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BLUM
NOVOTEST

Blum-Novotest News



Measuring & Testing Technology Made in Germany





Alexander Blum, President

The year of 2015 was a very successful and eventful one. Looking back, we could again realise many exciting projects together with you, our customers, but also establish a place for creativity and knowledge transfer – in the form of our new centre for associates and customers. I am very pleased indeed to introduce some of these subjects to you in the current issue of the Blum-Novotest News.

For some time, people have been talking about integrated and automated production far and wide and this has become more topical than ever before since the introduction of the term Industry 4.0. The goal of the fourth industrial revolution is the creation of “intelligent factories”. The comprehensive data exchange of all units involved in the production process is supposed to be achieved, i.e. also the comprehensive networking of production machines and the pertaining peripherals. This situation presents substantial challenges to all parties involved. After all, nobody wants to miss technological progress and everybody intends to be competitive in the market in the future. For many companies, this poses the question as to what they can contribute to Industry 4.0 or how they can make use of this so-called revolution.

A cornerstone of Industry 4.0 is networking and the creation of closed loop processes in production. In factories, networked, intelligent machines will independently coordinate the production process using bidirectional communication. Already in the actual production process, adaptive manufacturing elements can optimise the product and process quality up to the finished product. In this respect, it is decisive to integrate measuring and test processes in the overall procedure which can introduce compensation values to the process, thereby implementing adaptive manufacturing.

For Blum-Novotest, Industry 4.0 has been part of its life to a certain extent for many years, i.e. we already implemented such processes before this concept had a name. And thanks to the continuous further development of our measuring technology, we can now offer a suitable machine-integrated or post-process solution for almost any measuring or testing task.

Our latest technologies in the area of measuring components, the machine-integrated roughness measurement and the DIGILOG technology, continue driving machine-integrated component monitoring ahead. Analogue scans of the work-

piece surface recognise even the minutest deviation and workpieces can be processed adaptively on the basis of these scans. All of this happens fully automatically thus avoiding any rejects.

The great response of customers encouraged us to drive the development of both technologies even further ahead. The result is a new surface roughness gauge especially for standard geometries and an enhanced software which now also enables the direct display and operation on the control screen of the machine. This technology was particularly well received in highly productive series manufacturing operations. You will find more details on page 15.

We have introduced many different customers to you, from all imaginable sectors of industry, from the smallest operation up to large groups distributed across the entire globe. I am continually surprised and quite rightly also glad to say: They all have something from BLUM. Therefore, I would recommend page 19 to you, a very good example of the versatile use of our measuring technology. You will get an impression of how the Chinese premium furniture manufacturer “Rubens Art Gallery” uses the radio transmission probe TC60 for works of art or the restoration of “Teatro La Fenice”.

Please, have a look at page 13 too, you will find a report on the more than 20-year-old co-operation of our business division NOVOTEST Test Engineering with Daimler AG. The group uses more than 20 test benches, largely for gearboxes but also for drive shafts and hydraulic components. The most recent project, gearbox test benches for the Daimler subsidiary Detroit Diesel Corporation in the US, is not only impressive because of its volume but also because of the comprehensive test methods to which truck gearboxes are subjected.

And finally, the reverse contains a report on our new event format, the BLUM TECH-TALK. The goal of this event is to provide very personal and customised assistance to visitors. Because of the positive feedback of participants, we are very much looking forward to the next TECH-TALK to which we cordially invite you!

Lastly, I wish you a lot of fun with this News, get into them and get to know more about Blum-Novotest and our customers.

Alexander BLUM
President



BLUM-systems that both check workpiece position including dimensions and monitor the tools. These instruments soon facilitated the achievement of the desired quality level while observing the envisaged times.

Today all operations of the company use LaserControl systems of BLUM for contactless measuring and monitoring of the cutting tools. In many machine tools of the Bergamo-based company, Type Z-MT tool setting probes ensure the high level of production quality.

BLUM TC50 touch probes are used for workpiece measurement. The robust measuring systems ensure exact acquisition of the workpiece position. They automatically correct the thermal expansion of the machine, and that at an impressive probing speed of three metres per minute. As all BLUM probes, the systems work with no-wear optoelectronic measuring mechanism that facilitates the precise acquisition of all measured data even under strong coolant influence.

The MicroCompact NT and Mini NT laser measuring instruments allow reliable, contactless tool checking and measurement despite coolant and chips. This is warranted by the combination of patented NT technology, the protection system for the laser optics and the blowing nozzles for tool cleaning. Thanks to a focussed laser beam, the system additionally impresses with its

particularly high measuring accuracy even below nominal speed. And this 24/7.

The compact, hardwired Z-MT probe equipped with the revolutionary **shark360** measuring mechanism is ideally suitable for use in horizontal machining and turning centres. It is used for contact tool measurement, breakage detection, measurement of length and radius as well as axis compensation. Due to its integrated face gear, the **shark360** measuring mechanism guarantees highest precision.

On account of the successful application at Alumat, these measuring systems were also introduced at the Almax company located in the Trentino region, which has been part of the group since 2004. Also the Greek Matrex company of Saloniki, which has been part of the group since 2013, works with BLUM measuring technology today.

Blum-Novotest is the new No. 1

"The Blum-Novotest products have definitely proven themselves in recent years. This is why we decided to gradually replace the systems of other manufactures that are still used in some of our machining centres by BLUM-products. For BLUM measuring technology facilitates precise, reliable and competitive production," adds Astolli. "The customer service provided to us by the Italian branch of the German metrology specialist also played a decisive part. The reaction time of the experts employed there is extremely short and ranges within half a day."

Faster and more precise



Emanuele Astolli,
Manager of Alumat

The production of high-quality aluminium extrusion tools is an art unto itself. Only few companies match the precision and quality with which the Italian Alumat-Almax-Matrex company masters this process. Through the use of laser measurement and touch probes in the company's machining centres, the manufacturing time could be reduced significantly and the accuracy of the products was increased.

Competence, passion and know-how – these attributes account for the international success of the Alumat-Almax-Matrex group. Thanks to continuous investment in research, development and cutting-edge facilities, as well as the selection of the right partners, the enterprise has become a pioneering manufacturer of aluminium extrusion tools in the market.

The Alumat company was founded in Ciserano near Bergamo in 1994 and employs about fifty associates today in the design and manufacture of steel dies for aluminium extrusion. The continuous growth led to an expansion of the business operations already in 1998 resulting in an enhancement of production capacity and a tripling of sales within 4 years.

Time and quality are decisive

"The special thing about our activities is the fact that our tools essentially are individual items created very specifically for our customers. Not only do we supply individual dies,

but also provide the entire planning and validation of the product," says Emanuele Astolli, Manager of Alumat. "Reducing lead times has become a fundamental component of our strategy. It is what differentiates us from our competitors. From planning to completion, a tool will undergo approx. 15 production steps which we currently realise in about six days, while it took us as many as 12-15 days ten years ago."

