clamping unit, to shorten the cycle time for many applications even further.

Energy efficient production

The clamping unit is characterised by a very high degree of rigidity and excellent mould fixing platen parallelism. The platen-parallelism control for injection compression moulding is included in the standard version of the machine. The ecodrive servohydraulics are also standard equipment. Because the usual hydraulic accumulator has been dropped completely, the ENGEL v-duo also sets new standards in energy efficiency.

Even prior to the official market launch, ENGEL gained a great deal of experience with its vertical, large-scale machine. Early in 2011, the first test system was installed at the premises of development partner Neue Materialien Bayreuth. Right from the start, this plant has been used continuously for various development projects, some in cooperation with ENGEL. Another ENGEL v-duo is available for customer trials and development projects at ENGEL's Technology Centre for Lightweight Composites in St. Valentin.

"ENGEL has been building all-electric injection moulding machines for more than 13 years and can offer the same level of experience with vertical designs. We benefit from these synergies in the ongoing development of the ENGEL duo model range."
Bernhard Lettner, Product Manager ENGEL duo

The ENGEL v-duo is more compact and more easily accessible than the conventional presses used for composite applications.

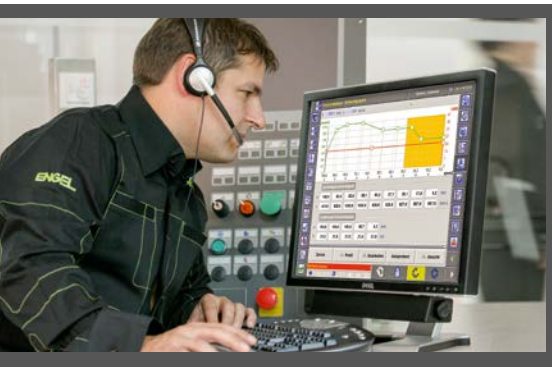
ENGEL e-service.24
minimises plant downtimes

Costs can quickly mount up when a machine is inactive. What is needed is fast and accurate identification and trouble shooting. With its ENGEL e-service.24 package, ENGEL links the injection moulding machines operated by its clients to more than 300 service engineers and its global production plants. In this way, ENGEL guarantees speedy response times – around the world and around the clock.

ENGEL never sleeps. Eight production plants on three continents are in the business of making sure the ENGEL e-service.24 service team is globally available, 24 hours a day and seven days a week. By means of remote connection, specialists working for the injection moulding machine manufacturer can start looking for the cause as soon as a fault is reported. In the event of a breakdown or service request, the system automatically informs the responsible plant operator by email. The operator may then confirm the message and call in ENGEL specialists immediately.