This improvement required the deliberate use of machining centres and the attempt to optimise all processes. One looked for systems which would avoid any down times and facilitate machine-integrated quality control. In addition, they were to allow direct access during each production phase in order to correct any deviations immediately.

Then, six years ago, Alumat decided to confide in the technology and professionalism of Blum-Novotest. Since then, the machining centres have been equipped with



Roberto Pagani (left), Head of Service of Blum-Novotest Italy in the production of dies at Alumat



At home in the automotive industry

For about three years, the Huron machining centre at the tool shop of Forges de Courcelles has been equipped with BLUM measuring technology. Under the constant pressure of having to optimise its production processes, the department has to reduce its cycle times continuously. Against the background of strong competition and rising demand, especially of crank shafts, the laser measuring systems and TC52 touch probes of BLUM facilitated the reduction of lead times and an increase in precision.



From left to right: Cyrille Martin (engineer in the field of methods and tools), Régis Varney (head of the tool shop), Guillaume Rey (technical merchant at Blum-Novotest), David Grimont (workshop engineer) and Guillaume Thenon (former Head of the Blum-Novotest Sarl in France)

The Nogent area located in Haute-Marne was known for its cutlery-producing industry for a long time. Another industrial sector that also originated in the middle of the 19th century has held its ground in the industrial landscape: the operation of steel mills. Also today, the operation at the Forges de Courcelles site is running at full speed. Being a subsidiary of the SIFCOR group, the company is specialised in hot pressing safety parts.

Market leader in crank shafts

Forges de Courcelles actually benefits from the upturn in the European automotive market, which accounts for 95 % of its turnover. The remaining 5 % concern trucks. "We mainly produce steering boxes, shifting forks, drive shafts, chassis components such as King pins for cars and triangular control arms for trucks," explains Régis Varney, head of the tool shop at the site. "A large part of our production, however, concerns the crank shafts, the demand of which has dramatically risen ever since the introduction of direct injection diesel motors (HDI)." With 470 associates, a turnover of € 116.6 million and an annual tonnage of 53,600 tons, Forges de Courcelles has maintained its position as a European market

leader in the production of crank shafts. Every year, three million of them are being produced. And the company, which works with cutting-edge production machines, also equipped its tool shop with modern machining centres. This enables them to supply up to twenty dies a day for their own use.

Huron machines with Blum-Novotest measuring technology

The tool shop consists largely of horizontal machining centres with pallet-changing devices which allow short production changeover times. The machines also include a station with 3 MAKINO A88 machining centres equipped with 13 pallets.

In addition, the tool shop contains a robot-welding station for certain processes. Endeavouring to expand its equipment and to further modernise its production resources in order to meet the rising demand, Forges de Courcelles opted for a vertical Huron K2X10 machining centre. The special thing about this machine is that it has been equipped with a laser measuring system for tool measurement and a touch probe for workpiece measurement – both of Blum-Novotest. We chose this solution

because – considering the fact that this machine is not palletised – we had to win some time elsewhere. Thanks to Blum-Novotest, we realised the savings in the measuring time."

Time is money

Time is always of great significance and this is where the Blum-Novotest touch probes come in. After placing the workpiece on the magnetic plate, all the user needs to do is start the measuring cycle. The touch probe measures the workpiece or acquires the workpiece zero point in record speed. "The optoelectronic measuring mechanism developed by Blum-Novotest allows a significantly higher probing speed. Up to 2000 mm/min are possible with the TC52, and this with higher accuracy as compared to other touch probes," explains Guillaume Thenon, former head of the French Blum-Novotest branch. "Together with the BLUM FormControl software, users can recognize machining errors directly in the process, which enables them to rework the part in its original clamping."

The BLUM MicroCompact NT laser measuring system is integrated directly in the Huron machine. Thanks to the optical system, tools can be measured under working speed while the

current chucking situation as well as the spindle expansion are taken into consideration. "A finishing tool will reach about 24,000 rpm while a roughing tool is used only at approx. 2,000 rpm. This difference inevitably results in a speed-dependent expansion of the spindle, which, thanks to the laser system, does not pose any problem for the user anymore," explains Thenon.

Various applications are possible: Of course, all functions of an optical system, such as non-contact tool setting in length and radius, shaft breakage and cutting edge monitoring, examination for chucking and concentricity errors as well as wear monitoring are available.

Régis Varney adds: "With the LaserControl systems, we can also check the shape of the cutting edge, for instance. So we can detect even minuscule errors in the cutting edge before we commence machining. We thus increase process safety and eliminate the risk of workpieces being damaged or becoming rejects." The BLUM-systems integrated in the Huron machines entirely convinced the production manager of Forges de Courcelles. This is why he already ordered a second machine with the same equipment without hesitation.



Grinding machines as those of Luren are often operated via software proprietary to the manufacturer. Especially for the scanning measurement, Luren thus also developed its own measuring software and integrated it in its machines. From then on, the machines were not only to perform tactile measurements but also to conduct analogue scans on the workpiece surface.

Through the scanning measurement using the TC76-DIGILOG touch probe, the deviations between the actual workpiece surface and the CAD data are determined almost instantaneously. The measuring speed in this process is more than five times higher than in point-by-point (digital) measurement, and reaches up to 1000 measured values per second. The high number of measured values make it possible, in addition, to filter out outliers by means of statistical analysis, which results in even more precise and reliable measuring results.

The measuring programs comprise several measuring processes used to determine geometric accuracy, e.g. the scanning measurement of profile and flank lines or the tactile measurement of the tooth width. The measured values are acquired by the

software and transferred to the grinding program. This guarantees top process reliability.

The Taiwanese company is entirely convinced of the scanning measurement using the Digilog touch probe. On the one hand, it can massively reduce machining time and improve process safety. On the other hand, the machine-integrated measurement eliminates the need to clamp and unclamp the large components, since machining errors are detected immediately. It is not without a reason that Luren categorises this technology as indispensable for competitive production.

The touch probes of Blum-Novotest have established themselves in these machines in recent years and dozens of them have been installed. This helped Luren to increase brand awareness and to supply competitive machines also internationally. In particular with respect to "Industry 4.0", with great global demand for intelligent automation, the machine-integrated metrology of Blum-Novotest represents a real step forward and supports Luren in its objective of worldwide expansion.

Quality through cooperation

Luren Precision Co., Ltd. is a renowned manufacturer of gear grinding machines and cutting tools. Since 2009, Blum-Novotest and the Taiwanese company have been closely cooperating. The trigger of this was the innovative DIGILOG technology of the German metrology manufacturer.

Luren was founded in Hsinchu City in 1994. In the first few years, the Taiwanese company mainly developed and produced high-precision gear cutting tools such as hobs and shaving cutters. To optimise the company's production process, they started to develop machine tools and the pertaining software. The company's developments was indispensable for the production process of shaving cutters include sharpening devices, gear grinding machines and worm grinding machines.

In those times, people in Taiwan depended on imports when it came to gears. Due to the high costs and the long delivery periods, it was difficult for the Taiwanese industry to be competitive in the international market. This was one of the reasons why Luren started manufacturing its own gears at the time.

Over and over, the people at Luren proved that they perfectly mastered the processes of research and development from the production process through to quality assurance. In addition, the produced machines and tools offer a very good price-performance ratio: Many Taiwanese

gear producers were able to improve their competitiveness significantly because of the innovative machines of Luren. One of the company's objectives is to strengthen the worldwide market position of its machines and tools for gear production.

The contact between Blum-Novotest and Luren was established at an international fair at which the German specialist for measuring technology had introduced – apart from the known range of production metrology for machine tools – also its scanning touch probe, TC76-DIGILOG, for the first time.

Until that time, only digital systems were used for measuring in machine tools, and also the grinding machine manufacturer used such systems to measure its gears. However, the digital measurements, due to the many probing operations, were very time-consuming. So Luren started looking for a way to check the workpieces faster and found the solution at BLUM. With its TC76-DIGILOG, Blum-Novotest was thus the first company to facilitate a scanning, machine-integrated measurement in gear grinding machines.



Inline measurement at production rate

The demands on quality and productivity are constantly rising. Being able to produce competitively while meeting the quality standards requires outstanding expertise. Intelligent solutions that warrant safe processes are much in demand. With its Measuring Machines business division and in cooperation with the young manufacturer of turning machines, Inventhor, Blum-Novotest offers its customers individual manufacturing and measuring solutions.



The CEO of Inventhor Ralf Prahler (l) talking to Blum-Novotest Sales Engineer Holger Schöller



Inventhor is a manufacturer of 4-axis vertical turning machines and a system supplier of serial turned parts in medium-sized to large batches. Due to the lack of available alternatives, Ralf Prahler, owner of WZT Wendland-Zerspanungs-Technik GmbH, had developed and built a special turning machine for the production of his own serial turned parts. One of his customers for serial turned parts liked the machine called "IRIDIUM" so much that he ordered a turning machine like this also for his own production. So the trained turner and master mechanical engineer, Ralf Prahler, founded Inventhor GmbH in 2004 and began to produce turning machines.

Today, the two companies, WZT and Inventhor, are located in the town of Hitzacker and employ about 100 associates and trainees. As many as 74 turning machines are on the market, most of which in the automotive industry. The machines, which are geared to the daily manufacturing routine, combine design and proven technology in an intelligent manner. A reduction of machining time, the increase of primary processing time and the decrease of idle time resulted in a significant improvement of output.

The BMK 5 measuring and automation concept of Blum-Novotest GmbH consists of a modularly extendable measuring cell with integrated workpiece handling. Unlike in-process measurement, the BMK 5 automatic measuring machine allows cycle-time-neutral post-process tests outside

of the machine. The applications of the BMK 5 cover a broad spectrum: From a flexible stand-alone device to an inline measuring and testing cell for fully integrated, highly productive serial production. Employed immediately after the machining centre, the advantages of the closed loop including correction interface with the machining centre become evident. Workpiece handling and automatic calibration of the measuring system are realised by an integrated 6-axis robot. When the corresponding modules are integrated, the BMK 5 can also assume such tasks as sorting, labelling or the transfer to packaging in addition to workpiece testing.

Holger Schöller, sales engineer in the Measuring Machines division of Blum-Novotest explains, "The BMK 5 automatic measuring machine is especially geared to and optimised according to end-customer specifications. Here the workpieces are safety-relevant components for cars for which 100 % testing and documentation of the results is mandatory."

Here is an example of the interaction between turning machine and automatic measurement machine:

The blanks enter the distribution system of the turning machine where each of the two spindles completely processes one workpiece. "While one workpiece is being processed, the next one is already fed to the other spindle," says Ralf Prahler. "The sliding carriage concept



minimises travel and idle times, so ultimately, more parts are manufactured and tested in the same time." In the BMK 5, an articulated arm robot takes over the spindle-turned workpieces and takes them individually to the measuring device. The use of multi-point measurement on the workpiece allows the simultaneous acquisition of variables such as diameter, roundness and length or distance. Schöller adds: "Apart from the consistent separate-spindle handling, the challenge was short cycle time requirements for 100 % testing. Moreover, the testing equipment had to be designed in such a way that it could be set up for workpiece variants of already existing plants as well as future varieties within few minutes." The tolerances according to IT6 and the uninterrupted component contour characterise the task.

After the measurement, the assessed workpieces are sorted. "The two machines communicate continuously via an integrated data interface. Based on the measured workpieces and spindle assignment, only the spindle showing any deviation is corrected. This establishes a reasonable control loop," Schöller adds. Thanks to the combination of turning and measuring, the manual entry of correction values or the time-consuming trips to the measuring room are history. "The high workload of our associates is made easier and safer by the fully automated system," Prahler is pleased to announce.

It takes stable, safe processes and a high output to be able to produce competitively. Floor space is only available to a limited extent and the ways have to be short: Value added per square metre plays a significant part. The highly productive turning-measuring combination created by Inventhor and Blum-Novotest meets the specifications with very low space requirements. "The customer's cycle time was even reduced compared to the solution previously used," says Prahler. "With very little floor space, the BMK 5 meets the automotive industry's requirements of quality assurance systems. The required measuring accuracy is achieved directly in the machining environment."

Good cooperation is important when combining two entirely different systems. Prahler remembers, "So far the procedure has always been very constructive, reasonable and target-oriented. Despite the harsh production conditions and an enormous output volume, the combined systems run very reliably. The customer is always entirely satisfied and has not had any trouble to date." The result of this cooperation is a reduction of cycle times and a resulting increase in output by 20 %.

The joint project presented here is not the only one. The metrology specialist and the manufacturer of turning machines have been cooperating since 2011. "The first cooperation of our two companies occurred on request of a customer since Blum-Novotest had supplied Measuring Machines to a mutual end customer who, of course, wanted well-established, tried and tested equipment. The BMK 5 of Blum-Novotest is very elaborate," explains Prahler. With its integrated measuring routines, the measuring and automation cell designed in high quality and flexibility is able to solve nearly any task. The robot guarantees careful handling of the sensitive workpieces. Even though the two companies were engaged separately, the decision to combine the technologies of Inventhor and Blum-Novotest represents a successful symbiosis for the benefit of the customer. The mutual customer mentioned in this example had four turning-measuring combinations installed already by autumn 2015. And one delivery is yet to be made in the fourth quarter of the year.