Certified security

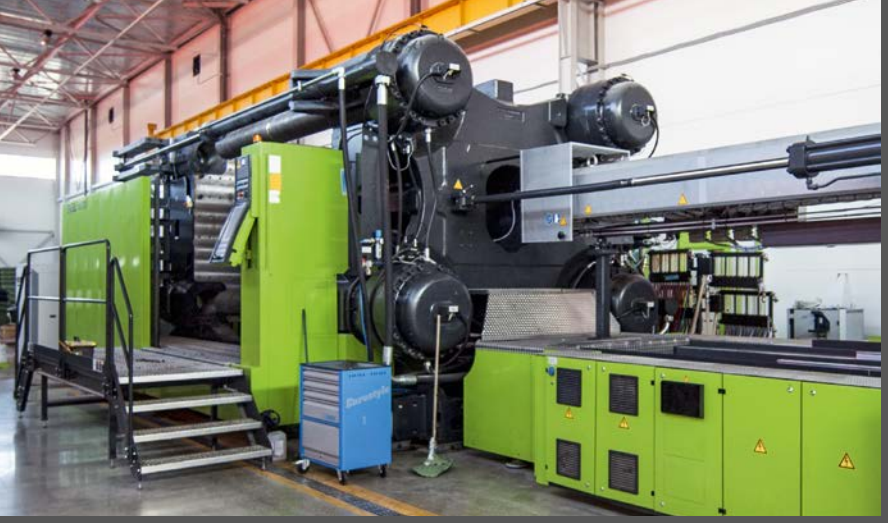
"Through this information chain we can make sure that every time a customer is in need of service, they are the ones to decide what details to share with us and what to withhold," says Wolfgang Degwerth, head of ENGEL's Customer Service Division. "The remote connection only allows us to access those machines and systems that the customer actively releases to us. The client retains data sovereignty at all times." ENGEL has always set great store by data security, and data links with the ENGEL e-service.24 client are established via Internet VPN tunnel. The security concept and the implementation of remote service software are certified by TÜViT, the independent IT testing organisation. As soon as a plant operator approves external access, ENGEL service engineers are able to view the actual screen pages on the machine control unit in real time via secure Internet connection and provide the machine operators on site with specific instructions and explanations in audio, video or text format. Even over distances of thousands of kilometres, efficient cooperation is possible thanks to document sharing functions and redlining tools. In this way, all manner of problems can be conveniently rectified via the Internet; in many cases, the plastics processing firm will not need to engage in costly and time-consuming service on site. If that should prove necessary, however, ENGEL e-service.24 is sure to have provided the best possible preparation: any spare parts needed, for example, can be ordered in advance to cut down actual deployment times. In both scenarios, ENGEL e-service.24 significantly improves machine availability and productivity.
Luke Biller of Toledo Molding & Die in Tiffin, Ohio, looks back on his experiences with ENGEL e-service.24: "I was surprised at how easy it was to work via remote connection. The ENGEL service engineer guided me towards the solution step by step. We could see how the machine was responding to the changes simultaneously. We now have a feeling of security at all times, even at remote production sites."



Thanks to this remote system, ENGEL e-service.24 resolves numerous problems over the Internet – quickly and easily.

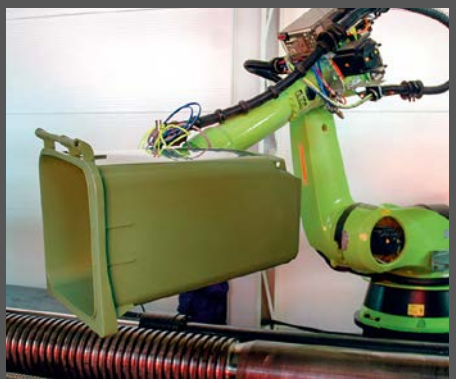
Transparency across all sites

ENGEL e-service.24 means advantages for plant operators even where no fault occurs. An online connection can also assist internal processes, especially for large companies with several sites. All service activities and results are recorded in a log book, providing operators and maintenance staff with a permanent overview of maintenance tasks, repairs, software updates, measurements and comments for all plants around the world. Manuals and internal instructions are made available centrally by means of a documentation management tool, while fast and easy updates are possible via the Internet at any time. Status reports can be compiled and measurement results evaluated as required to ensure continual process optimisation.
To simplify the internal processes of clients even further, ENGEL also plans to offer its ENGEL e-service.24 package as an app in future.



The ENGEL duo dual-platen machine has a relatively small footprint, which means Tara.ru can use the new hall for other projects as well.

From one source: ENGEL supplied the robot and injection moulding machine as a package.



Large containers – lean production

St Petersburg is home to the largest injection moulding machine in the packaging industry in Northwest Russia, as Tara.ru makes waste containers with capacities of 120, 140 and 240 litres on an ENGEL duo 2700 there.

In addition to waste containers, Tara.ru's product range includes a very wide variety of containers, crates, barrels, big boxes and pallets. To start with, the company, which was founded in 1997, focused on selling packaging solutions. It only began manufacturing a lot of its products itself recently, but is keen to use best suppliers nevertheless, to enable it compete successfully with other companies who have been manufacturing for many years. With this in mind, it has chosen ENGEL to provide its injection moulding solutions.