"Our joint know-how enables our customer to produce in Germany absolutely competitively," concludes Ralf Prahler. "If one calculates all costs incurred for an individual workpiece, this combined turning and measuring machine ranges below the price per part quoted by contract manufacturers in eastern countries in the majority of cases. The initial investment is quickly amortised and pays off ultimately. In future, I would like to have numerous other orders with BLUM. Possibly even with a BLUM BMK 5 on each of our turning machines."

GERMANY





Gearboxes on the test bench

Vehicle and truck gearboxes fulfil the task of converting revolutions and torque. In order to achieve the optimum relationship between low consumption and high torque, numerous factors must be observed and tested. Worldwide, the test benches of Blum-Novotest facilitate the extensive and reliable quality control of gearboxes before they are even installed.

An example in this respect is the "Global Powertrain Daimler AG" business division. For more than 20 years, the company has trusted the reliable test benches of Blum-Novotest GmbH. By now, Daimler operates more than 20 Blum-Novotest test benches worldwide. They largely concern gearbox test benches, but also drive shaft, pump or hydraulic test benches are used within the group.

Long-term partnership

Blum-Novotest is a well-known supplier in gearbox production testing. Numerous projects have already been realised in the area of truck gearbox assembly at the Gaggenau plant with its site in Rastatt. At present, there are 18 gearbox test benches of Blum-Novotest in operation only at this site. The most recent projects were realised for Daimler sites outside of Germany. Two gearbox test benches for mechanical gearboxes went into operation in India recently and later two series test benches as well

as an audit test bench for truck gearboxes were delivered to the "Detroit Diesel Corporation" (DDC) a wholly owned subsidiary in Redford, USA.

Due to the successful realisation of previous projects, Daimler took Blum-Novotest also into consideration in new test bench projects. A close relationship, between the two companies resulted in considerable profit for both parties as years went by. Blum-Novotest proved its ability of realising projects also on an international scale, for example, with test benches in India. The test benches in the USA were installed and commissioned a few months ago.

Heavy calibres

Today, heavy truck gearboxes are mainly produced at the Mercedes Benz plant in Gaggenau at its Rastatt site. In the future, the gearboxes are supposed to be assembled and

tested for the American market in Redford. The "DDC" subsidiary is presently building a complete truck gearbox assembly line in that location to supply the NAFTA market from there. The demand for Daimler truck gearboxes is continually increasing so that further test benches have already been ordered.

Test bench types for truck gearboxes

Blum-Novotest has supplied two types of test benches to Redford: Series test benches and audit test benches. A series test bench serves the final inspection of the gearbox assembly. This means that the gearboxes are tested for different functions after their assembly. On the series test bench, also called End-of-Line (EoL) test bench, different torque and revolution tests are performed to ensure the high assembly quality of the gearboxes. There are fully automatic test benches but also test benches in which a worker shifts the gears manually.

Audit test benches both verify the quality of series test benches and assume special functions. The gearboxes are put to the acid test at this point to discover any weaknesses.

The test benches differ completely in their external appearance in line with their requirements. For reasons of safety, the audit test bench in Redford is placed in a cabin of external dimensions of 13.5 m x 6 m x 3.5 m and a total weight of 23 t. The series test benches, on the other hand, are equipped with an automatic conveyor system and occupy an area of 140 m². To save space, the switchgear and electrical controls are installed on a second level.

In fully automatic test benches, the only manual activities are performed prior to or after the test when the gearbox is equipped with or detached from cable sets, drive adapter, compressed air and hydraulic connections.

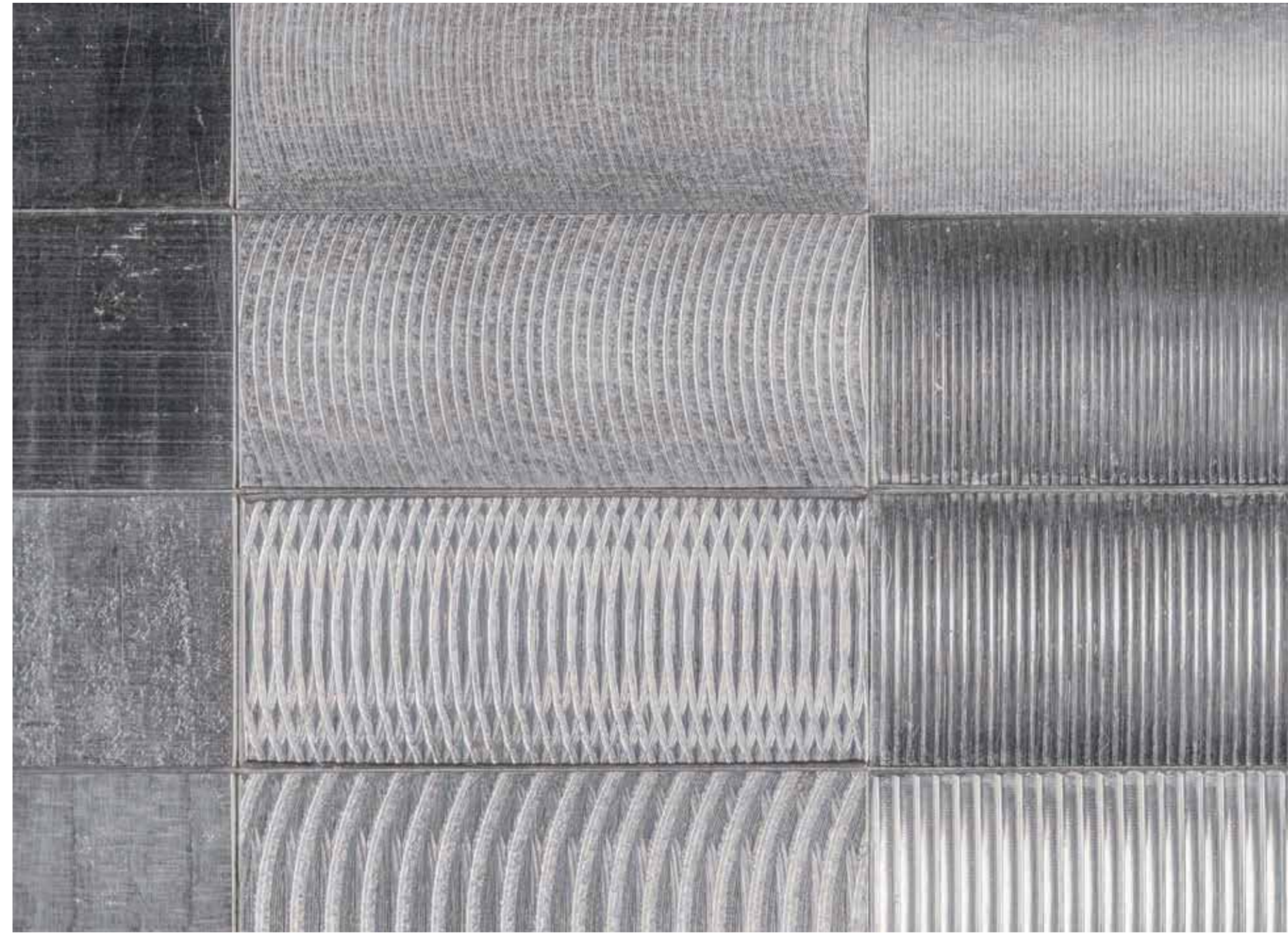
The gearboxes are tested with a test system specifically developed for this purpose by Daimler to ensure the comparability of the individual test benches. After testing, the gearboxes are forwarded to the dispatch area or, in case of an assembly error, to a rework section where they are repaired and retested.