Overall efficiency optimised

Tara set up a completely new production hall for this large ENGEL duo machine, which has a clamping force of 2700 tonnes and was supplied as a package with a six-axis robot by Kuka. "The dual platen design of the ENGEL duo injection moulding machines meets our requirements in the best possible manner," explains Dmitrij Korostelev, Managing Director at Tara.ru. "Its relatively small footprint meant we were able to save space and we can now use the new hall for other projects as well."

High production efficiency levels were also important to Mr Korostelev, and the ENGEL duo machine fulfils this request perfectly with a dry cycle time of only 5.8 seconds, the shortest of its class, and consistent product quality thanks to a high-precision injection unit. Moreover, the machine's servo-hydraulic ecodrive system and insulation of the plasticising barrel ensure that energy consumption is very low, and last but not least, the proximity of the supplier increases the overall efficiency. Although its headquarters are in Moscow, OOO ENGEL has a separate service and training centre in St Petersburg.

"Through our cooperation with ENGEL, we're able to maintain our market share successfully."

Dmitrij Korostelev, Managing Director of Tara.ru

Second large-scale machine added to machine fleet

Mr Korostelev says: "Through our cooperation with ENGEL, we're able to maintain our market share successfully. We are very happy with ENGEL's service, with regard to both the quality of its machines and turnkey solutions, and the competence and reliability of its employees."

Another large-scale ENGEL machine has already been ordered, so Tara.ru will soon be manufacturing bread bins on an ENGEL duo 900 as well.

Clean **work**

Small wastewater treatment plants are used when it is not possible to dispose of wastewater via a municipal sewerage system and wastewater treatment plant. They are used for groups of weekend properties and houses situated too far out to be connected to a municipal system, for example. These units clean wastewater directly where it is produced before it is fed back into the ground or a waterbody. TOPOL-EKO is the largest manufacturer of small wastewater treatment plants and independent sewerage system equipment in Russia. The consortium uses ENGEL turnkey solutions to make its plastic components.

There is no room for compromises when it comes to quality standards in manufacturing small wastewater treatment plants. As the systems are installed underground, the requirements regarding performance, reliability and longevity are particularly high. People's health depends on how efficiently and safely these treatment plants work, after all.

TOPOL-EKO's small wastewater treatment plants can be installed without causing upwelling or being pushed out again in even the most difficult ground conditions and when the water level is high. This is what sets them apart from most of the other treatment plants on the market. Each plant is more than just a septic tank; it is an independent sewerage system that deep cleans wastewater organically. Thanks to a robust, hermetic casing made from modified polypropylene, the plants will last for at least 50 years if used and looked after properly. Reinforcing ribs prevent the casing from becoming distorted during ground movements and protect it from leaking.

Machine, robot and technology from one source

The entire manufacturing process for TOPOL-EKO's wastewater treatment plants takes place over a production area of more than 3500 m². Each completed plant undergoes a multi-stage quality inspection, in which its tightness is checked, as well as the quality of its assembly and the functional reliability of all its components. The main treatment plant parts, which are large polypropylene panels weighing over 20 kg, are made on an ENGEL duo 35050/1500 WP injection moulding machine and are taken out of the mould by an integrated linear robot. ENGEL was not chosen as the Russian company's machine and robot supplier by chance. “First and foremost we needed a turnkey solution, which is why we turned to the market leader for complete injection moulding system solutions,” explains Jan Batischtschew, division manager at TOPOL-EKO. “ENGEL was also able to provide evidence of previous experience in the development of equipment for similar uses in Europe.”

When ENGEL supplies the injection moulding machine, automation, mould and peripheral unit from a single source, it takes full responsibility for the whole project, including components that have been manufactured in cooperation with partners. The result is a performance- and efficiency-optimised manufacturing cell with guarantees and maintenance services.