Reliability around the clock

Globally operating companies like Daimler AG make extremely high demands in terms of quality and service on their partners. Blum-Novotest has done justice to them in every respect for years: The company thus offers very fast response times as well as 24/7 service availability worldwide and this irrespective of the time zone of the customer location. In addition, the measuring and testing specialist from Germany offers, if required, commissioning support in form of a services associate trained by Blum-Novotest. Daimler makes use of this support, for example, for its test benches in India and the US in order to keep the gearbox output constantly high and to avoid any downtimes.

Blum-Novotest continuously developing its test benches in a natural manner thus permanently improving efficiency and output. Daimler appreciates this commitment very much and intends to continue the close partnership also in future.

Roughness Measurement, Scanning Measurements and new Software



At EMO 2015 in Milan, Blum-Novotest presented the TC63-RG modular surface roughness gauge along with new software solutions for machine-integrated roughness measurement and scanning, as well as Digilog measurement in machine tools.

"Our latest technologies – roughness measurement and DIGILOG technology – had generated considerable resonance at past trade shows," explained Winfried Weiland, Head of Marketing at Blum-Novotest. "The machine-integrated testing of workpiece surfaces was a particular visitor magnet. This has driven us to pick up the pace of development of both technologies, and as a result we presented the latest addition to the BLUM DIGILOG family at EMO – the TC63-RG surface roughness gauge. The TC63-RG has been specially developed for high-precision roughness measurement on standard plane surfaces, such as connecting rod holes and cylinder bores, sealing surfaces or bearing seats. This currently makes us the only measuring technology manufacturer in the world to offer roughness measurement solutions that are fully suitable for use with machine tools."

In principle, the TC63-RG surface roughness gauge is a combination of an analogue roughness sensor, standard accessories such as extensions and angle attachments, and a base device with integrated BRC radio transmission.

The modular construction enables the user to adapt the system very easily to their measurement requirements, which can be very useful with large workpieces or difficult-to-access surfaces, for instance.

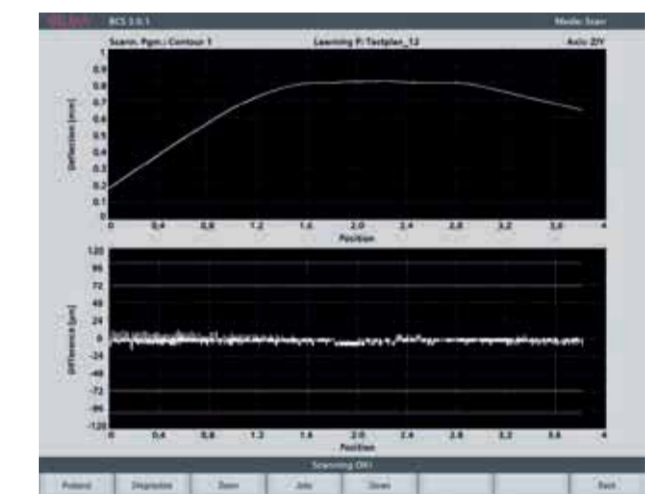
Measured values are generated using a newly-developed measuring sensor, a similar form of which has been in use for decades in BLUM bore gauges. Thanks to the application of a very low measuring force, it is possible to employ a coned roughness measurement element that is similar to standard specifications and has a very small tip radius, enabling very precise measurements to be performed. The measurement resolution of the system is an impressive 70 nanometres, enabling typical surfaces created in milling, turning and grinding processes to be tested down to the last μm in just a few seconds and to be analysed in terms of the roughness parameters Ra, Rq, Rt, Rz and Rmax.

However, not only the hardware is new. Also the software was improved for the areas of roughness measurement and DIGILOG technology. Amongst the innovations are the enhanced analysis and presentation options. The software RG 2.0 now also allows parameters such as waviness, skew or contact area ratio to be presented for the measured surface in addition to the calculated roughness values. The DIGILOG software, on the other hand, now enables customer-specific signal analyses to be performed for route-based measurement, which

allows not only form and surface defects to be logged but also lengths and angles of the measured surface, for example.

BLUM's specialists have also made great progress in integrating the DIGILOG and RG systems into machining centre control systems. In addition to the option of operating the analysis software using the new BLUM touch panel TP48-21, which is ideally suited to retrofits, the machine's control screen can now also provide direct display and operation tools. In this case, the operator simply uses a softkey to switch between the machining program and the BLUM user interfaces enabling them for example to conveniently define warning and tolerance limits or analyse current measurements. The new software versions run on the BLUM IPC48-20 installed in the control cabinet, which are powered by Windows 7 Embedded, and output to the controller via a remote connection. When using a Siemens 840Dsl controller, the powerful CPU can even eliminate the need to use an additional IPC when using DIGILOG applications.

"In recent years, the importance of design and user-friendliness has grown massively in the development of new machine tools. Additional display and control units that impair the visual quality of a machine or complicate its use are simply outmoded. We are therefore pleased to be able to offer integrated solutions for many controllers to meet this expectation," concluded Weiland.



The analysis software for roughness measurement and DIGILOG technology can be displayed and operated via the control screen of the machine tools.

Interview with David Mold, Director of Blum-Novotest Ltd., in Great Britain



David Mold, Head of the
Blum-Novotest Ltd. subsidiary in Great Britain

In each issue of our Blum-Novotest publication, we present an associate of the company to our readers. This issue, we speak with David Mold the Managing Director of Blum-Novotest UK. Of course, he enjoyed talking about his experience since the foundation.

David, Blum-Novotest has been active in the UK since 1999, please tell us a little more about your background and involvement with the company?