ENGEL supplied the injection moulding machine, the robot and the technology from one source. This did not just mean that efficiency potential could be fully exploited, but also that managing of the production process could be simplified.

A linear robot takes the panels out of the mould and deposits them on a conveyor belt. The ENGEL duo is a special solution for TOPOL-EKO and the large machine was equipped with an unusually wide screw.

“The compact design of the ENGEL duo machine was a very important decision factor.”
Jan Batischtschew, TOPOL-EKO

Huge injection volume on a small footprint

“Another important factor which spoke in favour of ENGEL as a supplier for us was the compact design of the ENGEL duo injection moulding machine,” continues Mr Batischtschew. The small hall area that was available for the machine posed a considerable challenge to the project team. The space-saving design of the two-platen ENGEL duo proved to be crucial. Furthermore, a special solution was found: An injection moulding machine with 1500 tonnes of clamping force was given a screw of 230 mm in diameter, which is bigger than normal for this clamping force, and also equipped with the Wide Platen (WP) function. This meant it was possible to achieve an injection volume of more than 43,000 cm³.
In addition, ENGEL optimised the production process together with the customer. ENGEL foammelt, a foam injection moulding process, is used with a chemical agent to reduce the weight of the panels. In chemical foam injection moulding, the agent, which is based on sodium bicarbonate or citric acid, is combined with the polymer granules. This process produces the propellant gas when heat is added during plastification. Chemical agents are used primarily to injection mould thick-walled components made from polypropylene or polyethylene.

ENGEL not only developed the ideal technical solution for TOPOL-EKO's needs, but also ensured it was supplied and set up very quickly and professionally. Jan Batischtschew says, “We're very happy with ENGEL's service. The engineers from OOO ENGEL in Moscow mastered the complicated assembly brilliantly.” Mr Batischtschew mentions this, because the very limited amount of space in the production hall also posed a sizeable challenge regarding the delivery of the ENGEL turnkey solution. The large machine had to be taken apart completely and put together again at TOPOL-EKO's premises.

Proximity to customer decisive

Olaf Kassek, Managing Director at ENGEL's Moscow subsidiary, says: “Maximum customer proximity all over the world is very important to ENGEL, and the subsidiary in Moscow is a good example of the success of this company motto. Our service is described as the most professional and active in the industry in Russia.” The company's customers in Russia, Belarus and Ukraine are currently supported by 17 locally based ENGEL service engineers, and the team is constantly growing. ENGEL also has its own spare parts depot with more than 1,500 replacement part types in Moscow, along with its own service hotline that provides technical support around the clock. Training courses on ENGEL machines are always being offered for ENGEL users at the St. Petersburg State Technological Institute.

ENGEL optimised the production process together with the customer. Thanks to the ENGEL foammelt process, the weight of the panels could be reduced.

Including the seals, the air box base is produced so that it is ready to install in just one step.

Low unit costs
thanks to ENGEL combimelt

Heating technology systems constantly have to comply with stricter regulations. To still keep product costs low, manufacturers are exploiting the potential of innovative materials and processing technologies. Viessmann, for example, asked its long-time supplier of plastic parts, Metak, which is based in Burgwald, Germany, to develop a plastic solution to replace the base plates for its wall gas boilers. These are also known as air box bases and are traditionally made from metal. Thanks to a new product design and ENGEL's combimelt technology, the efficiency of the manufacturing process could also be increased significantly. Furthermore, were the product's characteristics optimised.

"You can no longer rely on producing simple off-tool parts if you want to continue to be successful in Germany. High labour costs and rising energy costs mean intelligent plastic technologies need to be used more and more", says Jonas Åkesson, Metak's managing director. Sophisticated multi-component processes, sandwich technologies and injection moulding assemblies are some of the specialities of the medium-sized company, which is not just an extended workbench for its customers but also a development partner with its own mould-making facilities. Frank Hoffmann, Metak's sales manager, says, "Our customers benefit from our many years in injection moulding in particular when it comes to replacing materials such as metal with plastic. We take the materials' specific properties into consideration and are therefore often able to exploit extra efficiency potential."