"In the 1990's, I was a service engineer with Mikron machine tools and I was obviously aware of the BLUM brand and its range of products. I was approached to help set up the UK subsidiary of BLUM. At the time, BLUM products were commonplace in the UK with machine tool vendors such as DMG, Chiron, Hermle, Heller, Makino, Starag, Agie Charmilles and many others supplying machines to the UK with BLUM measurement solutions. However, BLUM was servicing these products from Germany with neither a UK service and support network nor a subsidiary. Hence the formation of BLUM UK. In the early days, our remit was to provide service and support to existing installations, rather than to sell the BLUM brand to a wider audience."

So, how has your involvement in the aerospace market evolved?
We targeted globally renowned aerospace OEMs knowing that if we installed systems on single production lines or cells, the success resulting from customer benefits would rapidly expand to

other production lines and also other manufacturing sites around the UK. This has proven the case and we now work with most of the world's leading aerospace companies that are based in the UK. For a small team, we generated huge success.

How does BLUM UK support local customers to optimise their production process?

With UK having the world's second largest aerospace sector, we have many customers using our flag ship product; LaserControl NT. We provide service support and applications training for customers purchasing the units with machines from the OEM and we retrofit existing machines with our measuring technology. Furthermore, we have recently installed a machining centre to conduct trials, training and demonstrations to support our customer base.

How will the machining centre benefit BLUM UK?

We took delivery of the Bridgeport machining centre last year and this was then fitted with a complete complement of BLUM measurement technologies. What this gives us, is the facility to invite existing and potential customers to BLUM UK to receive

demonstrations of our latest technology apart from our current product portfolio or even perform tests. Thus, the customer receives a good overview of the performance of our products which you would never get from a brochure in this way.

The second element of installing the Bridgeport is customer training. We have a wonderful new facility and we can now conduct in-house training and refresher courses for customers, without having to do it at the customers' site. By doing this on our own machine, we can offer structured and formal courses that we couldn't previously provide at the customer's site due to the daily business of the same.

Please expand upon the service and support you offer to the customers?

Many customers receive our products already installed on the machine tool and in some cases we are not aware of where our products may be in use. However, end users seek us out and we provide them with application support and training to help them get the most from our products. Customers come to us having issues controlling accuracy or having to regularly re-machine parts and we help them overcome these issues by ensuring the parts come off the machine 'right first time'. Using our measuring technology, we control the variables in the machine of the cutting tool and the workpiece to ensure the machining process is robust and repeatable.

How is the UK industrial landscape performing at the moment and how will BLUM products support manufacturing in the future?

Aerospace has always been strong and will continue to show strong growth in the UK. Here, BLUM products are allowing customers to machine parts more accurately and faster with less operator involvement. The automotive market is also very strong and growing, and here time is always a restraint. BLUM probing is the fastest on the market, but can offer many other benefits to ensure targets can be achieved. More SME's also now want the benefits of in-process measurement and we are ideally placed to offer support to new users to the technology to help them integrate this into their machining capacity.

What do you see as your most significant achievement to date?

I'm particularly proud of the fantastic progress the UK team has made with the UK's major Aerospace sector. From the early days of setting up the UK subsidiary where we were completely unknown to the UK's aerospace 'big boys' we managed to successfully secure our products as standard requirements for their machine tools. Today many of these companies specify BLUM on any new machines they purchase and this is testament to not only the hard work of the UK team but also the R&D department in Germany that keep developing groundbreaking product lines our customers benefit from.





Classic furniture. Modern production.

Rubens Art Gallery is a premium furniture manufacturer that is passionately attracted to works of art in the style of days gone by. Blum-Novotest is known for innovative high-tech products in the field of Measuring and Testing Technology. It is by coincidence that these two companies that seemingly do not have anything in common are now connected in a close partnership.

Renaissance of the classics

The Rubens Art Gallery manufactures furniture in the style of China's Golden Age with the objective of continuing the tradition of antiquarian-style products. At first, the company only restored the sensitive frames of oil paintings of the 19th and 20th century. Later the company established its own production of high-quality picture frames which were gold-plated and adorned with carvings. With the interior decoration of the "La Fenice" opera house in Venice, Rubens Art Gallery made a name for itself worldwide. Through its excellent work, the company earned an outstanding reputation in the industry. The restored decoration was highly praised and, according to some aficionados, was even better than the original. Rubens Art Gallery reproduces high-quality classic works of art. The replication of such exquisite works is everything but easy. Not only does it require vision, passion and diligence, but also precise measurements at the workpieces in order to achieve uniformly good quality.

Accurate positioning: easier said than done

In order to create truly exceptional products, Rubens Art Gallery spared no expenses for staff, raw materials and machines. Even though wood machining requires far less precision than the machining of metal, one acquired a state-of-the-art 5-axis machining centre to be able to realise even the smallest details in a precise manner. In woodworking, the initial workpiece is specially pretreated before it is fine machined. For this, the workpiece has to be unclamped and clamped again, which created a great problem: So far all machining steps at the Rubens Art Gallery, including transport, fixation and positioning were carried out by hand. The positioning occurred manually with mere visual judgement. Obviously, this took an enormously long time. In the end, the correct position of the workpiece could not always be guaranteed, which adversely affected the precision of the final product, of course. The high-quality materials used by the Rubens Art Gallery are very expensive, therefore, faulty workpieces should absolutely be avoided.

The search for a partner

The complex component positioning was ultimately the reason why production was to be changed to modern industrial machining. In a German magazine, they found what they were looking for and got to know Blum-Novotest and its products. So Siegfried Frost of Rubens Art Gallery turned to the Blum-Novotest GmbH site in Shanghai, China.

Ingo Wirth, General Manager of BLUM China, answered the inquiry of Rubens Art Gallery immediately. First he analysed the causes of the problems Rubens Art Gallery had: "The production requirements of Rubens Art Gallery were essentially not particularly complicated. They wanted to optimise their positioning accuracy and material utilisation when using their 5-axis CNC-machining centre," explains Ingo Wirth. An engineer of BLUM remembers, "From a technical point of view, it does not differ greatly from metal machining. After the analysis, it was clear that the problem could be solved by using our tactile workpiece measuring system on their current 5-axis machining centre." After Siegfried Frost had gained a thorough impression of the offer and presentations of BLUM China in Shanghai, he decided to work with them.

The TC60 of BLUM

The machining centre used at Rubens Art Gallery comes from a well-known German producer of wood-processing machines. According to the technical features of this machine the use of the TC60 radio transmission probe seemed appropriate. The multidirectional, superfast and highly precise system that can measure at incredible 3 m/min facilitates the automatic recognition of position and dimensions of the workpiece in the machining centre. On the inside, the multidirectional touch probe features the latest data transmission technology thus allowing reliable workpiece measurement. It is insensitive to cooling lubricants and chipped-off metal or wood, and can thus also be used under difficult conditions. The TC60 is robust, durable and guarantees high measuring accuracy.