"High labour costs and rising energy costs mean intelligent plastic technologies need to be used more and more."

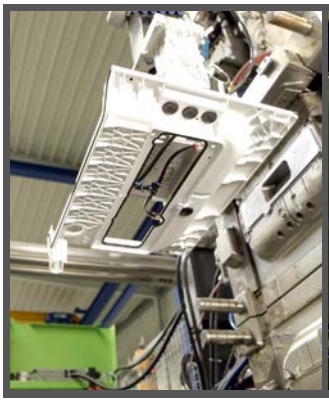
Jonas Åkesson, Managing Director at Metak

Ready-to-install components produced in one step

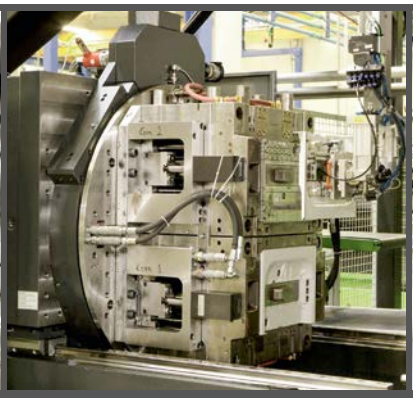
The air box base for Viessmann's wall gas boilers used to consist of two parts. Furthermore, seals used for cable entry points and to attach the base to the wall casing, were produced separately and stuck on later. With metal processing, elastomer injection moulding and assembly all involved, the manufacturing included a number of very different processes. Moreover the need to store and transport the components meant considerable logistics.

Today, the 400 mm by 280 mm base only has one part, is made from talcum-filled polypropylene and, including the TPV seals, is produced so that it is ready to install in just one fully automated step. "We completely redesigned the air box base and were able to integrate many functions by doing so," reveals Benjamin Veenhuizen, the head of development and project manager at Metak. He adds: "We also have the option of calculating the distortion and tension of a newly developed part. This, coupled with the ENGEL system, is the key to the high efficiency of the new multi-component process." Another bonus is that plastic means the part is significantly lighter than its metal predecessor, but has not lost any of its stability.

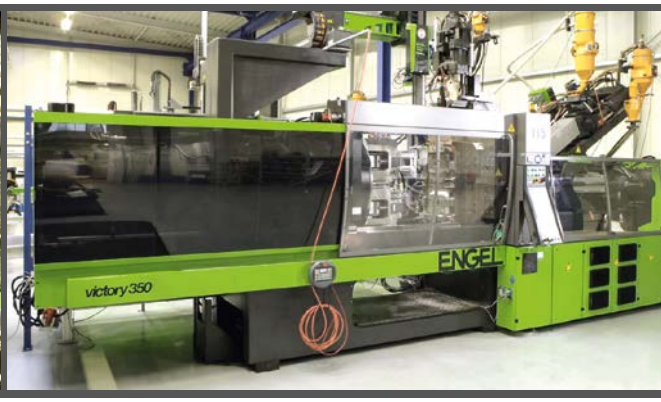
The core of the new manufacturing cell that mass-produces the parts in Burgwald is a 350-tonne ENGEL victory 2050H/650W/200V/350 combi injection moulding machine with a rotary table and an integrated ENGEL



The integrated ENGEL viper robot removes finished parts from the mould.



Thanks to tie-bar-less technology, the large rotating plate mould fits on a relatively small injection moulding machine.



With three injection units, the ENGEL victory 350 injection moulding machine can be utilised flexibly and is able to handle various combimelt applications.

viper 20 linear robot. To enable the system to be utilised flexibly, Metak invested in a three-component machine. While only the horizontal and vertical injection units are required to make the Viessmann air box base, the third unit in the piggyback position is needed for things such as the co-injection technology used to produce sandwich parts.

Tie-bar-less technology for more efficiency

ENGEL delivered two highly automated and energy-optimised turnkey solutions to Burgwald at the beginning of 2013. The second ENGEL victory combi injection moulding machine, a 150-tonne model, is equipped with an ENGEL easix multi-axis robot.

Markus Paulus, Metak's factory manager, says: "We prefer to use tie-bar-less injection moulding machines from the ENGEL victory series. They offer benefits for multi-component injection moulding in particular." Multi-component moulds are normally large and bulky because of the many core pulls and peripheral unit connections, but they can be used in combination with relatively low clamping forces. Mr Paulus adds, "We wouldn't be able to mount the 2,500-kilogram Viessmann mould on a regular tie bar machine with the same clamping force, so the tie-bar-less technology saves us investment and operating costs."

The ENGEL victory machines also have advantages with regard to automation and set-up. "As there are no tie bars to get in the way, the robot arms are able to reach in and remove parts from the mould area directly from the side", says Klaus Kuyken, sales engineer at ENGEL Deutschland: "The ENGEL robots are fully integrated into the control unit of the injection moulding machines and match their movements to the machine. This reduces the overall cycle time for many applications."

"We're often able to exploit extra efficiency potential when replacing materials such as metal with plastic."

Frank Hoffmann, Sales Manager at Metak

Rejects reduced to almost zero

Efficiency is a crucial factor when it comes to staying ahead of competition, but still only one of many requirements. "Base plates are safety-relevant parts," Frank Hoffmann stresses. When a wall gas boiler is being installed in a living area, the design of the base plate has to ensure that the heating system will not suck air out of the room, for example. The high precision and process consistency of ENGEL injection moulding machines comes into play here. According to production manager Michael Feige, "the temperature difference between the stable and the unstable process is only half a degree, but we produce virtually no rejects." A measurement system also built into the mould by Priamus, for 100 % monitoring contributes to this as well. Mr Feige says, "This system allows us to monitor process consistency and the control unit online."

The investment in the two new ENGEL injection moulding turnkey solutions means far more to Metak than just an increase in production volume. "Our goal is to expand further in the area of sophisticated multi-component technology and therefore broden our product range," stresses Mr Åkesson. A large proportion of Metak's products are used in the office furniture industry. The company sells 500,000 function armrests alone under its own label every year, which makes it a leading supplier in this sector. The aim is not to change anything as far as this is concerned, but to start making just as large an impact in other target sectors, such as the heating, solar and electrical industries.

Successful start
with 12 ENGEL victory machines

Many years of industry experience, sound market knowledge and the right partners. These are the ingredients in Luc&Bel's recipe for success, and in just one year, the biomedical sector start-up has made a name for itself. On 12 ENGEL victory machines the company manufactures high-precision components for medical technology purposes in a clean room.

Like the company's other three founders Massimo Magnani, Francesco Greco and Costantino Bianchi Maiocchi, managing director Luca Ferrari is not a new face in the industry, and the location chosen for the new production site in the Northern Italian town of Carpi also promised success from the start. Since being introduced to biomedical technology in the 1960s, the area surrounding Mirandola in the Province of Modena has become an important region on the global scale for suppliers in the industry. The circumstances at the beginning were anything but ideal for the new site, however. Just a few weeks after the building work had started, the region was hit by a powerful earthquake, the consequences of which are still being felt by numerous companies.

Luc&Bel was not too badly affected, but the completion of the building was delayed by four months and extra money had to be invested to safeguard the building more effectively from future earthquakes. Production was finally able to start in January 2013.