After the installation of the touch probe in the machining centre, it was as if a blind person had suddenly regained vision, to put it in exaggerated terms. Nobody had to tediously assess the accuracy with the naked eye anymore. Due to the precise measurements of the TC60 touch probe, the data could immediately be corrected at the machining centre. The following processing steps did not have to be conducted blind. Productivity and accuracy improved. The error rate dropped and the quality of the products rose significantly. In addition, BLUM installed a laser measuring system for tool monitoring. In combination with the touch probes, the company was ultimately able to increase productivity by 30-40 %.

"With the TC60 touch probe, we can measure inside the machining centre without any trouble. The plant can thus quickly react to process requirements and adapt the machining accordingly. After machining, the system measures the components again and compares the reference data," explains a Rubens Art Gallery machine operator. "With the touch probe, we can measure the basic data and can work much more efficiently and accurately. This procedure is very reliable. We can machine orders more easily and can also manufacture products multiple times."

The best — not just one of the best

With the support of Blum-Novotest measuring technology, the problems Rubens Art Gallery had in chipping could be solved. The TC60 touch probe of BLUM can be described as "excellent", however, the "friendliness and immediate processing of the inquiry also left a lasting impression" with the Rubens Art Gallery. "In all, BLUM China is the best supplier we worked with so far. Not just one of the best – the best." Siegfried Frost was lavish in his praise: "There is no doubt that we will continue working with BLUM. Should we purchase a new machining centre, we will definitely choose the products and solutions of BLUM again. And if BLUM launches new products in future, we will be glad to test them."



Mr. Taichirō TAKI,
sales manager of Pascal Corporation

Productive cooperation

The Japanese company Pascal produces pneumatic and hydraulic clamping elements and systems for automation. Apart from many other industrial sectors, the products are employed mainly in the automotive industry. In the production of the high-quality systems, Blum-Novotest measuring devices are used for precise measurements of the most varied components.



Interview with Taichirō TAKI, sales manager of Pascal Corporation:
"A good reputation in Europe is important for us"

How did the high market share of Pascal come about?

Surely a reason for the high market share is that we often performed real pioneering work. We have an in-house production rate of 95 %, which is quite high for a company with a staff of 300 and we are very proud of this. It is not only the cost benefit that matters here, it is primarily also the quality.

How does Pascal benefit from the cooperation with Blum-Novotest?

We have been working with Blum-Novotest for approx. 10 years and have always received fast and competent help for our very distinct inquiries. With the help of your products, the competent support and the know-how of Blum-Novotest, we were able to drastically optimise our production processes.

Could you explain that in more detail?

Some time ago, for instance, you prepared special measuring cycles for our purposes due to which we were able to significantly improve our machining. The motto "focus on productivity" not only matches your products but also our company mindset.

You have two sites in Japan. How do they differ?

At the Oita site, we have five plants and primarily manufacture complex products. At the Yamagata site, mainly smaller parts are produced in high volumes. In order



to meet the rising demand, we are going to build a third plant on an adjacent 10,000 sqm plot. If the plant runs the way we hope it will, our productivity will presumably rise by 10 to 15 per cent.

What is the focus of your global strategic planning in the medium- and long run?

There are strong competitors in the European industry, particularly in Germany. This is why we want to stand our ground there. To do so, we already presented our products especially developed for Europe at the EMO 2015.

Innovation through good cooperation

The cooperation with the Pascal Corporation is also very helpful for Blum-Novotest Japan. Specific tasks help Blum-Novotest to understand customers even better and thus to be able to cater to their needs better. Apart from the innovative hardware, the company is strong in developing software. The elaborate systems, for instance, transmit the values measured by means of the touch probe to the machine control unit. This allows for the CNC program to be adapted automatically. This avoids waste and, due to the fast probing speed, the productivity is increased.

Also with the latest developments, the German metrology manufacturer fills the needs of its customers. Innovations such as the DIGILOG technology allow the performance of scanning operations or roughness measurement of surfaces within the machining centre. In addition, BLUM supports the worldwide trends of Industry 4.0, Smart Factory or Automation/Labour-Saving-Process by its machine-integrated measurement.



New product developments secure growth

Pascal excels with 2000 product developments since its foundation. After the company developed a compressed-air driven hydraulic pump in 1975, also referred to as the "Pascal pump", which is based on Pascal's law, numerous other products for automation were launched. Especially in the automotive industry, many products of the company are employed in production lines with presses, injection moulding plants, die-casting plants or machine tools. Due to the high quality of its products, the Pascal company has a very good reputation. In the field of machine tools, the company primarily advances the automation of workpiece clamping systems in order to improve productivity and machining accuracy. Yet also in other areas, the product portfolio is constantly expanded. Pallet clamping systems, rotary

distributors, coupling systems, tool clamps, N2 gas springs for spindle units to increase machining speed are some of the products continuously improved.

Pioneer in tool-changing equipment

Pascal Corporation was the first company worldwide to develop tool-changing equipment with which the processing times of production lines in the automotive industry were significantly reduced. Its market share in tool-changing devices in body construction is 80 % today. The company's play on words, "Single-DANDORI", describes a decisive advantage: "... the plant can be prepared by a single operator...". The customers of the manufacturer then changed it to "10 minute-DANDORI", because, with this system, an entire tool change is possible within only 10 minutes.



Producing quality around the clock

The Magna Tooling Corporation is a small but fine mould and die shop in the Indian Metropolis of Pune. Since 2010 the company has been developing and manufacturing precision injection moulds for diverse industries such as automotive, medical engineering, the electronics industry, household appliances (white goods) and has stood for top quality ever since. Blum-Novotest spoke with its manager, Mr Sachin Netrabyle about how production measurement helps to become more productive.



Mr Sachin Netrabyle, owner of M/s. Magna Tooling Corporation

Mr Sachin Netrabyle, owner of M/s. Magna Tooling Corporation is a mechanical engineer and specialist in the field of mould and die construction. After years of gathering extensive experience and a profound insight into the producing trade of India, Netrabyle founded the "Magna Tooling Corporation" in 2010. Already at his previous employers', he had mainly worked in the field of developing moulds and dies. Therefore, he decided to focus on this very segment also with his own company.

Quality vs. volume

"When I founded the company, I was well aware of the high requirements of the plastic injection moulding industry both on a national and international level. Due to the sudden worldwide recession, we faced a series of problems in mould and die construction. The industry has its own advantages and disadvantages. In the end, we learned from the worldwide slump that quality is more important than the production of high volumes," explains Netrabyle.

Even now after Magna has won a strong position among small to medium-sized companies, large production volumes are not realised. A maximum of 40-50 precision plastic injection tools, whose component tolerances are below 5 microns, are manufactured every year.