Strong suppliers guarantee future security

Luc&Bel is based on two main pillars: high-quality fittings, which the company sells under its own label, and contract orders that cover the development of

Luc&Bel manufactures high-quality components for biomedical uses in this class 8 clean room.

products, their construction and their mass production. The 1,200m² clean room housing 12 ENGEL victory injection moulding machines with clamping forces ranging from 80 to 300 tonnes is the firm's standout feature. "Our planning has been far-sighted from the start," stresses Mr Ferrari. "A clean room validated once would cost a great deal of time and money to expand, which is why it was important to us to offer a wide spectrum right from the beginning. Building a new greenfield factory represented a huge opportunity for us, and we put all our experience together to create the best possible manufacturing conditions. Combining these with the best technologies available has now put us in a position to focus on innovation and quality permanently."
ENGEL is Luc&Bel's sole injection moulding machine supplier. Mr Ferrari says: "When choosing suppliers, we look for quality and efficiency, and most importantly, stability. ENGEL has strong roots in Europe and here in Italy as well, and is able to guarantee us continuity, even when it comes to the after-sales service."

Tie-bar-less technology provides efficiency

Another ENGEL advantage guarantees Luc&Bel production efficiency: it's tie-bar-less technology. Thanks to their tie-bar-less clamping units, changing the mould on the ENGEL victory injection moulding machines is easy and can be done very quickly. In addition, relatively small machines are able to accommodate large moulds. For multi-component processes and the integration of assembly steps in particular, large, bulky moulds are often required, but in combination with relatively low clamping forces. The tie-bar-less technology helps to reduce operating costs and, in effect, unit costs.
"We focus on products with a high added value," stresses Mr Ferrari. Among other things, components for intravenous infusion, dialysis and heart surgery are currently being manufactured for customers. Many products are assembled as soon as the injection moulding process has been completed, so there is an automated assembly cell, the first of its kind, right next to the injection moulding machines in the clean room.
Short distances are the hallmark of Luc&Bel's production concept. Parallel to the injection moulding machines in the clean room are the systems supplying the granules in a corridor separated from the clean room. This is also where the sprue granulators are. In closed systems, high-quality materials are turned into regranulate.
Luc&Bel currently employs 14 people in Carpi, but another ten employees are expected to be added to the team in the medium term, with a view of reaching a turnover of ten million euros. "We have analysed the market very carefully and are sure we will achieve this target," says Mr Ferrari. "We concentrate on highly innovative products and integrated manufacturing processes, which gives our products and, in turn, our customers an edge over competitors."

Luca Ferrari (right) and co-founder Massimo Magnani bring a lot of biotech expertise and many years of experience to the start-up.

The granules come through the wall. Conversely, the sprues are transported out of the clean room through a pass box and processed in closed systems.

The interior of the new Škoda Octavia gleams with piano lacquer and chrome. NIFCO-KTS uses an ENGEL victory machine to produce streamlined trims for air vent panels via two-component injection moulding.

ENGEL solutions support **lean production process at NIFCO-KTS**

NIFCO-KTS Kunststofftechnik Schmidt GmbH & Co. KG is a Solingen-based company specialising in complex kinematic assemblies for vehicle interiors. Demands on functionality and design are rising, from ashtrays and cup holders to storage compartments and air vents. To keep unit costs low in the face of this trend, the plastics processing firm is continually investing in the efficiency of its manufacturing processes. Together with NIFCO, its new owner, KTS is aiming for international expansion.

The inside of the new Škoda Octavia gleams thanks to the combination of piano lacquer and chrome selected by its designers. As a result, the inner edge of the trim separating the central air vents from the lower section of the centre console is a shiny black while the outer edge has a lustrous chrome finish. "The trend is to give even functional modules a higher quality look and feel," explains Thoralf Schmidt, Plant Manager at NIFCO-KTS in Germany. The plastics processing firm delivers air vents as pre-assembled modules at the rate of 4,800 units per day.

The streamlined double-edged contour is produced via two-component injection moulding using an ENGEL victory 160 combi injection moulding machine with rotating plate and integrated ENGEL viper linear robot. The inner rim is produced from black polycarbonate before uncoloured ABS is injected – the basis of metallisation. Generally speaking, achieving a high-gloss finish represents a major challenge for injection moulding. "The biggest challenge, though, is to keep on raising production efficiency, even for visible components where standards are high," emphasises Christian Birka, head of the injection moulding facility. This means that manufacturing cells must combine the highest precision and process stability with minimal cycle times and maximum flexibility.

Tie-bar-less technology cuts unit costs

KTS has relied on injection moulding solutions from ENGEL since 1998. The machine park in Solingen has 60 injection moulding machines, 57 of which are from the ENGEL victory series. "The victory is our preferred

machine type because of its tie-bar-less technology," says Birka. "That enables us to keep our costs low, and to save floor space." A barrier-free clamping unit offers particular advantages in the case of multi-component processes. Moulds are usually relatively large, while projected part surfaces tend to be small and require comparably low clamping force. The fact that mould fixing platens on tie-bar-less ENGEL victory machines can be used up to the edges means that much larger moulds can be utilised than is the case for machines with tie-bars and identical clamping force. "If we didn't have tie-bar-less technology, we'd need a 300-ton machine for the air vent panels," says Birka.

Other advantages of ENGEL victory machines in this application include their high precision and process stability; the two panel materials must be precisely demarcated and the long flow paths call for consistent filling pressure. The ENGEL victory machine is equipped with a servohydraulic ecodrive for a high degree of energy efficiency. "In this way, as our calculations show, we realise energy savings of 49.4 percent compared to a structurally identical ENGEL victory machine with a standard hydraulic system," says Udo Riethmüller, Sales Engineer at ENGEL Deutschland based in Hagen, Germany.

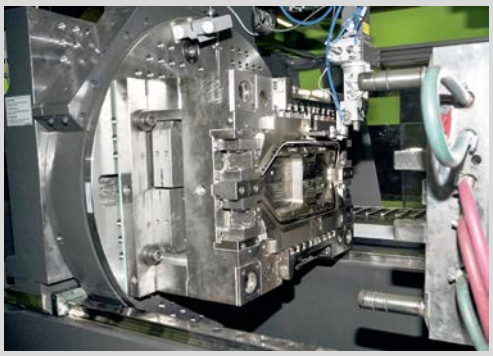
The ENGEL subsidiary in Hagen is only a 30-minute drive from NIFCO-KTS, so service can be provided quickly. "Whenever we call, even on a weekend, we can rely on fast and competent assistance," reveals Christian Birka. As Thoralf Schmidt confirms, "We are the sole supplier for many assemblies, so reliability is critical in making us competitive."

Continued growth with a strategic partner

KTS Kunststofftechnik Schmidt GmbH & Co. KG, which is expanding rapidly, was established by brothers Peter and Thoralf Schmidt from Leipzig. From the outset, the company founders demonstrated a good nose for lucrative niche markets. The company is outgrowing its Solingen site, however, with the construction of two large assembly halls opposite the injection moulding facility. In response to the growing needs of the automobile manufacturers, the company entered into a strategic partnership with NIFCO Inc. of Japan. Working with the Japanese automotive supply group will enable KTS to maintain its course of expansion under the name NIFCO-KTS. NIFCO has several sites in Europe, the capacity of which will now be open to NIFCO-KTS.

NIFCO-KTS managers from Germany have already received training in Japanese working philosophies: kaizen (which promotes continuous improvement) and lean production (eliminating superfluous procedures through intelligent organisation) are on the agenda. KTS is no stranger to such ideas; during sales discussions, NIFCO was particularly impressed with the high efficiency of the injection moulding facility. "In the end, though, kaizen is about getting better all the time," admits Thoralf Schmidt.

ENGEL victory, the preferred machine type of NIFCO-KTS in Solingen.



Thanks to tie-bar-less technology, a 160-ton machine can accommodate the rotating plate mould for air vent panels.

Collaborating on new manufacturing processes for complex assemblies: Christian Birka and Franz Füreder, head of ENGEL's Automotive business unit.

Christian Birka and Thoralf Schmidt of NIFCO-KTS with Udo Riethmüller of ENGEL Deutschland (left to right).

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