Sought and found

In order to produce with more precision and efficiency, the enterprise embarked on a search for cost-effective high-tech products for automation in production. As a result, today there is a vertical machining centre from Makino equipped with a TC50 touch probe, a Z-Nano tool setting probe as well as FormControl measuring software from Blum-Novotest. Apart from this machine, the company also has a Makino wire-cutting machine as well as several conventional machines.

Sachin Netrabyle explains, "We use the BLUM-System Z-Nano for tool setting, the TC50 touch probe for zero-point acquisition of forms and FormControl for the subsequent testing of the finished workpiece in the machine. Thus we achieve a higher quality level within less time."

The Z-Nano tool setting probe provides several advantages for the company. For instance, we were able to significantly reduce the error rate in tool-length measurement, which resulted in less rework and higher precision. In addition, the system contributes to the avoidance of defects caused by typing errors during the manual input of tool length. Even with small tool diameters of 0.2 mm, tool breakage detection can be realised reliably and very quickly.

Also the touch probe and the measuring software of BLUM brought a significant added value to the company. Netrabyle explains, "Thanks to the TC50, we could shorten the workpiece setting process from 10-15 min. to only few minutes. And by using TC50 together with the FormControl software, we were able to reduce the time for testing the finished mould from 45 to 12-15 min. Due to the measuring equipment, our night shift does not even need machine operators."

Tremendous savings in time and costs

"Meanwhile, we are able to produce moulds with a maximum tolerance of 5 microns. This is made possible by the high repeat accuracy and the option of machine-integrated workpiece measurement of any contour using the measuring systems of BLUM. Thanks to these systems, 95 % of our cycle time in production is accounted for the chipping itself, while the rest consists of manual activities. And these, too, have been reduced due to the extremely precise machining. This way, we can produce a complete mould within 18-25 hours, while it used to take us 50-125 hours for the same job," emphasizes Netrabyle.

Precision increased. Lead times cut by half.

"Now we are in a better position. Thanks to the measuring systems of BLUM we were able to increase our precision and cut the lead times by half. This contributes to the strengthening of customers' trust in us. Before we decided in favour of the BLUM systems, of course, we tested other suppliers in the market. However, according to our experience, the BLUM products were more robust, durable and featured higher precision and repeatability than others did. Now we are proud of our decision."

Netrabyle is so very convinced of the measuring equipment that he allows the sales staff of BLUM to visit his company with potential customers so they can see the reliable function of the measuring equipment for themselves. This symbolises the great trust and the good partnership between the Magna Tooling Corporation and Blum-Novotest.



The Business Divisions



Measuring Components

The division of Measuring Components develops and produces high-quality measuring technology for machine tools. We offer laser measuring systems and probes for tool setting and monitoring, touch probes for workpiece and tool measurement, as well as sophisticated probing software for comprehensive production control during initial setup.



Measuring Machines

The division of Measuring Machines offers state-of-the-art, well-proven solutions for dimensional or geometric measurement and crack testing mainly for rotation symmetrical parts in the automotive industry and its component suppliers. Furthermore, we are a capable partner for your individual measuring and testing demands.



NOVOTEST Test Engineering

NOVOTEST is the Test Engineering division of Blum-Novotest GmbH. The business division specialises in test stands for automotive and hydraulics industries. The scope of supply and services incorporates planning, design and manufacturing of test stands for function, endurance and lifetime testing as well as the integration into the automated systems of our customers.

New Customer Centre

Last year Blum-Novotest opened the new associate and customer centre at the headquarters in Ravensburg. On the ground floor, there are offices, a conference room and the tech centre. The latter is the venue of regular courses and workshops for customers, associates and international colleagues. Moreover, the software necessary for the operation of the measuring systems is developed here and tested on the machining centres of the most varied manufacturers made available at this place. Heating and air conditioning are realised ecologically and in a modern fashion, which includes an air-water heat pump. On the first floor, there is the new staff and customer restaurant. It seats about 150 guests with a lounge, alcoves, counters and tables for larger and smaller groups. This inviting place, however, is more than a mere cafeteria. Associates of different areas use this room for conferences or the development of ideas. For in this inspiring atmosphere, there is plenty of space for creativity.



Personal | Innovative | Solution-oriented



From June 15th to 17th 2015, Blum-Novotest arranged the first BLUM TECH-TALK at the headquarters in Ravensburg. A great number of customers ranging from brand name watch manufacturers to automotive groups, were informed about the latest developments of production metrology.



In the Tech-Centre of Blum-Novotest, the latest measuring and testing solutions could be viewed in the machining centre.

“ I consider BLUM to be a very, very positive example of a modern, innovative company...”

Michael Bisser, Head of Sales, Berthold Hermle AG

Alexander Blum, president of Blum-Novotest GmbH, explains: “Traditionally, BLUM presents the current trends and extraordinary product newcomers at the big industry fairs. In the past, however, we have found that for the presentation and discussion of the future-oriented technologies more time is desired, than these events allow. Therefore, BLUM has decided to adopt a new approach in terms of information transfer and has called into life the BLUM TECH-TALK format. Contrary to the established customer events in the industrial sector, on the TECH-TALK we put special emphasis on personal care of our visitors.”

“ At no other company have we ever experienced such personal care throughout the day...”

Volkmar Buck, Technische Schule Heidenheim

Over 100 of technically interested guests have been counted, among them specialists and managers of smallest enterprises up to DAX-companies. Blum-Novotest offered an extensive programme to the visitors and opened every door. Besides specialist lectures about the latest application area of DIGILOG-Technology and machine-integrated roughness measurement, a tour through the manufacturing and assembly halls as well as live demonstrations on the machining centres were offered in the BLUM Tech-Centre.

Furthermore, a special feature of this event was that the visitors were able to discuss their metrological tasks directly with the experts of the BLUM application technology department. It was also praised that all demonstrations and discussions have been performed in a relaxed and confidential atmosphere in small groups.

“ Very interesting event at which we could discuss specific technical topics without time pressure...”

Martin Striedacher, Production Engineering Department
MTU Friedrichshafen GmbH

The highlights of the demonstrations on the machining centres in the BLUM Tech-Centre have been the machine-integrated roughness measurement as well as the scanned measurements of workpieces via DIGILOG-Technology. But also the live demonstration of the measuring software FormControl, which enables the measurement of freeform surfaces and standard geometries directly in the machining centre, fascinated many viewers.

“ Technically speaking, we gained a lot of insight, particularly about the possibilities of roughness measurement in the machining centre...”

Michel Hennig, Production Manager, Alfred Haasis Formenbau GmbH

Of course, the latest applications of the established LaserControl systems, which are used for tool-setting and monitoring in the machining centre, have been demonstrated just as well as the latest solutions of the divisions Measuring Machines and NOVOTEST Testing Technology. Due to the positive feedback of customers the format TECH-TALK will take place regularly.

